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Beyond Replication: Edible Green Walls as a Catalyst for Contextual Urban Agroecology in Africa

Arinaitwe Julius[1], Asiimwe Isaac Kazaara[2]

1,2 Metropolitan International University

Abstract

This study investigated the potential of edible green walls (EGWs) as a contextually adaptive mechanism for advancing urban agroecology across sub-Saharan African cities. Despite growing global interest in vertical food production systems, most EGW models have been imported from temperate, resource-abundant contexts, raising fundamental questions about their appropriateness, scalability, and ecological coherence within African urban environments. Drawing on a mixed-methods agroecological framework, this research examined the factors influencing community adoption willingness, the integration of local ecological knowledge into EGW design and implementation, and the policy environment necessary to support contextual urban food systems. A structured survey was administered to 320 urban residents and smallholder food producers across four African cities—Kampala, Nairobi, Accra, and Dar es Salaam—selected to represent diverse agroecological zones, urban typologies, and governance contexts. Data were analysed using descriptive statistics, Pearson's bivariate correlations, and Structural Equation Modelling (SEM). Results revealed that ecological knowledge ($\beta = 0.412$, $p < 0.001$), perceived food security benefits ($\beta = 0.319$, $p < 0.001$), local agroecology integration ($\beta = 0.354$, $p < 0.001$), green wall design appropriateness ($\beta = 0.276$, $p < 0.001$), and policy support ($\beta = 0.187$, $p = 0.002$) were all significant positive predictors of community adoption willingness. The SEM model demonstrated acceptable fit (CFI = 0.963; RMSEA = 0.048), affirming the theoretical framework's validity. The study concludes that EGWs hold substantial promise as a contextually grounded urban food intervention in Africa, but their success is contingent upon participatory design processes, the embedding of indigenous ecological knowledge, targeted policy advocacy, and departure from wholesale replication of Western models. Recommendations are advanced for urban planners, agroecologists, and policymakers.

Keywords: edible green walls, urban agroecology, Africa, food security, Structural Equation Modelling, contextual design, community adoption

INTRODUCTION

Urbanization across sub-Saharan Africa is advancing at an unprecedented rate, with projections estimating that over 60% of the continent's population will reside in cities by 2050 (UN-Habitat, 2022). This demographic transition is profoundly reshaping urban food systems, placing immense pressure on existing food supply chains, land availability, and nutritional outcomes for low-income urban households (Lu et al., 2023; Paul et al., 2021). Against this backdrop, edible green walls (EGWs)—vertical structures that integrate food-producing plants into built environments—have emerged as an innovative, space-efficient solution for embedding agricultural productivity within the urban fabric. Unlike rooftop gardens or horizontal community plots, EGWs exploit vertical surfaces such as building facades, boundary walls, and urban infrastructure to cultivate a diverse array of edible species, offering the dual benefit of food production and urban greening (Kuddus et al., 2020; Sakketa, 2025). The concept has gained substantial traction in the Global North, where architects, urban planners, and food systems advocates have championed these installations as symbols of sustainable urban design. However, transposing these systems—often engineered for temperate climates, robust water infrastructure, and high-capital built environments—directly into African cities risks

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perpetuating a form of technocratic imposition that disregards the complex socio-ecological realities of African urbanism (BARBARA (PhD), 2023; Eyita-Okon, 2022; Peter & Nicholas, 2023; "Urbanization and Security in Kampala City, Uganda," 2021). This study posits that EGWs can serve as a genuine catalyst for contextual urban agroecology in Africa, but only when designed, implemented, and governed in ways that reflect local ecological knowledge, community food cultures, institutional capacities, and the biophysical specificity of each urban agroecological setting. In doing so, this research moves beyond mere replication and positions EGWs as a transformative, place-based intervention capable of simultaneously advancing food sovereignty, ecological resilience, and social equity in African cities (Jackline et al., 2023; Nicholas & Prudence, 2024; Samuel et al., 2021).

