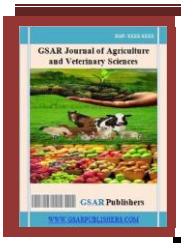

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INVOLVEMENT OF HOUSEHOLDS IN BACKYARD FARMING ON HOUSEHOLD FOOD SECURITY IN MAIDUGURI METROPOLIS, BORNO STATE, NIGERIA.

By

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Abstract

This study examined the involvement of households in backyard farming and its influence on household food security in Maiduguri Metropolis, Borno State, Nigeria. A two-stage sampling procedure was adopted for the study. Data were collected using a structured questionnaire and analyzed using descriptive statistics (frequencies and percentages) and multiple regression analysis. The findings revealed that households cultivated diverse crops, with fruit vegetables (27.3%) and leafy vegetables (23.6%), root and tuber crops (18.2%) and fruits (17.3%). Backyard farming significantly improved household food availability, as 45.5% of respondents reported increased food availability, while 31.8% experienced an average increase, indicating that most households benefited from the practice. Regression results showed that education level, household size, farm size, access to credit, farming experience, and access to extension services positively and significantly influenced household involvement in backyard farming. Conversely, age and distance to market had negative but significant effects on participation. The model explained 61.1% of the variation in involvement, indicating strong explanatory power. Major constraints affecting backyard farming included limited land/space (22.7%), water scarcity (18.2%), climate change (15.9%), limited access to inputs (13.6%), and inadequate capital (11.4%). Other constraints such as poor extension services, pest and disease incidence, and insecurity also hindered effective participation. The study concludes that backyard farming plays a significant role in enhancing household food availability, dietary diversity, and livelihood resilience in urban conflict-affected environments. The study recommends that; Improve access to water for backyard farming. Government and development agencies should promote affordable small-scale irrigation technologies such as drip irrigation, water harvesting, and household water storage systems to address water scarcity

Keywords: *Involvement, Backyard Farming, Household Food Security, Maiduguri Metropolis, Nigeria.*

INTRODUCTION

Urbanization and population growth have led to decreased food security in urban areas, exacerbating malnutrition and related health issues. Over 50% of the global population resides in urban areas, and this number is expected to increase to 70% by 2050 [United Nation] (UN, 2018). Ensuring household food security has become a pressing concern for urban dwellers, particularly in the face of climate change, poverty and limited access to arable land (FAO,2023). In Nigeria, backyard farming also referred to as homestead, or home garden production is a long-standing traditional practice, and has long been an integral part of rural livelihoods. Traditionally, farming households especially rural dwellers and women, have maintained small plots of land adjacent to their homes, cultivating and growing of a diverse range of crops including vegetables, fruits, herbs, medicinal plants, and the rearing of small animals around the home- in balconies, rooftops or even indoor spaces, primarily to increase access to fresh produce for improving household nutrition, enhancing food security, and generating supplementary income, and conserving agro-biodiversity (Sekyere, 2018). The practice is often informal, utilizing family labor, small spaces, and recycled resources. According to Ovharhe *et al.* (2020) in an Empirical study suggest that backyard farming improve food availability, dietary diversity,

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household nutrition, and income generation, as excess produced can be sold, and reduce their reliance on markets, These backyard farming, has emerged as potential strategy to serve multiple purposes, and is increasingly adopted in urban and peri-urban areas due to rising food costs and land access challenges, aims to increase access to fresh and locally grown food, promote sustainable agricultural practices and enhance community engagement (Mougeot, 2018).

Food security remains a fundamental concern in many developing countries, particularly, Nigeria with millions of people struggling to access nutritious and sufficient food. Despite numerous interventions and programs targeted at boosting food production, millions of Nigerians still suffer from hunger and malnutrition. According to the Food and Agriculture Organization (FAO, 2023), over 25 million Nigerians are projected to face acute food insecurity due to a combination of economic, environmental, and conflict-related factors. In the light of these challenges' backyard farming has been proposed as a potential solution and can effectively mitigate the food security issue in the region. Food security mean that a country should always be able to make food accessible, and available to all its citizens in both quality and quantity under all circumstances that can reasonably be expected (Mitlin 2003).

