Journal of Innovative Research (JIR)

ISSN: 2837-6706 (ONLINE)

VOLUME 3 ISSUE 2 (2025)

PUBLISHED BY
E-PALLI PUBLISHERS, DELAWARE, USA

Journal of Innovative Research (JIR)

Volume 3 Issue 2, Year 2025
ISSN: 2837-6706 (Online)
DOI: https://doi.org/10.54536/jir.v3i2.4636
https://journals.e-palli.com/home/index.php/jir

Urban Farming Practices and Constraints to Urban Agriculture in Bauchi Metropolis

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Article Information

Received: March 08, 2025

Accepted: April 05, 2025

Published: May 08, 2025

Keywords

Agriculture, Constraints, Farming, Practices, Urban

ABSTRACT

The rise in urban population, accompanied by growing poverty and hunger, has triggered the need to engage in urban agriculture in order to address the challenges of food insecurity in urban centers. This research is aimed at assessing the practices and constraints to urban agriculture in Bauchi metropolis with a view to improving urban food security. Primary and secondary data were used for the study. A total of 285 copies of the structured questionnaire were administered to urban farmers in the eight political wards within the Bauchi metropolis using a chain referral sampling technique. Secondary data were obtained from the review of relevant literature. Data collected were analysed using Statistical Package for Social Science (SPSS) involving descriptive and inferential methods. Respondent Agreement Index (RAI) was used to measure the constraints to urban agriculture in the study area. Findings revealed that majority of farmers who practice UA do not own lands. For this reason, they eventually borrow or rent lands for UA. Farmers engage in urban farming for extra sources of food and to complement their source of income. The major constraints to urban agriculture are lack of tenure security, limited land area and poor access to microcredit facilities. The study recommended that space allocation for urban agriculture should be integrated into the master plan of Bauchi metropolis.

INTRODUCTION

The global population of urban areas is rapidly growing (Arbolino *et al.,* 2018). It is predicted that by 2050, 68% of the world population will reside in cities (The United Nations Department of Economic and Social Affairs [UN-DESA], 2018). However, the pace of this urbanization varies across regions. The majority of the world's population growth is expected to occur in sub-Saharan Africa, where cities are projected to increase at an annual rate of 4.1%, higher than the global average of 1.84% (World Health Organization [WHO], 2015). Nigeria's urban population is predicted to double by 2037, with an approximate yearly growth rate of 4.3% (UN-DESA, 2018). This increase in population and urban development will also require an increase in the food production efforts of cities, of which, urban agriculture is a strategy.

Food is any substance that is consumed by living organism such as humans, plants and animals for nutrition and to support bodily functions. It is a fundamental human requirement that sustains existence and provides nourishment (Morgan, 2009). It affects economic growth, social justice, public health, land usage, and domestic security (Morgan, 2009). Food security and nutrition are crucial for urban residents of all income levels (Steward *et al.,* 2013). Urban Agriculture involves the production of food and non-food items within and around urban areas, using intensive or extensive production techniques (Food and Agriculture Organization [FAO], 2016); United Nations Development Programme [UNDP], 1996). UA includes gardening on private and public or semi-public spaces, as well as practices like hydroponics, aquaculture, and greenhouses (Abu & Soom, 2016; Larose *et al.,* 2014). Urban agriculture can make cities more resilient by reducing urban residents' susceptibility to food shocks (FAO, 2016). Urban farming practices, a key component of UA, offers numerous benefits, including increased food production, and enhanced urban ecosystems. However, UA also faces numerous constraints, including physical, regulatory, and socio-economic challenges. These constraints can limit the adoption and success of UA initiatives, hindering the realization of its full potentials.

However, the expansion of residential, commercial, and industrial developments in many African cities, including Ghana, Nigeria, and Gambia, limits the practice of urban farming due to decreased agricultural land, unplanned urbanization, and environmental degradation (Fischer & Sha, 2010). Farmers also face institutional and socioeconomic barriers, such as conflicting land uses, crop damage due to unpredictable climatic conditions and disasters (Idris *et al.,* 2018), theft, and limited access to microcredit facilities (Chah *et al.,* 2010; Odudu & Omirin, 2012; Asadu *et al.,* 2016; and Olumba *et al.,* 2019). Alaimo *et al.* (2023) conducted a systematic review of literature on community gardens and mental health, highlighting the benefits of urban farming for mental well-being. However, the study did not consider the challenges of mainstreaming urban farming into city planning. Despommier (2024) concentrated on vertical farming, highlighting its potentials to increase food production in urban areas. The study did not consider the dynamics in city structure in order to integrate urban

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farming. Dunnet *et al.* (2020), Orsini *et al.* (2013) and Dubbeling *et al.* (2019) examined the benefits of rooftop gardens, including its potential to promote biodiversity and their ability to provide insulation and reduce storm water runoffs. The study was limited because it failed to stress on the unhealthy practices of urban farmers that can have impact on the environment. These studies have necessitated the need for assessing the practices of urban farming in African cities like Nigeria and the challenges of integration into the metropolitan fabric.

