The Role of Urban Farming in Enhancing Food Security and Sustainability in Lagos Metropolis: A Stakeholder Analysis

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DOI: https://doi.org/10.51584/IJRIAS.2025.101100130

Received: 08 December 2025; Accepted: 15 December 2025; Published: 25 December 2025

ABSTRACT

This study explores the role of urban farming in enhancing food security and sustainability in the Lagos Metropolis through a stakeholder analysis. As urbanization rapidly accelerates, the implications for food security and environmental sustainability become increasingly significant. This research employs focus group discussions and quantitative surveys with various stakeholders, including policymakers, urban farmers, and community members, to gather insights into their perceptions and experiences. The findings underscore urban farming's potential to reduce food transportation distances, enhance local food production, and mitigate climate change impacts. However, challenges such as land demands and gender disparities persist, necessitating integrated policy approaches and targeted educational programs. Ultimately, this study emphasizes urban farming as a viable solution for achieving food security and fostering sustainable development in Lagos.

INTRODUCTION

Urbanization is an unstoppable global phenomenon that is reshaping the world at an astonishing pace. According to the United Nations, more than half of the world's population currently resides in urban areas, and this number is projected to rise to 68 percent by 2050. Projections also show that urbanization, combined with the overall growth of the world's population, could add another 2.5 billion people to urban areas by 2050, with close to 90 percent of this increase taking place in Asia and Africa (United Nations, 2018). As the world continues to urbanize, there is an urgent need to address the challenges and implications of this growth, especially in low- and lower-middle-income countries, where the pace of urbanization is projected to be the fastest.

Similarly, climate change profoundly impacts food security, directly affecting agricultural production, availability, and access to food. These effects are expected to intensify over time and vary across countries and regions with far-reaching consequences for urban livelihoods and food security (Food and Agriculture Organization, 2016). Thus, countries must implement adaptation strategies and invest in resilient agricultural practices to mitigate the adverse effects of climate change on food production systems. Rapid urbanization is another critical factor that can exacerbate the challenges of food security and livelihoods. Because of increasing urbanization, food insecurity is continuously rising and approximately 9.2 percent of the world's population faced hunger in 2022, compared with 7.9 percent in 2019 (World Bank, 2023). This trend is concerning as it highlights the growing disparity between the availability of nutritious food and the increasing population in urban areas. The lack of access to fresh and affordable produce not only impacts the physical health of individuals but also contributes to various social and economic challenges within these communities. Ultimately, food security beckons us to strive for a more compassionate, equitable world where the basic sustenance required for a life of dignity is not a privilege but a universal entitlement.

To address the challenges of urbanization and climate change, urban farming appears to be a promising solution. By bringing agriculture into the heart of cities, urban farming not only reduces the carbon footprint

associated with transporting food from rural areas but also promotes community engagement and education about healthy eating habits. In a publication by the World Bank and FAO, urban farming is said to account for 15 percent of the total agricultural land in the world (Tefft, 2018). According to FAO, it has the potential to supply up to 15–25 percent of the world's food, reducing dependence on distant rural areas and enhancing local food security (FAO, 2017). As cities continue to grow and face increasing pressure on food production, urban farming presents a viable and efficient way to meet the nutritional needs of urban populations while creating a more resilient and self-sufficient food system. Urban farming has become an increasingly popular and important phenomenon worldwide as cities continue to grow and the demand for food increases. Its potential for addressing food security challenges, environmental sustainability, and community development has also made it an attractive solution for many countries (Bryant *et al*. 2016).

Amidst rapid urbanization in African cities, urban farming emerges as a critical strategy to sustain livelihoods and ensure food security. In Nairobi, Kenya, urban agriculture addresses climate change impacts and the need for sustainable food sources amidst a growing population and limited agricultural land, offering a sustainable food supply and income generation opportunities. Legislation like the Nairobi City County Urban Agriculture Promotion and Regulation Act guides and supports urban farming initiatives, promoting environmentally friendly farming methods and the efficient use of urban space for agricultural purposes.

