

Urban Agriculture in Jos Metropolis, Nigeria: Farmers' Experiences, Constraints, and Livelihood Benefits

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Abstract

Urban agriculture is widely practiced in Nigerian cities, yet studies in mid-sized cities like Jos have paid limited attention to how farmers experience, negotiate, and sustain farming under urban constraints. This study examined the experiences, challenges, and perceived benefits of urban agriculture among farmers in Jos Metropolis, Plateau State. A convergent mixed-methods design was adopted. Survey data were collected from 300 urban farmers selected through multistage sampling, and qualitative data were obtained from 20 in-depth interviews and three focus group discussions across four wards. Quantitative data were analyzed using descriptive statistics and Chi-square tests, while qualitative data were analyzed thematically. Findings showed that farming is predominantly small-scale and household-based, with most respondents cultivating vegetables on plots under half a hectare and farming year-round. Key constraints included insecure land tenure, high input costs, and seasonal water shortages, all of which were significantly associated with disruptions to farming activities. Despite these constraints, a majority of farmers reported improved household food access, additional income from sales, better health and well-being, and stronger community connections. Qualitative narratives confirmed that farming supports daily survival and social ties, even amid risks of eviction and environmental hazards. The study concludes that urban agriculture in Jos is essential to livelihood and food security but remains precarious in the absence of policy recognition and structural support. Recommendations include formal land-use zoning, input and water support, and strengthened market linkages.

Keywords: *Urban agriculture, food security, livelihoods, land tenure, Jos Metropolis, Nigeria, mixed methods*

INTRODUCTION

More than half of the world's population now lives in cities, and urbanization continues to reshape food systems globally. According to the United Nations, 56.2% of the global population was urban in 2024, and this proportion is expected to rise to 68.4% by 2050 (United Nations Department of Economic and Social Affairs [UNDESA], 2019). The pressure is most pronounced in low- and middle-income countries, where urban growth often outpaces investments in infrastructure, housing, and food supply. In many cities, households

allocate between 50% and 70% of their income to food, yet access to affordable, fresh, and nutritious produce remains uneven (Food and Agriculture Organization of the United Nations [FAO], 2017). Faced with these constraints, urban agriculture has emerged as a widely practiced strategy for supplementing diets, generating income, and enhancing resilience among urban residents (Mougeot, 2005; Zezza & Tasciotti, 2010).

The trend is especially visible in Sub-Saharan Africa, the world's fastest-urbanizing region. Between 2015 and 2020, the urban population

in Sub-Saharan Africa grew at an average annual rate of 3.7%, compared with 1.9% globally (UNDESA, 2019). Urban centers in the region are characterized by rapid immigration, expanding informal settlements, and limited capacity of formal markets to meet food demand. In this context, farming within and around cities has become common. FAO (2017) estimated that urban and peri-urban agriculture supplies up to 70% of fresh vegetables in some African cities, while Zezza and Tasciotti (2010), found that urban farming households had higher dietary diversity scores than non-farming households in several developing countries. These patterns suggest that urban agriculture plays a significant role in addressing food insecurity at the household level across the continent.

Nigeria exemplifies these continental dynamics. The country's urban population reached an estimated 121.3 million, or 54.3% of the total population, in 2024 (World Bank, 2024). Urbanization has been accompanied by persistent poverty and unemployment. The National Bureau of Statistics (2020) reported that 40.1% of Nigerians lived below the national poverty line in 2019, and many urban households remain vulnerable to food price fluctuations due to reliance on long supply chains. Within Nigerian cities, small-scale cultivation of vegetables, maize, and poultry is frequently observed in low-income neighborhoods where market access is limited (Adebisi, Ogunjinmi, & Ojo, 2019). Thus, urban agriculture functions both as a food source and as an informal livelihood strategy for many residents.