In Bauchi metropolis, Nigeria, UA is practiced organically and uncoordinatedly, with some farmers cultivating crops on sensitive land use corridors such as utility lines and setbacks of major tertiary institutions (Adeogun *et al.,* 2007). Despite the clear evidence of UA's presence and potential in Nigeria, policymakers and the government have largely overlooked this industry, missing an opportunity to address poverty and food insecurity (Egbuna, 2001). Despite the growing interest in UA, there is a need for further research on urban farming practices and constraints to UA. This study aims to contribute to the existing literature by examining the current state of urban farming practices and identifying the key constraints to urban agriculture (UA) in the Bauchi metropolis. By understanding these constraints, policymakers, urban farmers and other stakeholders can develop effective strategies to support the promotion of UA, ultimately enhancing food security, sustainability, and urban livability.

Models of Urban Spatial Structure and Urban Agriculture

Urban spatial structure has been explained by models such as the Burgess, Hoyt, and that of Harris and Ullman (Schwirian, 2007). These models provide a conceptual framework for understanding the complex relationships between land uses, transportation systems and socioeconomic activities in cities (Rimmington, 1970). These models have been used to analyse and predict the spatial pattern of urban development and identify areas that are suitable for urban agriculture (Wunarlan *et al.,* 2023). For example, the concentric zone model, developed by Ernest Burgess in 1925, provides a conceptual framework for understanding the spatial structure of cities. The model proposes that cities grow outward from a Central Business District (CBD) in a series of concentric rings or zones, each with distinct land use characteristics. When applied to urban agriculture, the model reveals opportunities for integrating urban farming into the city landscape. The transition zone, surrounding the CBD, can accommodate urban agriculture initiatives such as community gardens, rooftop gardens and urban farms (Aderinto & Achem, 2019). The low-income housing zone can support backyard gardening and community-based urban agricultural projects, while the middle-income residential zone may feature larger community gardens. The commuting zone, on the outskirts of the city, can accommodate large-scale urban agriculture initiatives, such as peri-urban agriculture or agro-ecological farming.

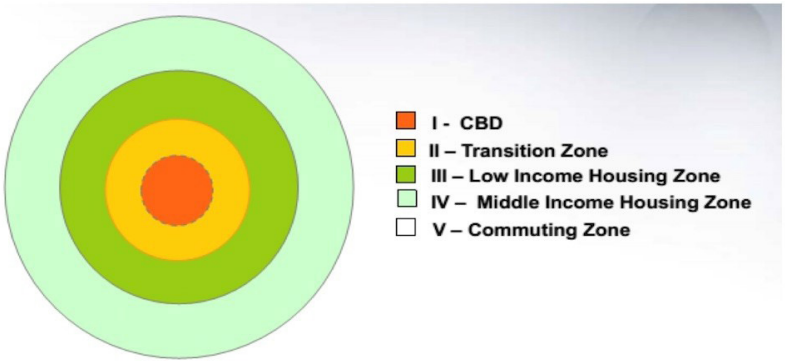

Figure 1: Burgess Concentric Zone Model
Source: Haggerty (1971).

Urban Farming Practices and it Relevance in Cities

Urban farming is the practice of growing and cultivating food in urban areas (Othman *et al.,* 2017). This innovative approach to food production has gained significant attention in recent years as cities seek to address issues of food security, sustainability, and environmental degradation (Likitswat, 2021). Urban farming practices in cities offer a sustainable future by providing fresh produce, reducing carbon footprints, and promoting community engagement (Xi *et al.,* 2022).

The mode of engagement of urban farmers in African cities such as Nigeria is such that they practice as a permanent job to earn a living or a complementary activity to have other sources of income. This urban activity is usually observed within the premises of residential houses, vacant and unused plots or rented lands for such purposes. The sizes of these lands used for urban agriculture varies based on the city structure.

One of the most important benefits of urban farming is its ability to provide fresh, local produce to urban residents. Traditional agricultural practices often require long-distance transportation, resulting in increased carbon emissions and decreased food quality (Bailkey & Greenstein, 2024). In contrast, urban farming allows for the production of fresh produce within city boundaries, reducing transportation costs and environmental impact (Orsini *et al.,* 2013). For example, rooftop gardens and vertical farms can be established in urban areas, providing a sustainable source of fresh produce for urban communities.