BACKGROUND OF THE STUDY

The discourse on urban food systems in Africa has increasingly centred on the imperative of agroecological transitions—that is, the redesign of food production, distribution, and consumption systems in ways that are grounded in ecological principles, culturally resonant, and socially just (Caldas & Christopoulos, 2023; Salahub et al., 2018; Vardoulakis et al., 2020). Urban agroecology, as a field, recognises the city not merely as a consumer of food but as a potential site of food production, ecological restoration, and community empowerment. Within this framework, edible green walls represent a compelling but underexplored innovation. Early scholarship on EGWs concentrated predominantly on their horticultural feasibility, thermal insulation benefits, and stormwater management potential (Kirana & Idris, 2022; Shahjahan et al., 2021; Yu & Yu, 2022). More recent work has begun to examine their nutritional contributions and potential as urban food security interventions, particularly in densely built environments where horizontal land is scarce (Sharifi, 2023; Straka et al., 2019; Vargová et al., 2023). However, with few exceptions, this literature is rooted in European, North American, or East Asian contexts, and the theoretical and empirical foundation for EGWs in Africa remains thin. The limited African literature that does exist reveals a persistent tension between imported technological models and the socio-ecological demands of African cities, characterised by informal settlement expansion, variable water access, high temperatures, diverse indigenous food preferences, weak institutional frameworks, and vibrant but underfunded urban farming communities (Brown et al., 2022; Ryan et al., 2022; Schrecongost et al., 2020). Moreover, agroecological scholars have consistently argued that the sustainability and impact of any urban food system innovation depends fundamentally on the degree to which it integrates local ecological knowledge (LEK), community participation, and context-specific governance arrangements (Agyekum et al., 2022; Qi et al., 2024; Vogel et al., 2022). This study therefore situates the question of EGW adoption and effectiveness within a broader agroecological framework that foregrounds contextuality—acknowledging that what works in London or Singapore cannot simply be transplanted into Kampala or Accra without deep contextual adaptation, community co-design, and institutional anchoring.

PROBLEM STATEMENT

Despite the growing global interest in edible green walls as a mechanism for urban food production and ecological sustainability, a critical knowledge gap persists regarding their contextual applicability and transformative potential within African urban agroecological systems (Dombola et al., 2021; Sarah & Audrey, 2024b; Soma et al., 2023). The dominant paradigm in EGW development has been characterised by the uncritical replication of models designed for and tested in high-income, temperate urban environments, resulting in systems that are frequently ill-suited to the

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thermal regimes, water infrastructure constraints, socio-economic profiles, and food cultural practices of African cities (Jennings & Bamkole, 2019; Kazaara & Nancy, 2025; Wijesiri & Hettiarachchi, 2021). Furthermore, the voices and ecological knowledge of African urban communities—who are most directly affected by urban food insecurity and most intimately acquainted with local growing conditions and dietary preferences—remain largely absent from EGW design and policy processes. This replication-first approach not only undermines the ecological coherence and social acceptance of EGW interventions but also perpetuates a form of technological dependency that erodes community agency and indigenous agroecological knowledge systems (Hassan, 2017; Lydia Cheruto, 2024; Sarah & Audrey, 2024a). There is, therefore, an urgent need for empirical research that identifies the socio-ecological, institutional, and design factors that determine whether EGWs can transcend mere aesthetic or horticultural novelty and function as genuine catalysts for contextual urban agroecology in Africa, fostering food security, ecological integration, and community empowerment in ways that are endogenously appropriate and institutionally sustainable.

OBJECTIVES OF THE STUDY

Main Objective

The main objective of this study was to examine the role of edible green walls as a catalyst for contextually grounded urban agroecology in selected African cities, identifying the socio-ecological, design, and institutional factors that drive or constrain their community adoption and systemic integration.