At the state and city level, Jos Metropolis in Plateau State illustrates the opportunities and challenges of urban farming in Nigeria's mid-sized cities. Plateau State is located on the Jos Plateau, with a cool climate and fertile soils that support year-round vegetable production. The 2006 census recorded 872,692 residents in Jos North and Jos South LGAs combined, and

projections by the Plateau State Ministry of Budget and Economic Planning (2022) indicate that the metropolis now exceeds one million inhabitants, reflecting an estimated annual growth rate of 3.2%. Urban expansion has reduced the availability of open land, but wetlands, floodplains, and vacant plots continue to be used for crop and livestock production (Oyatoye & Adebisi, 2018). For many households, these farming activities provide food, income, and a buffer against economic shocks. At the same time, farmers face constraints such as insecure land tenure, limited irrigation, high input costs, and weak policy recognition (Afolabi, Olanrewaju, & Ogundele, 2017).

While the quantitative dimensions of urban agriculture are increasingly documented, qualitative accounts of farmers' experiences remain limited, particularly in cities like Jos. Most Nigerian studies have focused on crop yields, income, or food supply (Danso, Drechsel, Wiafe, & Gyiele, 2014), with less attention to how farmers understand, negotiate, and sustain farming in an urban environment. This gap is significant because interventions that do not reflect local experiences often have limited impact.

This study therefore explores the experiences of urban farmers in Jos Metropolis, Plateau State, Nigeria. It addresses three questions: (1) What are urban farmers' experiences in Jos Metropolis? (2) What challenges do they face, and how do they overcome them? (3) How do they perceive the benefits and drawbacks of urban agriculture? By foregrounding farmers' voices, the study aims to provide evidence that can inform more responsive urban agriculture policy and practice in Jos.

Literature Review

Research on urban agriculture in cities worldwide indicates that farming within urban boundaries contributes to food security, income generation, social interaction, environmental

management, and health. Global evidence shows that urban producers often achieve greater dietary diversity than households without access to farming. The Food and Agriculture Organization (2017) reported that urban agriculture provides a substantial share of vegetables consumed in many cities, and Zezza and Tasciotti (2010) demonstrated that urban farming households in a sample of developing countries had higher dietary diversity and lower food insecurity than non-farming households. These findings are relevant to Sub-Saharan Africa, where urbanization has been rapid and formal food systems often fail to reach low-income neighborhoods. In Ghana and Kenya, for example, urban vegetable production has been linked to improved household nutrition, particularly for children and the elderly (Danso et al., 2014; Koc, MacRae, Mougeot, & Welsh, 2018).

Economic contributions are also widely documented. Smit, Ratta, and Nasr (2001) argued that urban agriculture creates employment and income opportunities for urban residents, especially in informal settlements where formal employment is scarce. Subsequent studies in African cities have shown that women and youth are particularly active in urban farming, using small plots, containers, and shared spaces to produce food for sale and consumption (Danso et al., 2014; Koc et al., 2018). In Nigeria, Adebisi et al. (2019) found that urban vegetable farming in southwestern cities improved household food access during periods of market price volatility. In Jos, farming activities include leafy vegetables on small plots, as well as poultry and small ruminant rearing, often combined with other informal work (Oyatoye & Adebisi, 2018). Beyond income, urban farming spaces can foster social cohesion. Obane, Oduro, and Owusu (2020) observed that community gardens in Accra provided venues for cooperation and collective action in neighborhoods with few public green areas.

This pattern resonates with informal farming groups in Jos.

Environmentally, urban agriculture can contribute to waste reuse, biodiversity conservation, and microclimate regulation. Barthel, Folke, and Colding (2010) showed that urban gardeners often recycle organic waste, reducing pressure on municipal waste systems. Cilliers, Timmermans, Van den Goorbergh, and Slijkhuis (2018) highlighted the role of urban green infrastructure in supporting biodiversity and ecosystem services. In highland cities such as Jos, vegetable plots on wetlands and floodplains also help manage runoff and moderate local temperatures (Lwasa, Mugagga, Wahab, Simon, Connors, & Griffith, 2018). Health benefits have also been reported. Story, Kaphingst, Robinson-O'Brien, and Glanz (2008) and Larson, Green, and Bally (2018) found associations between gardening or farming activities and increased physical activity and improved mental well-being, particularly in settings with limited access to formal recreational spaces.