Sustainability is the ability to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (United Nations, 1987). In the context of urban farming as a climate-resilient strategy, sustainability refers to the capacity of these farming practices to provide long-term environmental, social, and economic benefits. This includes minimizing resource depletion, reducing greenhouse gas emissions, promoting biodiversity, and enhancing food security in urban areas. This definition is vague and broad nature, which makes it challenging to operationalize and measure sustainability. However, it emphasizes intergenerational equity and a long-term perspective, aligning with the study's focus on evaluating urban farming as a strategy for long-term food security and sustainability. This makes it suitable for the study because of the intergenerational perspective and the need to meet present needs without compromising future generations.

The integration of farming into cities' socio-economic and environmental planning is imperative as the urban components of food crises and climate change become more evident (Prain and Lee-Smith, 2010). The Lagos State Government aims to enhance food security and minimize dependence on imported food by implementing urban farming practices (Osayomi and Lawanson, 2022). Therefore, it is imperative to assess the viability of urban farming as a climate-resilient approach to enhance food security and promote sustainability inside the Lagos metropolis in West Africa.

MATERIALS AND METHODS

Study Area

In general, Lagos is one of Africa's most populous metropolises situated on the short coastal flood plain of the Bight of Benin between longitudes 2° 42′ E and 3° 22′ E and latitudes 6° 22′ N and 6° 42′ N. The region is bounded on the east and north by Nigeria's Ogun State, on the south by the Atlantic Ocean, and on the west, by the Republic of Benin Lagos has a 180-kilometer-long coastline and a land area of approximately 1,171 squares kilometres (452 square miles). In particular, the geographical description of the Local Government Areas of the study is as follows:

Ifako-Ijaiye is at latitude 6° 52’ 0” N and longitude 2° 53’ 60” E. It covers 43 square kilometres within Lagos State’s 3,577 square kilometres of land. It has a tropical savanna climate with high temperatures ranging from 25 to 32 degrees Celsius. The hottest months are between December and March, while cooler months occur between June and August. Ifako-Ijaiye has distinct wet and dry seasons, with the rainy season starting in March or April and ending in October. Heavy rainfall is common, with an average annual rainfall of 1,500 to 2,000 millimetres. Humidity levels are high, especially during the rainy season. Alimosho is at 6° 36' 39" North, 3° 17' 46" East. Lagos State, Nigeria. It is one of the largest LGAs in the state covering approximately 1,288 square kilometres. Alimosho's climate is a tropical savanna, with high temperatures ranging from 25 to

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue XI November 2025

32 degrees Celsius. The hottest months are between December and March, while cooler months occur between June and August. The region has distinct wet and dry seasons, with the rainy season starting in March or April and lasting until October. Heavy rainfall is common, with an average annual rainfall of 1,500 to 2,000 millimetres. Humidity levels can exceed 80% during the rainy season. Ikeja is located at6° 36' 21.1464" N and 3° 20' 56.9364" E. It has a tropical monsoon climate. The majority of the year's months get heavy rainfall. The brief dry season has very little impact on the climate as a whole. The Köppen-Geiger scale rates this area's climate as Am. Ikeja's typical temperature is 26.4 °C (79.5 °F). About 1645 mm (64.8 inches) of precipitation falls here each year. With an average daily high temperature above 90°F, the hot season lasts for 4.4 months, from December 12 to April 25.