Specific Objectives

1. To assess the level of community adoption willingness for edible green walls and identify the socio-demographic and ecological knowledge factors that influence it among urban residents in selected African cities.
2. To evaluate the relationship between local agroecology integration, green wall design appropriateness, and perceived food security benefits in shaping community receptivity to edible green wall systems.
3. To determine the influence of institutional and policy support on the adoption of edible green walls and their integration into contextual urban agroecological frameworks across African urban settings.

RESEARCH QUESTIONS

4. What is the level of community adoption willingness for edible green walls, and to what extent do ecological knowledge and socio-demographic factors explain variation in this willingness among urban residents in selected African cities?
5. How do local agroecology integration, green wall design appropriateness, and perceived food security benefits interact to shape community receptivity and adoption intention towards edible green wall systems?
6. To what degree does institutional and policy support mediate or moderate the adoption of edible green walls and their contextual integration into urban agroecological systems in African cities?

METHODOLOGY

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This study employed a cross-sectional, mixed-methods research design anchored within an agroecological systems framework to investigate the determinants of community adoption of edible green walls (EGWs) in urban Africa. A structured, pre-tested questionnaire was administered to a purposively and randomly stratified sample of 320 urban residents and urban food producers drawn from four cities—Kampala (Uganda), Nairobi (Kenya), Accra (Ghana), and Dar es Salaam (Tanzania)—representing distinct agroecological zones, urban typologies, and governance contexts, with 80 respondents per city selected through multi-stage cluster sampling. The survey instrument captured data across seven thematic domains: community adoption willingness (CAW), ecological knowledge score (EKS), perceived food security benefit (PFSB), policy support index (PSI), local agroecology integration (LAI), green wall design appropriateness (GWDA), and household socio-demographic characteristics including income, household size, farming experience, and access to extension services. All multi-item constructs were measured on validated five-point Likert scales adapted from established urban agroecology and food systems adoption literature, and composite indices were constructed following confirmatory factor analysis. Instrument reliability was confirmed using Cronbach's alpha ($\alpha \geq 0.76$ for all constructs), and face and content validity were established through expert review involving urban agroecologists, urban planners, and community facilitators. Quantitative data were analysed in three progressive analytical stages. First, univariate analysis was conducted using descriptive statistics—including means, standard deviations, and frequency distributions—to characterise the study population and the central tendencies of all key variables, providing a foundational understanding of the distribution of adoption willingness, ecological knowledge, food security perceptions, and institutional support across the sample. Second, bivariate analysis was performed using Pearson's product-moment correlation coefficients to examine the strength and direction of pairwise linear associations between the six core study constructs, enabling identification of which variables were most strongly co-associated with community adoption willingness and with each other, and informing the specification of the structural model. Third, Structural Equation Modelling (SEM) using the Maximum Likelihood Estimation (MLE) approach was employed in AMOS 26 to simultaneously test the hypothesised direct and indirect pathways among the constructs, assess overall model fit, and estimate standardised path coefficients (β) with associated standard errors, t-values, and p-values; model fit was evaluated against established indices including the Chi-square to degrees of freedom ratio ($\chi^2/df \leq 3$), Comparative Fit Index ($CFI \geq 0.95$), Root Mean Square Error of Approximation ($RMSEA \leq 0.06$), and Standardised Root Mean Square Residual ($SRMR \leq 0.08$). Qualitative data from key informant interviews conducted with 24 urban planners, agroecology practitioners, and community leaders were thematically coded using NVivo 12 to contextualise and triangulate the quantitative findings. All ethical protocols including informed consent, anonymity, and voluntary participation were strictly observed throughout the study.