In Nigeria, studies have documented both the potential and the constraints of urban agriculture. Afolabi et al. (2017) identified land insecurity, inadequate infrastructure, and restrictive policies as major challenges in several Nigerian cities. Oyatoye and Adebisi (2018) emphasized the need for approaches tailored to the cultural, economic, and environmental context of Plateau State. However, much of the existing literature emphasizes measurable outputs, such as crop yields or income, rather than the lived experiences of farmers. Qualitative studies that examine how farmers navigate challenges, mobilize resources, and perceive the benefits and drawbacks of urban farming remain scarce, especially in mid-sized cities like Jos. This study addresses that gap by documenting urban farmers' experiences, challenges, strategies, and perceptions in Jos Metropolis.

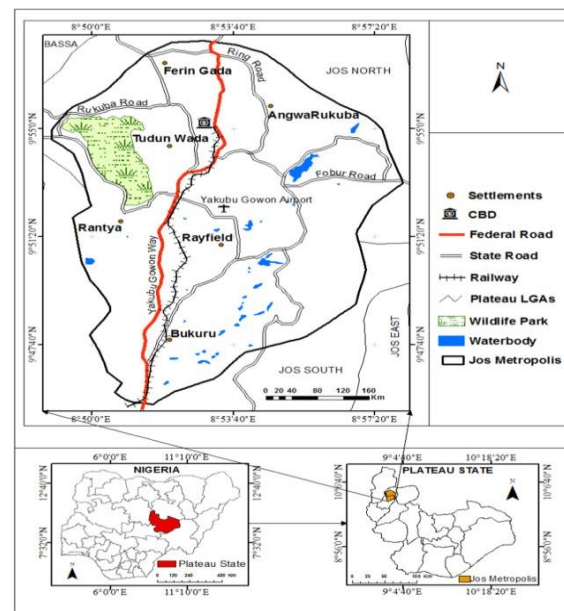
MATERIALS AND METHODOLOGY

Research Design

This study adopted a convergent mixed-methods design to examine the experiences of urban farmers in Jos Metropolis, Plateau State, Nigeria. The design was chosen to combine the breadth of survey data with the depth of qualitative narratives (Creswell & Plano Clark, 2018). The quantitative phase provided data on the prevalence of challenges and perceived benefits, while the qualitative phase explored how farmers experienced, negotiated, and made sense of urban farming.

Study Area

Jos Metropolis is located on the Jos Plateau in central Nigeria and comprises Jos North and Jos South Local Government Areas (National Population Commission [NPC], 2006). The area lies within the Guinea Savannah ecological zone and has a tropical highland climate with an average temperature of 22°C and distinct wet and dry seasons (Adebayo, 2018). The 2006 census recorded 872,692 residents in the two LGAs, with current estimates exceeding one million (Plateau State Ministry of Budget and Economic Planning, 2022). The city's fertile soils, wetlands, and floodplains support year-round vegetable production. Farming is concentrated in wards such as Naraguta A, Tudun Wada, Bukuru, and Jenta Adamu, particularly along the Delimi River floodplain and peri-urban fringes (Oyatoye & Adebisi, 2018). See figure 1



Source: National center for Remote Sensing Jos, Nigeria. (2025).

Fig 1: Jos Metropolis Plateau State Nigeria. Population and Sampling

The target population consisted of active urban farmers in Jos Metropolis, defined as individuals who had engaged in crop or small livestock production within the city for at least six months in the year preceding data collection. An estimated population of 1,150 active farmers was obtained through preliminary consultations with farming associations in the four selected wards.

The sample size for the survey was determined using Yamane's (1967) formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where $N = 1150$ and $e = 0.05$ at a 95% confidence level, yielding a minimum sample of 294. A total of 300 questionnaires were administered to accommodate non-response. A multistage sampling technique was employed: first, the four wards with the highest concentration of urban farming were purposively selected; second, farming clusters within each ward were randomly selected;

third, individual farmers were selected using systematic random sampling.