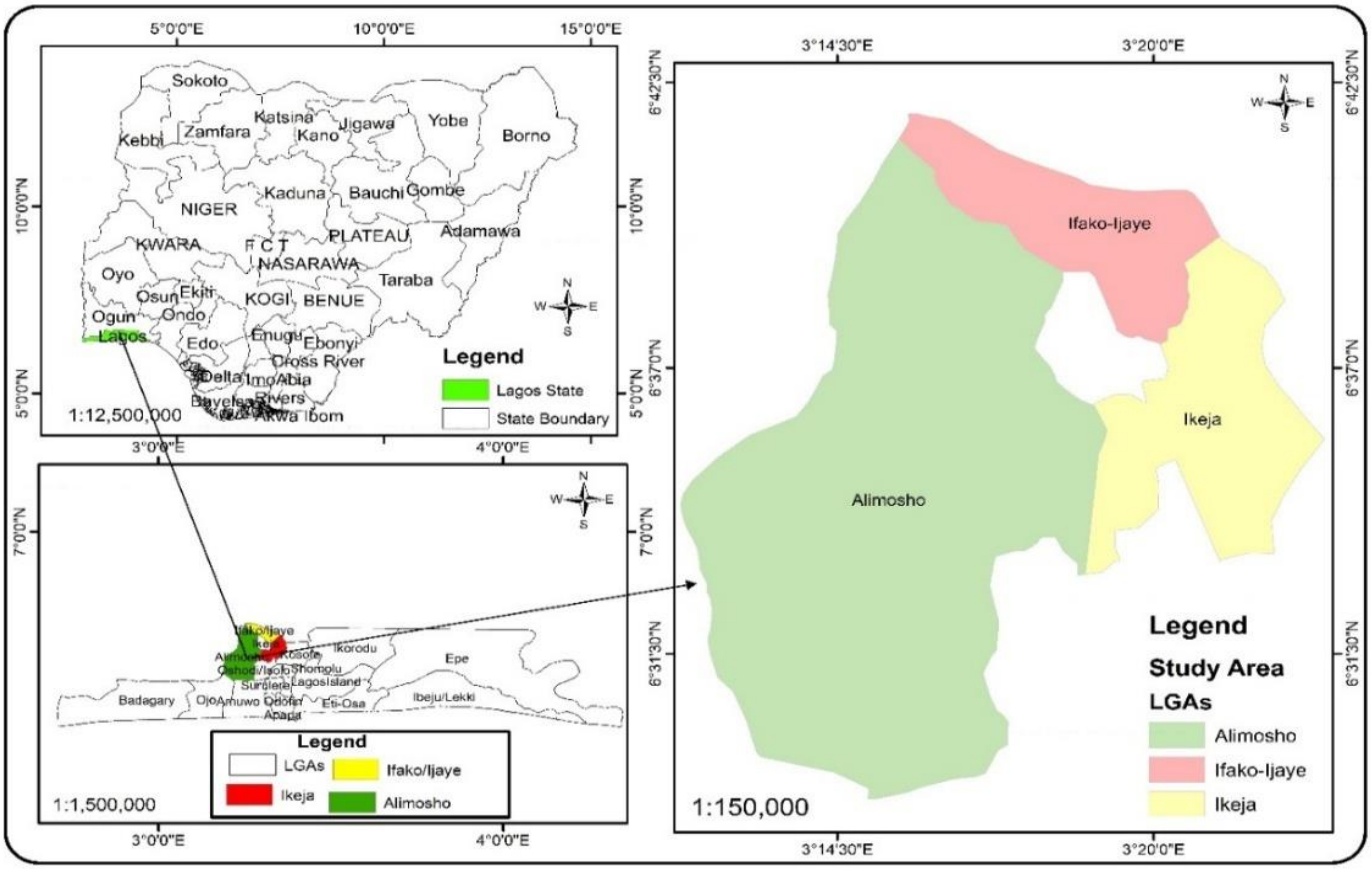

Figure 1: The Study Area (Alimosho, Ikeja, Ifako-Ijaiye, Lagos Mainland) Lagos, Nigeria.

Source: Author (2025)

Data

The study made use of primary data that were collected through surveys, interviews, and focus group discussions with relevant stakeholders, including policymakers, urban farmers, and residents.

Quantitative and Qualitative Analysis

The potential of urban farming in addressing food security was explored from the perspective of urban farmers, residents, and policymakers. The food security measures adopted for this study are “Accessibility and Availability.” The population of this study was defined based on the geographical proximity of urban farming to communities within the identified strata. The three Local government Areas (Alimosho, Ifako-Ijaiye, and Ikeja) have a total population of 3,056,900. Morgan’s sample size calculator was adopted for this study with a confidence level of 95 percent and a margin error of 5 percent. According to Morgan, a 384-sample size is acceptable for a population of over three million, which applies to the study area. However, the study had a slight oversample of 26, which increased the total to 410. Thus, a sample size of 410 respondents was

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interviewed to provide a comprehensive understanding of the initiatives and community engagement in sustainable agriculture practices within these urban farming communities.