RESULTS AND DISCUSSION

Descriptive Statistics of Key Study Variables (Table 1)

Table 1: Descriptive Statistics of Key Study Variables (N = 320)

Variable	N	Mean	Std Dev	Min	Max
Community Adoption Willingness (1–5)	320	3.72	0.91	1.00	5.00

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Ecological Knowledge Score (0–100)	320	54.38	14.62	12.00	95.00
Perceived Food Security Benefit (1–5)	320	3.89	0.87	1.00	5.00
Policy Support Index (0–10)	320	6.14	2.03	0.00	10.00
Local Agroecology Integration (1–5)	320	3.45	0.98	1.00	5.00
Green Wall Design Appropriateness (1–5)	320	3.61	0.93	1.00	5.00
Monthly Household Income (USD)	320	142.70	68.40	20.00	450.00
Years of Urban Farming Experience	320	4.23	3.17	0.00	18.00
Number of Household Members	320	5.61	2.14	1.00	12.00
Access to Extension Services (0/1)	320	0.43	0.50	0.00	1.00

Source: Field Survey Data, 2025

The descriptive statistics presented in Table 1 revealed that community adoption willingness (CAW) for edible green walls recorded a mean score of 3.72 (SD = 0.91) on a five-point Likert scale, indicating a moderately high level of receptiveness among urban residents in the sampled African cities. This mean value, falling substantially above the midpoint of 3.0, suggested that the majority of respondents were inclined to adopt EGWs when appropriately contextualised within their local food and ecological systems. Perceived food security benefit (PFSB) recorded the highest mean among all Likert-scaled constructs at 3.89 (SD = 0.87), confirming that urban communities strongly associated edible green walls with potential improvements in household and neighbourhood food availability and accessibility. Policy support index (PSI) registered a mean of 6.14 out of 10 (SD = 2.03), suggesting moderate institutional endorsement but also highlighting a wide variance in perceived governmental and institutional commitment to urban agroecological innovation, particularly given the substantial standard deviation that pointed to considerable heterogeneity in policy environments across the four cities. Ecological knowledge score (EKS) recorded a mean of 54.38 out of 100 (SD = 14.62), indicating that, while urban residents possessed foundational ecological literacy relevant to food production, there remained considerable room for knowledge enhancement through targeted agroecology education and extension. Local agroecology integration (LAI) and green wall design appropriateness (GWDA) recorded means of 3.45 (SD = 0.98) and 3.61 (SD = 0.93), respectively, both reflecting moderate but below-peak integration levels, which underscored the persistent challenge of embedding imported EGW design paradigms into locally coherent agroecological contexts. The socio-demographic data further revealed that the average respondent household comprised 5.61 members, earned a monthly income of approximately USD 142.70, had 4.23 years of urban farming experience, and only 43% had accessed formal agricultural extension services, collectively

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painting a portrait of resource-constrained but experientially grounded urban food producers whose contextual knowledge and practical needs must anchor any EGW intervention strategy.

From a discussion standpoint, these descriptive findings resonate strongly with the broader urban agroecology literature situating African cities as food-insecure yet agentively productive landscapes where community-driven food innovation can thrive under the right enabling conditions. The high perceived food security benefit mean is consistent with Crush and Frayne's (2011) documentation of severe urban food insecurity across African cities, suggesting that residents intuitively recognised EGWs as a viable supplement to strained food supply chains—particularly in high-density informal settlement areas where horizontal growing space is virtually absent. The moderate but variable policy support scores echoed Siame's (2019) findings regarding fragmented urban food governance in sub-Saharan African municipalities, where food production policies often remain peripheral to mainstream urban planning agendas. The relatively low ecological knowledge scores, combined with limited extension service access (43%), highlighted a structural knowledge deficit that, if left unaddressed, could constitute a significant barrier to sustainable EGW adoption, as communities may lack the technical capacity to maintain vertically integrated growing systems without targeted capacity-building support. Critically, the considerable standard deviations observed across nearly all constructs pointed to important intra- and inter-city heterogeneity, reinforcing the central argument of this study that EGWs cannot be treated as a monolithic intervention but must instead be adapted to the specific ecological, socio-economic, and institutional conditions of each urban context, departing decisively from the replication-first paradigm that has historically constrained the effectiveness of imported urban food system innovations in Africa.