Maiduguri, the capital of Borno State, has experienced significant socioeconomic and political disruptions due to the Boko Haram insurgency, which has led to displacement, loss of livelihoods and assets, reduced agricultural activities, and has exacerbated food insecurity, particularly among vulnerable households such with limited access to resources (Independent Data Monitoring Committee, 2022). In such settings, home gardens can serve as a resilient strategy for food access, especially for farming households who have limited access to farmland due to insecurity or displacement. The broad objective of this study is to examine the involvement of households in backyard farming on household food security in Maiduguri metropolis. The specific objectives are to:

i. identify the various crops grown among farming households in the study area
ii. examine the extent of backyard farming contributions to household's food availability in the study area.
iii. examine the factors influencing involvement in backyard farming
iv. identify the constraints faced by households in practicing backyard farming in the study area.

METHODOLOGY

The study was conducted in Maiduguri Metropolis, Borno State, located within the semi-arid of Northeastern Nigeria. Maiduguri Metropolis lies between latitude 11°45′ N and 11°55′ N and longitude 13°10′ E and 13°30′ E. It serves as the capital and largest city of Borno State, functioning as the administrative, commercial, and cultural hub of the region (National Population Commission, 2023). The population of Maiduguri Metropolis, based on the 2006 census, was 521,492. Projected to 1,026,479 people considering 3.8 percent annual growth rate for 2024/2025. The metropolis is characterized by a short rainy season from June to September and a long dry season from October to May. The average annual rainfall ranges between 300 mm and 650 mm, with peak precipitation occurring in August (Nigerian Meteorological Agency, 2022). Average temperatures hover around 29°C, often rising significantly during the dry season, (World Bank Climate Data, 2023). Maiduguri Metropolis comprise a diverse mix of ethnic groups including the Kanuri, Babur, Hausa, Shuwa Arabs, and other minority (Macro-trends, 2025 and World Population Review, 2025). Maiduguri Metropolis, also referred to as Maiduguri Urban, comprises the Metropolitan Council (MMC) and parts of Mafa, Jere and Konduga LGAs.

SAMPLING PROCEDURE

A two-stage sampling design was employed to select respondents for this study. In the first stage, 11 wards were randomly selected from the 22 wards in Maiduguri metropolis using a simple random sampling technique. In the second stage, a systematic sampling approach was used to select households within each selected ward. A list of households was obtained from local authorities and a sampling interval (k) was determined by dividing the total number of households by the desired sample size. A random start was generated, and every kth household was selected. The selected households were then screened for involvement in backyard farming, and those meeting the eligibility criteria were included in the study. To maintain uniformity and allow for fair representation, 20 respondents was randomly selected from each ward, regardless of population differences. This resulted in a total sample size of 220 respondents (11 wards × 20 households each), drawn from the population of households involved in backyard farming were selected as respondents for this study.

Sampling Procedure Table

Table 3.1

Stage	Sampling Technique	Description	Output
Stage 1	Simple Random Sampling	Eleven (11) wards were randomly selected from the twenty-two (22) wards in Maiduguri metropolis.	11 selected wards
Stage 2	Systematic Sampling	A list of households was obtained from local authorities. A sampling interval (k) was determined by dividing the total number of households by the desired sample size. A random	Households selected within each ward

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Stage	Sampling Technique	Description	Output
		start was chosen and every kth household was selected.	
Screening Stage	Eligibility Screening	Selected households were screened to identify those involved in backyard farming, and only eligible households were retained.	Eligible backyard farming households
Allocation Stage	Equal Allocation / Random Selection	Twenty (20) respondents were randomly selected from each of the 11 selected wards to ensure uniform representation regardless of population differences.	20 respondents per ward
Final Sample	—	Total sample size calculated as 11 wards × 20 respondents each.	**220 respondents**

Source: Field Survey, 2025

Analytical Technique

The data collected was analyzed using both descriptive and inferential statistical tools. Descriptive statistics such as frequencies and percentages were used to address objectives i, ii, and iv. Multiple regression analysis was used to achieve objective iii, which relates to examining the factors influencing involvement of farming households in backyard farming.