For the qualitative component, purposive sampling was used to select 20 urban farmers for in-depth interviews and three focus group discussions with 8–10 participants each. Participants were selected to ensure representation across gender, years of farming experience, and the four wards. This sample size is consistent with recommendations for achieving data saturation in qualitative studies (Saunders et al., 2018).

Data Collection

Data collection instruments were developed and aligned with the three research questions. Research Question 1, which focused on the experiences of urban farmers, was addressed using a semi-structured interview guide and focus group discussion (FGD) guide covering daily farming activities, social relations, and the role of farming in household livelihoods. Research Question 2, which examined challenges and coping strategies, was addressed through survey items on land tenure, input costs, water access, and policy issues, measured on a 5-point Likert scale, while interviews and FGDs explored how farmers managed these constraints. Research Question 3, which assessed perceived benefits and drawbacks, was addressed through survey items on food security, income, and well-being, as well as interview questions exploring farmers' experiences of the gains and risks associated with urban farming. The questionnaire, interview guide, and FGD guide were pilot-tested with 20 farmers in a ward outside the study area, and necessary revisions were made based on the findings. Survey data were collected through face-to-face administration, while in-depth interviews and FGDs were audio-recorded with participants' consent and transcribed verbatim.

Data Analysis

Quantitative data were analyzed using SPSS Version 26. Descriptive statistics, including frequencies and percentages, were used to present patterns related to Research Questions 2 and 3. To provide a more robust analysis, Chi-square tests of independence at a 5% alpha level were conducted to examine associations between key variables, with Cramer's V reported as a measure of effect size, where 0.10, 0.30, and 0.50 represent small, medium, and large effects, respectively. Qualitative data were analyzed thematically using NVivo 12, following Braun and Clarke's (2006) six-step approach. Codes and themes were developed in direct relation to each research question. At the interpretation stage, quantitative results were presented alongside qualitative excerpts to provide a free-flowing, logically organized account of findings.

RESULTS AND DISCUSSION

The findings are presented in accordance with the three research questions. They integrate descriptive analyses from the 300 survey respondents, inferential tests, and narratives from the 20 interviews and 3 focus group discussions.

Experiences of Urban Farmers in Jos Metropolis

Urban farming in Jos is predominantly small-scale and household-based. Survey data showed that 67.3% of respondents grew vegetables such as cabbage, lettuce, carrots, and leafy greens on plots under 0.5 hectares, and 58.6% farmed year-round, using the city's cool climate and Delimi River wetlands. A farmer in Naraguta A explained, "We plant vegetables because they grow fast. The small land near the stream is what many of us use." Another in Bukuru stated, "In the morning I farm, in the afternoon I sell food. It is how we manage our household." This reflects Adebisi et al. (2019), who described urban vegetable

farming in Nigeria as an embedded livelihood strategy. At a wider level, Danso et al. (2014) noted similar patterns across West Africa, while Mougeot (2005) argued globally that urban agriculture often fills gaps where formal employment is unstable. In Jos, the practice is therefore local in detail but consistent with broader African and global trends.

Challenges Faced by Urban Farmers

Urban agriculture in Jos metropolis operates within a constrained urban environment where access to land, inputs, and water remains precarious. Survey respondents were asked to identify the main structural constraints affecting their farming activities. Because farmers often face multiple, overlapping challenges, respondents were permitted to select more than one option.

The results, presented in Fig 1, show that insecure land tenure, high input costs, and

seasonal water shortages constitute the most frequently reported barriers. Insecure land tenure emerged as the most pervasive challenge, reported by 78.3% of farmers, 95% C.I (73.5%, 82.8%). A chi square test between land tenure security and continued farming was significant, $\chi^2(1, N = 300) = 24.67, p < .001$, Cramer's $V = 0.29$. This was followed by high cost of farm inputs at 71.7% 95% CI (66.5%,76.6%) and seasonal water shortage at 64.2%, 95% CI (58.7%, 69.5%). The confidence intervals for the top three challenges do not substantially overlap with those of storage and policy constraints, suggesting they constitute a statistically distinct tier of structural barriers in this context. These constraints ranking were consistent with findings from other Nigerian cities as reported by Afolabi et al. (2017), where land tenure and input cost are consistently identified as primary constraints.