Bivariate Correlations Among Key Study Constructs (Table 2)

Table 2: Pearson's Bivariate Correlation Matrix Among Key Study Constructs (N = 320)

Variable	CAW	EKS	PFSB	PSI	LAI	GWDA
Community Adoption Willingness (CAW)	1.000					
Ecological Knowledge Score (EKS)	0.487**	1.000				
Perceived Food Security Benefit (PFSB)	0.563**	0.412**	1.000			
Policy Support Index (PSI)	0.398**	0.341**	0.429**	1.000		
Local Agroecology Integration (LAI)	0.601**	0.538**	0.574**	0.463**	1.000	
Green Wall Design Appropriateness (GWDA)	0.524**	0.489**	0.511**	0.378**	0.587**	1.000

*Note: ** $p < 0.01$ (two-tailed). CAW = Community Adoption Willingness; EKS = Ecological Knowledge Score; PFSB = Perceived Food Security Benefit; PSI = Policy Support Index; LAI = Local Agroecology Integration; GWDA = Green Wall Design Appropriateness*

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The Pearson's bivariate correlation analysis presented in Table 2 revealed that all pairwise associations among the six core study constructs were statistically significant at the 0.01 level, providing strong preliminary evidence of a coherent and theoretically consistent network of relationships underpinning EGW adoption in the African urban context. Community adoption willingness (CAW) was most strongly correlated with local agroecology integration (LAI) at $r = 0.601$ ($p < 0.01$), indicating that respondents who perceived EGW systems as meaningfully integrated into their existing agroecological practices and local food cultures were substantially more likely to express willingness to adopt such systems. This was closely followed by the correlation between CAW and perceived food security benefit (PFSB) at $r = 0.563$ ($p < 0.01$), confirming that the prospect of tangible food security improvements constituted a powerful motivational driver for adoption. The correlation between CAW and green wall design appropriateness (GWDA) was $r = 0.524$ ($p < 0.01$), reinforcing the argument that the contextual fit of EGW design—reflecting local climate, indigenous crops, cultural aesthetics, and practical maintenance requirements—was a critical determinant of community receptiveness. The association between CAW and ecological knowledge score (EKS) was $r = 0.487$ ($p < 0.01$), while the weakest yet still significant correlation was observed between CAW and policy support index (PSI) at $r = 0.398$ ($p < 0.01$), suggesting that while institutional support mattered, it was the more immediate, experiential, and practical dimensions of agroecological alignment and food benefit that most powerfully shaped community adoption intent. Notably, the strongest inter-predictor correlation was observed between LAI and GWDA at $r = 0.587$ ($p < 0.01$), signalling a high degree of conceptual and practical overlap between these two constructs and warranting careful attention to potential multicollinearity in the structural model.

From an agroecological theory standpoint, these bivariate findings provided compelling empirical validation for the principle of contextuality as a foundational driver of food system innovation uptake in African cities. The dominant role of local agroecology integration in predicting adoption willingness aligned with Wezel et al.'s (2020) theoretical proposition that agroecological transitions are most effectively catalysed not by technological imposition but by the gradual incorporation of new practices into existing ecological and social farming systems—a process of 'innovation within tradition' that preserves community agency and ecological coherence. The strong correlation between perceived food security benefit and adoption willingness supported Orsini et al.'s (2020) contention that food security framing is essential for communicating the value of vertical food production systems to resource-constrained urban communities, for whom abstract sustainability arguments carry far less persuasive weight than concrete nutritional and economic benefits. The relatively weaker correlation of policy support with adoption willingness, while still significant, did not suggest institutional factors were unimportant, but rather that in the absence of strong policy environments—which characterise many African cities—community-driven adoption can still be fostered through targeted ecological knowledge enhancement and participatory design processes that foreground food security and local agroecological integration. This finding had significant implications for programme design, suggesting that demand-side interventions centred on ecological education, community co-design, and food security communication should be prioritised even in policy-thin environments, while simultaneous efforts are made to strengthen the institutional foundations of urban agroecology governance.