Focus Group Discussion (FGD) with selected stakeholders was conducted to gain deeper insights into their perspectives, attitudes, experiences, and suggestions regarding urban farming and its contributions to food security and sustainable development in Lagos Metropolis. The following list outlines the various stakeholder groups identified and engaged in the FGD, each bringing unique viewpoints and expertise to the conversation.

a. Policymakers

i. Lagos State Ministry of Agriculture

ii. Lagos State Agricultural Development Authority

iii. Lagos State Ministry of Physical Planning and Urban Development

iv. Lagos State Parks and Gardens Agency (LASPARK)

v. Lagos State Ministry of Environment.

The results were cleaned and analyzed on Microsoft Excel and Jeffreys's Amazing Statistics Program (JASP) Application for quantitative analysis. This provides a numerical understanding of stakeholders' perceptions towards urban farming as a measure of achieving food security and sustainability in Lagos Metropolis.

For the qualitative analysis, NVivo was used to analyze responses from interviews and focus group discussions. This assisted in identifying key themes, patterns, and insights regarding stakeholders' attitudes and experiences with urban farming.

RESULTS AND DISCUSSIONS

Socio-Demographic characteristics of respondents

Table 1 represents the demographic characteristics of the respondents and it highlights various aspects of the sampled population, including gender distribution, education levels, household, age groups, employment status, and marital status.

The gender breakdown shows a significant male majority at 70.49 percent, compared to females at 29.51 percent. This male dominance indicates a potential cultural or societal influence on who participates in urban farming and food security discussions. The notable lack of female representation underscores the need for targeted outreach efforts to encourage women's involvement in urban agriculture. Addressing this gender disparity is crucial for fostering inclusive practices and ensuring diverse perspectives in agricultural initiatives.

The age distribution indicates a youthful population, with 33.42 percent between the ages of 21-30 years and 33.9 percent between 31-40. Together, these groups make up over 67 percent of the sample, suggesting that urban farming appeals more to younger individuals. This trend may reflect their innovative approaches and openness to sustainable practices. This is followed by 14.39 percent falling between the ages of 41-50 years, 6.83 percent are between 51 and 60, 7.07 percent are 61 and above, and 4.39 percent are between 10-20 years.

In terms of education, the majority of the population holds secondary school qualifications (31.46 percent), and 21.22 percent completed a diploma. 20.24 percent of the respondents are primary school graduates and 15.12 percent hold bachelor's degrees. Conversely, only a small percentage have attained a master's degree or higher (5.37 percent) and 6.59 percent are not educated. This finding indicates that urban farming is more accessible to individuals with lower school qualifications. Programs should be designed to ensure that information and training are understandable and relevant, fostering greater participation and engagement from a diverse audience.

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The income distribution reveals that a significant portion of households (32.44 percent) fall into the 50,000-100,000-income bracket, with 27.56 percent earning between 100,000-150,000. This is followed by 20.24 percent earning 150,000-200,000, and 13.42 percent earning 200,000 and above. However, a notable 6.34 percent earn less than 50,000, indicating a segment of the population living below a potentially critical economic threshold. This indicates that a significant portion of participants belongs to the lower-middle-income category, emphasizing the importance of affordability in urban farming initiatives.

Regarding employment status, a majority of the respondents are self-employed 53.90 percent, 21.46 percent are employed, 13.66 percent are unemployed, 6.83 percent are retired, and 4.15 percent are students. This suggests that urban farming attracts individuals seeking alternative income sources or entrepreneurial opportunities. The finding indicates a potential for urban agriculture to serve as a viable economic strategy, highlighting the importance of supportive policies and resources that facilitate self-employment in this sector.

The marital status reveals that a significant portion of the respondents are married (67.32 percent), while only 19.02 percent are single. The low percentages of cohabiting (0.49 percent) and divorced (9.27 percent) individuals suggest a relatively stable family structure, 2.93 percent are widowed and 0.98 percent are separated. This indicates that family dynamics significantly influence participation in urban farming and married individuals may prioritize food security for their households, underscoring the need for family-oriented urban farming initiatives.