Multiple regression model

The regression model used for this study is specified as:

$$Y=f\ (X_1\beta_1 + X_2\beta_2 + X_3\beta_3 + X_4\beta_4 + X_5\beta_5 + X_6\beta_6 + X_7\beta_7 + X_8\beta_8 + X_9\beta_9) + u$$

Where:

Y = Involvement of farming households in backyard farming (dependent variable)

X_1 - X_9 = Socioeconomic factors (independent variables), which may include:

- $\mathbf{X_1}$ = Age of household head (years)
- $\mathbf{X_2}$ = Educational level (years)
- $\mathbf{X_3}$ = Household size (number of persons)
- $\mathbf{X_4}$ = Farm size (hectares)
- $\mathbf{X_5}$ = Access to credit (₦)
- $\mathbf{X_6}$ = Access to extension services (number of contacts per year)
- $\mathbf{X_7}$ = Farming experience (years)
- $\mathbf{X_8}$ = Market access (distance in km)
- $\mathbf{X_9}$ =Income (₦)

This model was estimating the influence of these socioeconomic variables on the involvement of households in backyard farming in Maiduguri Metropolis, Borno State.

RESULTS AND DISCUSSION

Distribution of various crops grown among farming household in the study area.

Table 1. Crops grown by households in backyard farming (n=220)

Crops grown	Frequency	Percentage (%)
Leafy vegetables	52	23.6
Fruit vegetables	60	27.3
Roots and tuber	40	18.2
Fruits	38	17.3
Other minor crops	30	13.6
Total	**220**	**100.0**

Source: Field Survey, 2025

Crops grown by households in backyard farming

The result revealed that a large proportion (27.3%) of the respondents cultivated fruit- vegetables such as tomato, pepper, okra, and onions, followed by (23.6%), leafy-vegetables (Spinach, Amaranthus, and Moringa leaves), making it the most common crop category grown by nearly half of the respondents, indicating their importance as both food and cash crops. 18.2% cultivated root and tuber crops such as sweet potato and 17.3%, fruits, such as mango guava, orange and watermelon. Other crops such as maize, millet, sorghum, cowpea and groundnut were also cultivated by fewer (13.6%), respondents, possibly due to variations in land size, and water availability. A smaller proportion of the respondents grew other minor crops such as leafy herbs, which were mainly cultivated for domestic consumption. This finding suggests that the study area is dominated by vegetables and staple crops, and the households engaged in backyard farming have access to fresh vegetables and staples that support household food security and income generation. The result agrees with Ali *et al*. (2021), who observed that the cultivation of fast-growing and high-demand crops such as tomatoes, peppers, vegetables and cereals are the most cultivated crops in smallholder urban gardens in Northern Nigeria, and it contributes significantly to household nutrition.

Table 2. Extent of backyard farming contributions to household food availability

Contribution Status	Frequency	Percentage (%)
Less Increase in food availability	50	22.7
Average increase in food availability	70	31.8
Increase in food availability	100	45.5
Total	**220**	**100.0**

Source: Field Survey, 2025

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The result in table 2. show the extent to which backyard farming influences household food availability. The result indicates that, 45.5% of the respondents has seen how far backyard farming has gone in addressing food availability issues in Maiduguri Metropolis. The result shows significant increase in food availability of households as a result of backyard farming, indicating a significant impact on household food security. About 22.7% of respondents were unable to feel the impact of backyard farming with a less increase in food availability, this may be due to low income source, or lack of access to improved seed varieties to boost food availability. About 31.8% experience an average increase in food availability among households. This implies that, backyard farming contributes to food availability as majority (77.3%) household experience at least an average increase in food availability. Usman and Abdullahi (2024). In a study, impact of urban Agriculture on household dietary diversity and food security in Kano metropolis Nigeria, found that household involved in backyard farming exhibited significantly higher dietary diversity scores (DDS) compared to non–participating households. The extent of backyard farming greatest aim according to FAO initiatives is to see how far backyard farming can build a sustainable agriculture, boost food production and eradicate food insecurity, and bring about food access and availability in rural areas.