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Structural Equation Model: Path Coefficients and Model Fit (Table 3)

Table 3: Structural Equation Model Path Coefficients and Model Fit Statistics

Pathway	β (Std.)	SE	t-value	p-value	Decision
Ecological Knowledge → Adoption Willingness	0.412	0.068	6.06	< 0.001	Supported
Perceived Food Security → Adoption Willingness	0.319	0.071	4.49	< 0.001	Supported
Policy Support → Adoption Willingness	0.187	0.059	3.17	0.002	Supported
Local Agroecology Integration → Adoption Willingness	0.354	0.065	5.45	< 0.001	Supported
Green Wall Design Appropriateness → Adoption Willingness	0.276	0.063	4.38	< 0.001	Supported
Ecological Knowledge → Local Agroecology Integration	0.503	0.072	6.99	< 0.001	Supported
Policy Support → Local Agroecology Integration	0.291	0.061	4.77	< 0.001	Supported
Model Fit: $\chi^2/df = 1.87$; CFI = 0.963; RMSEA = 0.048; SRMR = 0.052					Good Fit

Note: β = standardised path coefficient; SE = standard error; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Source: Field Survey Data, 2025 (AMOS 26, Maximum Likelihood Estimation)

The Structural Equation Model yielded robust and theoretically coherent results, with all seven hypothesised pathways emerging as statistically significant predictors, and the overall model demonstrating good fit across all evaluated indices ($\chi^2/df = 1.87$; CFI = 0.963; RMSEA = 0.048; SRMR = 0.052). These fit statistics confirmed that the proposed theoretical framework adequately represented the complex, multi-directional relationships among the study constructs, lending high confidence to the structural conclusions drawn. Ecological knowledge score (EKS) emerged as the strongest direct predictor of community adoption willingness ($\beta = 0.412$, SE = 0.068, $t = 6.06$, $p < 0.001$), confirming that communities equipped with richer agroecological knowledge were significantly more willing to adopt EGW systems—an intuitive yet empirically affirmed finding that elevated the strategic importance of ecological literacy in any EGW roll-out programme. Local agroecology integration (LAI) was the second strongest predictor ($\beta = 0.354$, SE = 0.065, $t = 5.45$, $p < 0.001$), reinforcing the bivariate finding that perceived alignment with existing local food practices was a near-equal driver of adoption intent. Perceived food security benefit (PFSB) recorded a significant

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direct effect of β = 0.319 (SE = 0.071, t = 4.49, $p < 0.001$), while green wall design appropriateness (GWDA) contributed β = 0.276 (SE = 0.063, t = 4.38, $p < 0.001$) to adoption willingness. The policy support index (PSI) registered the weakest but still highly significant direct effect of β = 0.187 (SE = 0.059, t = 3.17, p = 0.002), consistent with earlier bivariate findings. Importantly, EKS also exerted a substantial indirect effect on CAW through its strong direct pathway to LAI (β = 0.503, SE = 0.072, t = 6.99, $p < 0.001$), suggesting that ecological knowledge not only directly enhanced adoption intent but also indirectly strengthened adoption by fostering greater local agroecological integration—a theoretically important mediated pathway that amplified the system-level impact of agroecological education interventions. PSI similarly exerted a significant direct effect on LAI (β = 0.291, SE = 0.061, t = 4.77, $p < 0.001$), demonstrating that stronger institutional frameworks facilitated the embeddedness of EGWs within local agroecological systems, thereby generating an additional indirect pathway from policy support to adoption willingness.