Table 1: Socio-Demographic Characteristics of Respondents

Gender	Percentage
Male	70.49
Female	29.51
Age group	
10 - 20	4.39
21-30	33.42
31-40	33.90
41-50	14.39
51-60	6.83
61 and above	7.07
Level of Education	
Bachelor's degree	15.12
Diploma	21.22
Master's degree or higher	5.37
Not educated	6.59
Primary school	20.24
Secondary school	31.46

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Average monthly household income	
0-50,000	6.34
50,000-100,000	32.44
100,000-150,000	27.56
150,000-200,000	20.24
200,000 and above	13.42
Employment Status	
Employed	21.46
Self- Employed	53.90
Unemployed	13.66
Student	4.15
Retired	6.83
Marital Status	
Cohabiting	0.49
Divorced	9.27
Married	67.32
Separated	0.98
Single	19.02
Widowed	2.93
Total	**100**

Food security measures

Table 2 presents a comprehensive overview of urban farming activities and food security measures, highlighting the awareness, perceptions, and experiences of respondents.

Regarding the level of awareness of urban farming activities, most individuals fall into the "somewhat aware" (47.32 percent) and "very aware" (37.56 percent) categories. 14.15 percent of respondents are fully “aware” of urban farming activities, while a small portion of 0.98 percent are “not aware” at all. This indicates that a majority of the respondents have some level of awareness of urban farming activities within the study area.

When examining the overall food security situation in the study area, the responses reveal a predominantly secure environment, with 59.02 percent of respondents feeling "somewhat secure" and 11.95 percent feeling "very secure." However, a significant portion of the respondents (24.63 percent) remain neutral, indicating uncertainty about their food security status. Only 4.15 percent feel "somewhat insecure," and a minimal 0.24 percent report being "very insecure."

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The perceived availability and accessibility of locally produced food are rated positively by respondents. 32.44 percent consider it "excellent," and 55.12 percent rated it as "good." Only 10.73 percent view it as "fair," and 1.71 percent rate it as "poor." From this analysis, it can be deduced that the availability and accessibility of food are generally good.

When exploring experiences with food availability, 63.42 percent of respondents indicated they “sometimes” had to reduce the size of their meals, with 22.93 percent doing so "often." Only 13.66 percent of the respondents “never” reduced the size of their meals. This indicates that a significant portion of the population struggles with food access despite their perceptions of security. Regarding food shortages in a month, 50.24 percent reported experiencing shortages between 6-10 times, while 24.63 percent experienced shortages between 1-5 times, 13.17 percent experienced them between 11-15 times, and 10.98 percent encountered shortages 10-15 times. Only 0.98 percent reported facing shortages 16-20 times. This frequency of food shortages suggests that while urban farming initiatives are perceived positively, there are still significant gaps that need to be addressed to ensure consistent food availability.

The perception of urban farming activities addressing food security issues is strong, with 73.42 percent of respondents affirming its positive impact. Conversely, 26.59 percent believe it does not contribute to food security. To probe further, respondents who affirmed its positive impacts were asked how urban farming has helped in addressing food security and the most common responses included "increased local food production" (58.80 percent) and "increased availability of fresh and nutritious food" (33.55 percent). Other benefits mentioned were "environmental sustainability" (3.32 percent), "reduced dependence on external food sources" (2.66 percent), "mitigated price fluctuations" (1.00 percent), and "enhanced food security" (0.66 percent). This indicates that urban farming initiatives are largely perceived as beneficial for enhancing the local food supply (Adekunle *et al*. 2024). However, the small percentage rating it poorly suggests that there are still areas where improvement is needed to ensure consistency.