Table 3. Socio-economic factors influencing involvement of households in backyard farming

Variable	Coefficient (β)	Std. Error	t-value	Sig. (p-value)	Expected Sign
Constant	3.214	0.842	3.82	0.000***	—
Age (X_1)	-0.042	0.021	-2.00	0.048**	±
Education Level (X_2)	0.187	0.056	3.34	0.001***	+
Household Size (X_3)	0.094	0.041	2.29	0.024**	+
Farm Size (X_4)	0.162	0.072	2.25	0.027**	+
Access to Credit (X_5)	0.214	0.085	2.52	0.014**	+
Access to Extension Services (X_6)	0.176	0.068	2.59	0.011**	+
Farming Experience (X_7)	0.129	0.062	2.08	0.040**	+
Market Access (X_8)	-0.118	0.057	-2.07	0.042**	±

Source: Field Survey, 2025

R=0.782, R^2=0.611 AdjustedR^2=0.582
F-statistic=21.14
Sig. F=0.000*Significant at1% level (p<0.01), Significant at 5% level (p<0.05), Significant at 10% level (p < 0.10)

The result in table 3. shows the multiple regression results of several socioeconomic factors that significantly influenced involvement in backyard farming among households in the study area. The R^2 value of 0.611 indicates that about 61.1% of the variation in the level of involvement in backyard farming is explained by the combined effects of the explanatory variables included in the model. The F-statistic (21.14, $p < 0.01$) confirms that the overall model is statistically significant, meaning that the socioeconomic factors jointly have a significant effect on the level of involvement in backyard farming. The coefficient of age (-0.042) and Market access (-0.118) is negative and statistically significant at ($p < 0.05$), suggesting that as respondents' age increases, their level of involvement in backyard farming tends to decrease. This may be due to reduced physical strength and preference for less labor-intensive activities among older individuals. The negative significance of Market access implies that, longer distances to markets reduce the level of participation in backyard farming. Farmers far from markets may face difficulties selling their produce, which may discourage production. This finding aligns with Balogun *et al.* (2023), who identified distances to market as a significant factor influencing farmer's markets access. The coefficient (0.187) of education level is positive and significant at 1%, implying that education positively influences involvement in backyard farming. Educated respondents are more likely to adopt improved practices and manage backyard farming resources effectively. The coefficients of farm size (0.162), household size (0.094), access to credit (0.214), experience (0.129), and access to extension services (0.176) has positive and significant relationships ($p < 0.05$). Implying that, respondents with larger farm sizes are more likely to diversify into backyard farming due to experience with crop management, households with larger family sizes are more involved in backyard farming because, larger households provide more family labor, which reduces the need for hired labor, households with access to credit can participate more in backyard farming. This reflects the role of financial resources in purchasing inputs like seeds, fertilizer, and tools. More experienced farmers are more involved in backyard farming due to accumulated knowledge and better decision-making ability and lastly extension contact enhances respondents' knowledge and skills, thereby increasing their involvement in backyard farming.

Table 4. Constraints faced by Farmers in Backyard Farming.

Constraint	Frequency	Percentage (%)
Water scarcity	40	18.2
Limited access to inputs	30	13.6

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Pest and disease attack	15	6.8
Poor extension services / lack of technical training	20	9.1
Limited land/space	50	22.7
Climate change	35	15.9
Limited capital	25	11.4
Insecurity/ Theft	10	4.5
Total	**220**	**100**