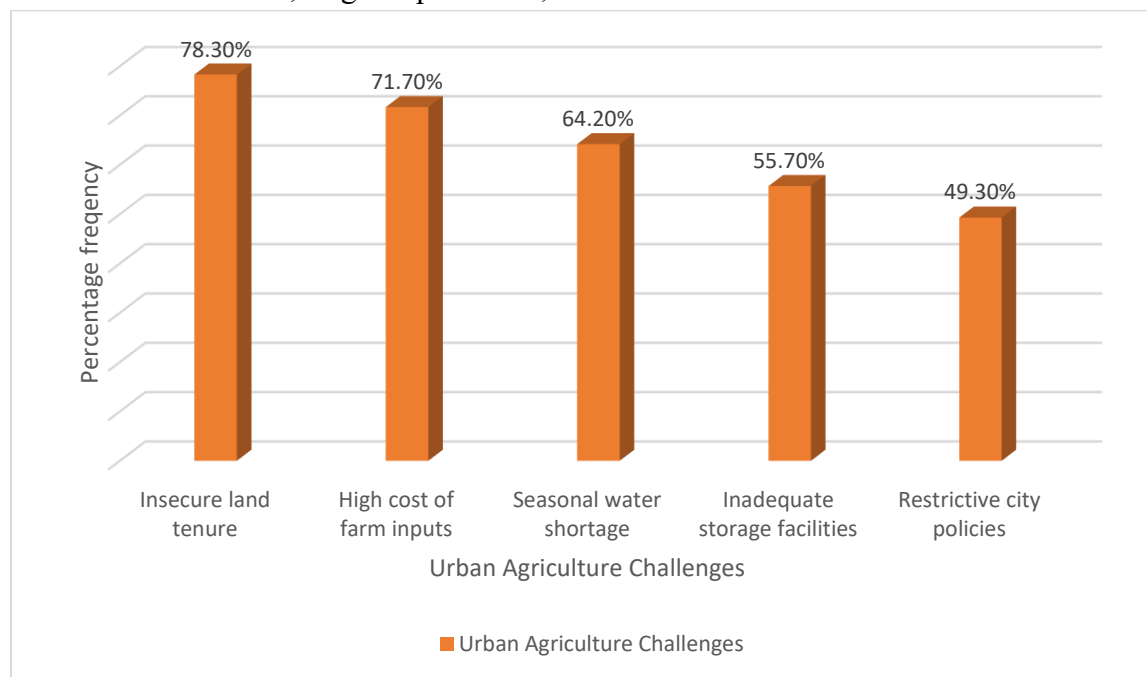


Fig 2: Challenges Limiting Urban Agriculture.

Source: Field Survey (2025)

To test whether these constraints translated into actual disruptions, a Chi-square test of

independence was conducted between land tenure security and continued farming. The

association was statistically significant, $\chi^2(1, N = 300) = 24.67$, $p < .001$, Cramer's $V = 0.29$. Confirming that insecure tenure is significantly and moderately associated with farming disruptions. Qualitative narratives further clarified these patterns, with respondents describing the persistent risk of eviction and the need to share costly inputs as key coping strategies. A farmer in Tudun Wada said, "We farm on government land. Anytime, someone can tell us to leave. That fear does not go away." Another noted, "Fertilizer is very expensive, so we share one bag among three people." These constraints align with Afolabi et al. (2017) in Ibadan and Kano, and Oyatoye and Adebisi (2018) in Plateau State. Regionally, Danso et al. (2014) identified tenure and infrastructure as the two most persistent barriers in West Africa. The FAO (2017) has similarly called for cities to integrate agriculture into planning. The Jos

data therefore confirm a wider pattern: where planning excludes food production, farmers improvise under risk.