Table 2: Food Security Measures

Level of awareness of urban farming activities	Percentage
Aware	14.15
Not Aware	0.98
Somewhat aware	47.32
Very aware	37.56
Overall food security situation	
Neutral	24.63
Somewhat insecure	4.15
Somewhat secure	59.02
Very insecure	0.24
Very secure	11.95
Availability and Accessibility of Locally Produced Food	
Excellent	32.44
Good	55.12

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Fair	10.73
Poor	1.71
Have you ever had to reduce the size of your meals because there was not enough food?	
No, never	13.66
Yes, often	22.93
Yes, sometimes	63.42
Experienced food shortages due to lack of availability or accessibility?	
1-5 times	10.98
10-5 times	24.63
11-15times	13.17
16-20 times	0.98
6-10 times	50.24
Perception on whether or not urban farming is addressing food security	
No	26.59
Yes	73.42
If yes, in what possible ways?	
Increased local food production	58.80
Increased availability of fresh and nutritious food	33.55
Environmental sustainability	3.32
Reduced dependence on external food sources	2.66
Mitigated price fluctuations	1.00
Enhanced food security	0.66
Total	**100.00**

Perception and attitudes of urban farming stakeholders

Table 3 presents the perception of policymakers on urban farming's contributions to sustainable development and food security. 50.00 percent believe urban farming primarily supports environmental conservation; 33.33 percent cite economic development as a significant contribution and 16.67 percent view it as a means of social empowerment. This highlights a strong recognition of urban farming's environmental benefits, which may be critical in shaping policy toward supporting sustainable practices.

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When considering the benefits of urban farming for food security and sustainable development, 41.67 percent of respondents emphasize the reduction in food miles and carbon emissions as a key advantage, indicating a strong environmental focus. 33.33 percent recognize increased access to fresh and nutritious food as another critical benefit, reflecting the role of urban farming in enhancing food availability. However, 16.67 percent mention the creation of local employment opportunities and 8.33 percent point to enhanced urban resilience and self-sufficiency. The impact of urban farming on environmental sustainability is overwhelmingly viewed positively, with 91.67 percent of respondents highlighting its role in reducing the carbon footprint. In contrast, 8.33 percent believe it promotes biodiversity. This disparity indicates a strong consensus on the environmental benefits of urban farming, particularly in mitigating climate change.

Regarding the environmental benefits of urban farming, 50.00 percent identify the mitigation of the urban heat island effect as a significant advantage, 41.67 percent highlight the reduction of food waste and 8.33 percent mention the conservation of water resources.

In terms of integrated urban farming strategies for achieving food security and sustainable development, a significant 75.00 percent of policymakers support implementing educational programs on urban farming in schools and communities. This reflects a strong belief in the importance of education in promoting urban farming. 16.67 percent advocate for establishing farmers' markets and community-supported agriculture (CSA) programs, while only 8.33 percent suggest incorporating urban farming into urban planning and zoning regulations. The strong support for educational initiatives suggests a pathway for future engagement and development to support urban farming initiatives.

Table 3: Perception and Attitudes of Policymakers

Contribution of urban farming to sustainable development	Percentage
Economic development	33.33
Environmental conservation	50.00
Social empowerment	16.67
Benefits of urban farming to food security and sustainable development	
Reduction in food miles and carbon emissions	41.67
Increased access to fresh and nutritious food	33.33
Creation of local employment opportunities	16.67
Enhanced urban resilience and self-sufficiency	8.33
Impact of urban farming on environmental sustainability	
Promotion of biodiversity	8.33
Reduction of carbon footprint	91.67
Environmental benefits of urban farming in terms of sustainability	
Conservation of water resources	8.33
Reduction of food waste	41.67
Mitigation of urban heat island effect	50.00

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Examples of integrated Urban Farming as a comprehensive strategy for achieving food security and sustainable development	
Establishing farmers' markets and community-supported agriculture (CSA) programs	16.67
Implementing educational programs on urban farming in schools and communities	75.00
Incorporating urban farming into urban planning and zoning regulations	8.33
Total	**100.00**

Comparative analysis of stakeholders' perceptions and attitudes

a) Thematic Codes

NVivo software was used to generate thematic codes from the response to the Focus Group Discussions (FGD) that were conducted with policymakers in the Lagos metropolis. Figure 2 represents the hierarchy chart of the generated codes and it employed a query of hierarchy nodes of clusters compared by the number of parent and child code references. The wider area of graphical presentation (Policies and Regulation) explains the greater amount of attention towards aligned code and sub-code. Other codes that were generated include balance Between the needs of farmers and urban development priorities, climate resilience considerations, collaboration with other agencies to support urban farming, demands for land, engagement with community stakeholders, implemented goals of urban farming policies, incentives and strategies to encourage urban farming engagement, integration of urban farming into educational curricular, integration of urban farming into urban planning and development, plans for the long-term sustainability of urban farming, plans to establish a dedicated department to oversee urban farming initiatives, planting at home, struggles to obtain permits for urban farming, success stories and urban farming campaigns. From the researcher's interaction with the policymakers, success stories have been recorded from urban farming activities within the state. Response from the Lagos State Ministry of Agriculture as quoted below gives credence to this.