Source: Field Survey, 2025

The result in table 4. presents the constraints faced in backyard farming in the study area. Limited land/space (22.7**%**), that could be a good source of farming and could support them in on-farm and off-farm activities emerged as the leading constraint to backyard farming in Maiduguri metropolis, likely due to urban density as a result of insurgency's impact on displacement of people, leading to increased pressure on available land. Competing uses for infrastructures exacerbates space scarcity. Water scarcity (18.2**%**), also a significant problem in the study area because, Maiduguri lies within the semi-arid Sahel region where rainfall is low and irregular, and water sources are often inadequate or overstretched. The scarcity of water limits the frequency of irrigation, increase labour for water fetching, reduces crop yields, and shifts to less nutritious crops, discouraging households from fully engaging in backyard farming, as without adequate water, household gardens cannot provide sustainable food supplies. Climate change (15.9**%**), limited access to inputs (13.6**%**), and limited capital (11.4**%**) is preventing farmers from fully participating in backyard farming. Climate change introduces unpredictability in weather patterns, the onset and offset of rainfall couple with high temperature, humidity as a result of climate change also affected farmers in causing crop damage, disrupting growing seasons and increasing pest/disease risk. High costs of seeds, fertilizers, and tools, coupled with irregular supply chains, prevent many households from cultivating optimally. The implication is that input limitations directly affect household capacity to expand or diversify their gardens, which reduces resilience against food insecurity. This agrees with Okoro (2020), who found that inadequate supply of improved seeds and high input costs are persistent constraints for urban farmers in Nigeria. Poor extension services and lack of technical training, suggests that most households rely heavily on indigenous knowledge and inherited farming practices rather than formal training. Limited access to agronomic knowledge, improved technologies and market access can lead to low productivity, poor quality produce and reduced income. Insecurity and theft prevented urban farmer from accessing farm land, as well, pests/disease reduce yields and increase the risk of crop failure, which undermines household food security. The implication here is that without proper pest management and access to resistant crop varieties, household gardening will continue to face setbacks. This aligns with Chukwu (2022), who highlighted pest infestation as a major threat among urban gardeners.

Conclusion

The study examined the involvement of households in backyard farming and its contribution to household food security in Maiduguri Metropolis, Borno State, Nigeria. The findings demonstrate that backyard farming is widely practiced among urban households and serves as an important strategy for improving food availability, nutrition, and livelihood resilience, particularly in a conflict-affected and resource-constrained environment.

Results revealed that households cultivated a variety of crops dominated by fruit vegetables and leafy vegetables, highlighting the nutritional importance of backyard farming. The study further established that backyard farming significantly improves household food availability, as the majority of households reported average to high increases in food supply from their gardens. This confirms the role of backyard farming as a practical and accessible approach to strengthening urban food security. The regression analysis showed that education level, household size, farm size, access to credit, farming experience, and extension services significantly enhanced household involvement in backyard farming, while age and distance to market negatively influenced participation. These findings indicate that both socioeconomic capacity and institutional support determine the level of engagement in backyard farming. However, households faced several constraints, including limited land/space, water scarcity, climate change, limited access to inputs, and inadequate capital, which restrict the scale and productivity of backyard farming. Despite these challenges, backyard farming remains a viable pathway for improving household food security, supporting income generation, and promoting sustainable urban agriculture. The study concludes that backyard farming is an effective household-level food security strategy in Maiduguri Metropolis and has strong potential to support urban resilience if properly supported through policy, infrastructure, and extension interventions.

Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Improve access to water for backyard farming Government and development agencies should promote affordable small-scale irrigation technologies such as drip irrigation, water harvesting, and household water storage systems to address water scarcity.
2. Strengthen extension services for urban agriculture Extension programs should incorporate backyard farming training, focusing on improved crop management, pest control, climate-smart practices, and efficient use of limited space.
3. Enhance access to agricultural inputs Provision of subsidized seeds, seedlings, fertilizers, and simple gardening tools will enable households to expand and intensify backyard production.

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4. Promote access to credit and financial support Microcredit schemes and livelihood support programs targeting urban households, especially women and vulnerable groups, should be strengthened to support backyard farming investment.
5. Promote climate-smart backyard farming practices Households should be encouraged to adopt practices such as container gardening, vertical gardening, mulching, drought-tolerant crop varieties, and integrated pest management.
6. Integrate backyard farming into urban food security policies
   Policymakers should recognize backyard farming as part of urban agriculture strategies and incorporate it into food security, nutrition, and resilience programs in conflict-affected areas.
7. Address land/space constraints through innovative approaches Promotion of space-efficient technologies such as rooftop gardening, sack gardening, and vertical production systems will help households overcome limited land challenges.

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