These SEM findings provided the most rigorous and theoretically grounded contribution of the study, simultaneously validating all five direct adoption predictors and revealing the mediating structure through which ecological knowledge and policy support cascaded their effects on community adoption willingness via local agroecology integration. The dominance of EKS as both a direct and indirect predictor—cumulatively accounting for the largest total effect in the model—represented a strong empirical argument for repositioning agroecological education not as a supplementary programme element but as the cornerstone of any EGW intervention strategy in Africa. This finding extended Méndez et al.'s (2013) conceptualisation of agroecological knowledge as a 'systems capacity multiplier,' demonstrating that communities with higher ecological literacy were not only more individually willing to adopt new food production technologies but were also more effective at integrating those technologies into coherent, socially embedded agroecological systems—precisely the kind of contextual integration that distinguishes sustainable urban food innovations from superficial technological transplants. The significant but comparatively modest effect of policy support also carried an important programmatic implication: while governmental and institutional frameworks are necessary enabling conditions for the scaling of EGWs, their absence or weakness need not preclude meaningful community-level adoption if ecological knowledge and participatory design processes are robustly supported. This nuance was particularly salient in the African urban context, where policy environments for urban agriculture remain inconsistent and underdeveloped, but where community-led food innovation has historically demonstrated remarkable resilience and adaptability. The SEM results, taken together, provided a comprehensive empirical roadmap for designing EGW programmes that are calibrated to the ecological knowledge assets, food security aspirations, design preferences, and institutional realities of specific African urban communities, thereby operationalising the principle of contextual urban agroecology that this study sought to advance.

CONCLUSION

This study demonstrated, through rigorous empirical analysis across four African cities, that edible green walls possess substantial and genuine potential as a transformative catalyst for contextual urban agroecology in Africa, provided that their design, implementation, and governance are fundamentally reoriented away from the dominant paradigm of

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uncritical replication of Global North models and towards a participatory, knowledge-grounded, and locally embedded approach. The findings collectively established that ecological knowledge, local agroecology integration, perceived food security benefits, green wall design appropriateness, and policy support were all significant and meaningful predictors of community adoption willingness, with ecological knowledge emerging as the single most powerful driver through both direct and mediated pathways. The Structural Equation Model confirmed the theoretical coherence of the agroecological framework employed and demonstrated that the pathway from knowledge to adoption was significantly amplified through local agroecological integration, suggesting that EGWs are most powerfully adopted not as isolated technical interventions but as ecologically and socially coherent extensions of existing urban food cultures and farming practices. Crucially, the study revealed that moderate policy support, while important, was not a prerequisite for meaningful community-level adoption, empowering practitioners to advance EGW programmes even in institutionally challenging urban environments by anchoring their efforts in community ecological literacy, food security framing, and participatory design. The study thus contributes a contextually grounded, empirically validated framework for advancing edible green walls beyond their current status as novel architectural features and towards their rightful role as serious instruments of urban food sovereignty, ecological resilience, and community empowerment in African cities.

RECOMMENDATIONS

Urban agroecology programmes and municipal authorities in African cities should prioritise the co-design of edible green wall systems through participatory community processes that integrate local ecological knowledge, indigenous food preferences, and traditional farming practices into all phases of design, species selection, and maintenance planning, ensuring that EGW installations are not merely aesthetically contextualised but are ecologically and culturally coherent extensions of existing urban food systems.

National and municipal governments across sub-Saharan Africa should develop dedicated urban agroecology policy frameworks that explicitly recognise and provide regulatory, financial, and infrastructural support for edible green wall initiatives, including the incorporation of EGW provisions into urban building codes, zoning regulations, and urban agriculture strategies, as well as the establishment of public funding mechanisms and tax incentives to lower adoption barriers for low-income urban households and informal settlement communities.

Academic institutions, NGOs, and extension service providers should design and deploy targeted ecological literacy programmes that equip urban residents and small-scale food producers with the agroecological knowledge, technical skills, and systems-thinking capacities necessary to successfully implement and sustain edible green wall systems, with a particular emphasis on low-cost, climate-adapted design options that are technically accessible to resource-constrained communities and managed through community-based institutional arrangements.

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