"The First Lady of the State has a garden set up by the ministry, with fish ponds, and vegetable gardens. There is also conversion of open spaces for vegetable production. Aside from helping in the area of flood management, it helps in providing food, a source of income, and also makes the city resilient."

However, the State still faces challenges and the key challenge highlighted is the demand for land, which is a critical resource for urban farming. The need for land is not only driven by the requirements of urban farming but also by the need for urban development, which often conflicts with the interests of farmers. According to the Lagos State Ministry of Physical Planning, *"The pressure for land is severe in Lagos"* and this has created a limitation to the extent of urban farming activities within the state.

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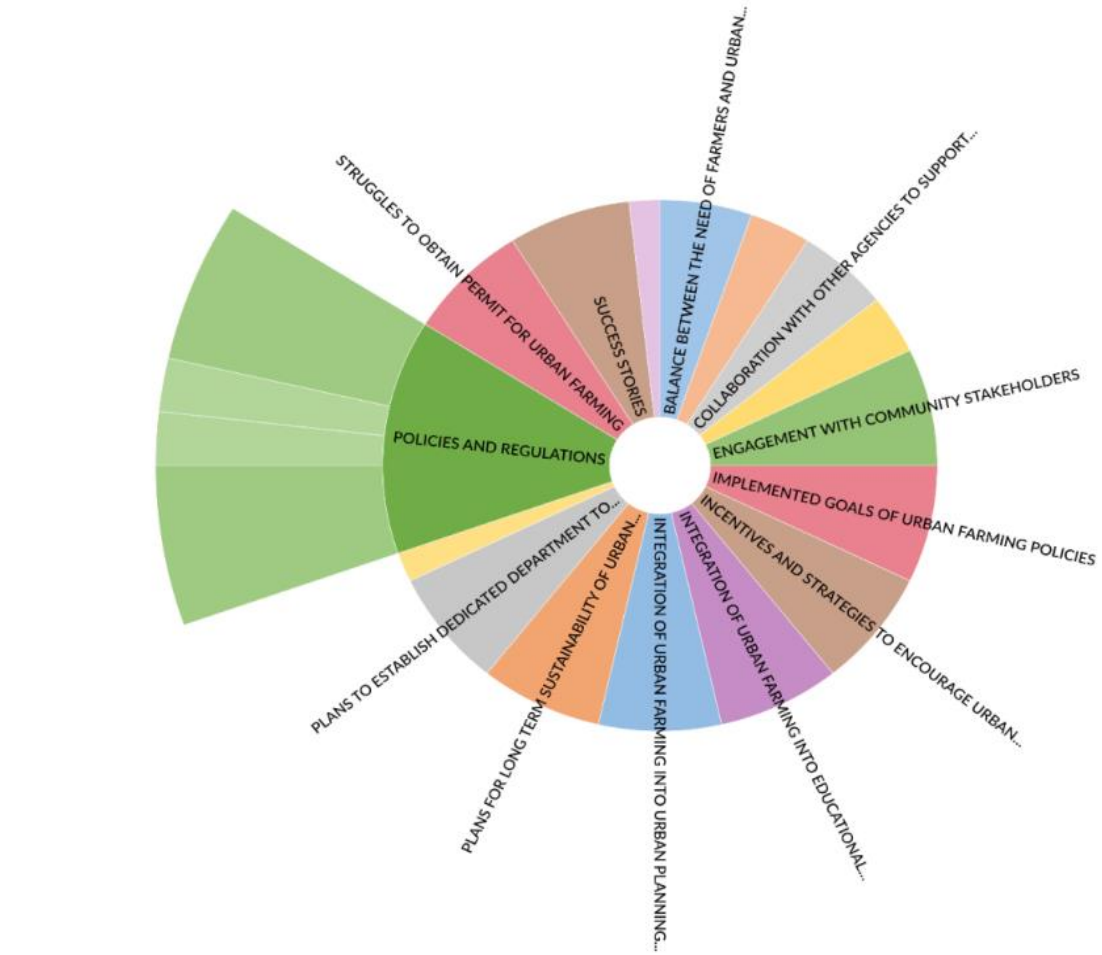