Perceived Benefits of Urban Agriculture

Despite reported constraints, farmers identified several tangible benefits of urban agriculture. Table 1 presents perceived outcomes. Table 1 revealed that the most frequently cited benefits were improved household food access (82.1%) and additional income from sales (69.4%). Perceived health and well-being (55.7%) and enhanced community connections (47.3%) were also reported. A Chi-square test conducted, revealed a significant association between food access and income, $\chi^2(1, N = 300) = 18.43$, $p < .001$, Cramer's $V = 0.25$. This indicates a moderate association between food access and income.

Table 1. Perceived Benefits of Urban Agriculture (N = 300)

Benefit	Frequency	Percentage (%)
Improved household food access	246	82.1
Additional income from sales	208	69.4
Perceived health and well-being	167	55.7
Enhanced community connections	142	47.3

Source: Field Survey, (2025)

Qualitative accounts explained this relationship. A participant in Jenta Adamu noted that, "*Because of this farm, my children eat vegetables every day. If we don't farm, we must buy everything.*" Another added, "*The money from carrots helps pay school fees.*" Risks were also named, including contamination and eviction. These mixed outcomes mirror Zezza and Tasciotti (2010), who found that urban farming improves food security while exposing households to urban risks. Koc et al. (2018) reported the same tension in African cities, and Barthel et al. (2010) noted globally that benefits often exist without policy support. For Jos, the implication is that gains are real, but achieved despite systemic gaps.

The integrated data show that Jos farmers use small plots and informal strategies to secure food and income under insecure conditions. The significant statistical associations confirm that these patterns are systematic. From Jos to Nigeria, West Africa, and the global literature, the pattern is consistent: urban agriculture is essential to households, yet precarious without policy recognition.

CONCLUSION

This study examined the experiences, challenges, and benefits of urban agriculture among 300 farmers in Jos Metropolis. The findings show that urban farming is largely small-scale and household-based, with 67.3%

of respondents cultivating vegetables on plots under 0.5 hectares and 58.6% farming year-round. Yet this practice occurs under considerable constraint. Insecure land tenure, reported by 78.3% of farmers, was significantly but moderately associated with farming disruptions, $\chi^2(1, N = 300) = 24.67, p < .001$, Cramer's $V = 0.29$, while high input costs and seasonal water shortages further limited productivity. Despite these barriers, urban agriculture delivers measurable benefits. A majority of respondents reported improved household food access, 82.1%, and additional income from sales, 69.4%, with a significant association between the two, $\chi^2(1, N = 300) = 18.43, p < .001$, Cramer's $V = 0.25$, reflecting a small to moderate effect. Qualitative narratives confirmed that farming provides food, income, health, and community ties, even as farmers contend with eviction risk and environmental hazards. Placed within the broader literature, the Jos case reflects patterns documented across Nigeria and Sub-Saharan Africa. Studies by Adebisi et al. (2019), Afolabi et al. (2017), and Danso et al. (2014) have reported similar constraints and coping strategies, while Zezza and Tasciotti (2010) and Koc et al. (2018) have shown that benefits and vulnerabilities often coexist in urban settings. The overall conclusion is that urban agriculture in Jos is essential to household food and livelihood security, but remains precarious in the absence of policy recognition and structural support.

RECOMMENDATIONS

In order to address these realities, three priority actions are recommended. First, the Plateau State Government, in partnership with Jos North and Jos South Local Government Areas, should formally recognize urban agriculture in land-use planning. Designating farming zones along the Delimi River floodplain and other peri-urban areas would reduce tenure insecurity and enable long-term investment. Second, immediate support for inputs and water is

needed. Given that 71.7% of farmers cited input costs and 64.2% reported water shortages, subsidized fertilizer and seed access, alongside investment in small-scale irrigation and safe water sources, would directly address key constraints. Extension services should also provide training on safe wastewater use and soil management. Third, market and capacity support should be strengthened. Programs focused on postharvest handling, storage, and market linkages can increase the economic value of produce, building on the income benefits already reported by farmers. Together, these measures can shift urban agriculture in Jos from an informal survival strategy to a recognized component of a sustainable urban food system.

Ethical Considerations

Ethical clearance was obtained from the University of Jos Research Ethics Committee. Written informed consent was obtained from all participants. Confidentiality, anonymity, and the right to withdraw were assured throughout the study.

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