Figure 2: Hierarchy charts of codes: compared by the number of coding references

DISCUSSIONS

Urban farmers' perceptions of the benefits of urban farming for food security and sustainable development indicated a significant majority recognize the reduction in food transportation distances and carbon emissions as a key advantage, underscoring the environmental benefits associated with urban agriculture. This awareness aligns with a growing emphasis on sustainability in food systems, highlighting urban farming's potential to mitigate climate change impacts. Humaida *et al.* (2023), opined that, by integrating green spaces into urban environments, urban agriculture can significantly lower surface and air temperatures, enhancing thermal comfort and improving local microclimates, thereby mitigating urban heat island effect.

According to several studies (Adekunle *et al.* 2024; Jason *et al*. 2024; Yiwen *et al.* 2023), urban farming is packed with benefits including reduced food transportation distances and carbon emissions, thereby contributing to food security and sustainable development efforts. Urban farmers also acknowledge the creation of employment opportunities, and the increased availability of locally grown fresh produce. These findings suggest that urban farming not only contributes to economic development but also enhances food accessibility, thereby supporting local economies.

However, the relatively low percentages associated with perceptions of urban farming's role in environmental conservation and urban resilience indicate gaps in awareness regarding its broader ecological benefits. The minimal recognition of urban farming's potential to improve food access and affordability suggests that there is significant room for education and advocacy.

Urban residents identified urban farming as beneficial for social and economic development, recognizing its role in community engagement and empowerment. However, environmental benefits are less emphasized.

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Residents also highlighted urban farming's potential to create income-generating opportunities, illustrating its perceived economic benefits for financial stability.

The qualitative analysis with NVivo software highlights a significant focus on "Policies and Regulation," as it received considerable attention among the generated codes and sub-codes. Success stories from urban farming initiatives in Lagos were also noted, such as a garden established by the Lagos State Ministry of Agriculture for the First Lady, which includes fish ponds and vegetable gardens. This initiative aids in food provision, thereby alleviating food insecurity and contributing to urban resilience.

However, the state faces significant challenges, particularly the demand for land, which is critical for urban farming but often conflicts with urban development needs. As highlighted by the Lagos State Ministry of Physical Planning, the severe pressure for land in Lagos limits the scope of urban farming activities, underscoring the complexities policymakers must navigate.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Urban farming represents a crucial strategy for addressing the intertwined challenges of food security and sustainability in the Lagos Metropolis. The findings from this study reveal that stakeholders (ranging from policymakers to urban farmers) generally recognize the environmental and economic benefits of urban agriculture. Despite awareness of urban farming's potential to enhance local food production and mitigate the carbon footprint, significant gaps persist in fully harnessing its capabilities, particularly in terms of community engagement and broader ecological benefits. The pressing demand for land further complicates urban farming initiatives, highlighting the need for integrated policy approaches that balance agricultural needs with urban development.

Recommendations

1. **Policy Integration**: Develop comprehensive urban farming policies that align agricultural priorities with urban development goals, ensuring that land-use planning includes provisions for urban agriculture.

2. **Educational Programs**: Implement educational initiatives targeting schools and communities to raise awareness about the benefits of urban farming, thereby fostering greater participation and understanding.

3. **Support for Women's Involvement**: Create targeted outreach programs to encourage women's participation in urban farming, addressing the gender disparity identified in stakeholder engagements.

4. **Incentives for Urban Farming**: Provide financial and technical assistance to urban farmers, facilitating market access and supporting sustainable practices that enhance food production and environmental resilience.

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