Urban farming practices also play a crucial role in reducing carbon footprints and promoting environmental sustainability. Traditional agricultural practices are often resource-intensive, requiring significant amounts of water, agrochemicals and pesticides. In contrast, urban farming practices often employ sustainable methods, such as hydroponics and permaculture, which minimize water usage and eliminate the need for chemical fertilizers (Othman *et al.,* 2017). Additionally, urban farming can help mitigate the urban heat islands' effect by providing green spaces and reducing the amount of impervious surfaces.

Furthermore, urban farming practices promote community engagement and cohesion. Urban farms often serve as community hubs, providing a space for residents to come together, share knowledge, and build relationships (Dhillon & Moncur, 2023). Community-supported Agriculture (CSA) programs, for example, allow residents to purchase shares in a farm produce, promoting a sense of ownership and community involvement (Grebitus *et al.,* 2020). Additionally, urban farming can provide job opportunities and training programs for urban residents, promoting economic development and social empowerment.

Constraints to Mainstreaming Urban Agriculture into the Built Environment

Urban agriculture has gained significant attention in recent years as a means to address food security, sustainability, and urban liveability. However, mainstreaming UA into the built environment faces numerous constraints, hindering its widespread adoption and integration (Hardman *et al.,* 2022). The built environment poses significant physical constraints to UA. Limited access to suitable land, soil contamination, and water scarcity are major challenges. Urban areas often have limited land, and high property values can make it difficult for UA practitioners to access affordable land (Sogang & Monkouop, 2022). Additionally, urban soils can be contaminated with pollutants, making them unsuitable for farming. Water scarcity is another significant constraint, particularly in areas with drought or water pollution.

Regulatory frameworks can also hinder the integration of UA. Zoning laws often restrict UA activities, limiting the types of crops that can be grown and the locations where UA can occur. Weak or inadequate policy and regulatory frameworks can also hinder UA development and growth. The lack of standardization in UA practices and regulations can create confusion and uncertainty for stakeholders such as the urban farmers and policymakers in urban and agricultural-inclined agencies responsible for policies related to land and agriculture.

Urban Agriculture often faces economic constraints, such as high start-up costs, limited access to farmers' market, and competition with industrial agriculture (Langemeyer *et al.,* 2021). Social constraints such as limited community acceptance, lack of public awareness, and competing interests for urban space, can also hinder UA adoption. The lack of education and training programs for UA practitioners can limit the adoption and success of UA initiatives (Chenarides *et al.,* 2021).

Despite these challenges, there are opportunities for mainstreaming UA into the built environment. Innovative urban farming practices, such as hydroponics, and vertical farming, can help overcome physical constraints (Horst *et al.,* 2024). Strong policy and regulatory frameworks can support UA development and growth. Community engagement and education can help overcome social constraints and promote public awareness and acceptance of UA.

MATERIALS AND METHODS

Bauchi metropolis is situated between Latitude 10°16'30" to 10°21'00" and Longitude 9°48'00" to 9°52'30" (Figure 2). Bauchi metropolis had a projected population of 670,280 in 2023 (Bashir, 2022). The metropolis is the headquarter of Bauchi State. The study area (Figure 2) has passed through series of urban changes in terms of its administrative status as the State capital in the course of its development (Bashir, 2022). The socioeconomic status of Bauchi metropolis can be likened to an area dominated by civil servants who work for the government as an occupation. Urban farming or agriculture is then practiced on a smaller scale by this government workers, while some other urban dwellers practice on a full time basis. The climate of the area is tropical in nature with distinct rainy seasons. It has an annual rainfall of 1097mm with the highest rainfall in August (Bashir, 2022). The soil of Bauchi metropolis is mainly laterite, while other minor soil categories include clay and loamy which occurs along flood plains, providing fertile soils for urban agriculture. Bauchi metropolis has two broad relief zones, a high plain area of hill range which is part of the crystalline rock area of northern Nigeria, and central high plains such as Dutsen Tanshi, Guru, and Kofar Wambai. These plains are favourable for urban agriculture and the development of human settlement (Bashir, 2022).

This study adopted the non-experimental research design. Specifically, it considered the survey-based approach to the design of the research. Primary and secondary sources of data were used for the study. The primary sources of data were obtained from field observations, google imagery of the study area, field surveys of the registered and unregistered urban farmers, and interviews. The data required comprises of socio-economic characteristics of urban farmers, location of urban agriculture practices among others. The secondary source of data was sourced from the reviews of relevant literatures and records from government institution. There are two categories of farmers who practice UA on either full time or part time basis in the study area. These are registered and unregistered urban farmers. According to data from the Bauchi State Agricultural Development Programme (BSADP) Area Office, there are 427 registered urban farmers across the eight political wards of the Bauchi metropolis; all of whom have farmlands located within the metropolis (Table 1).

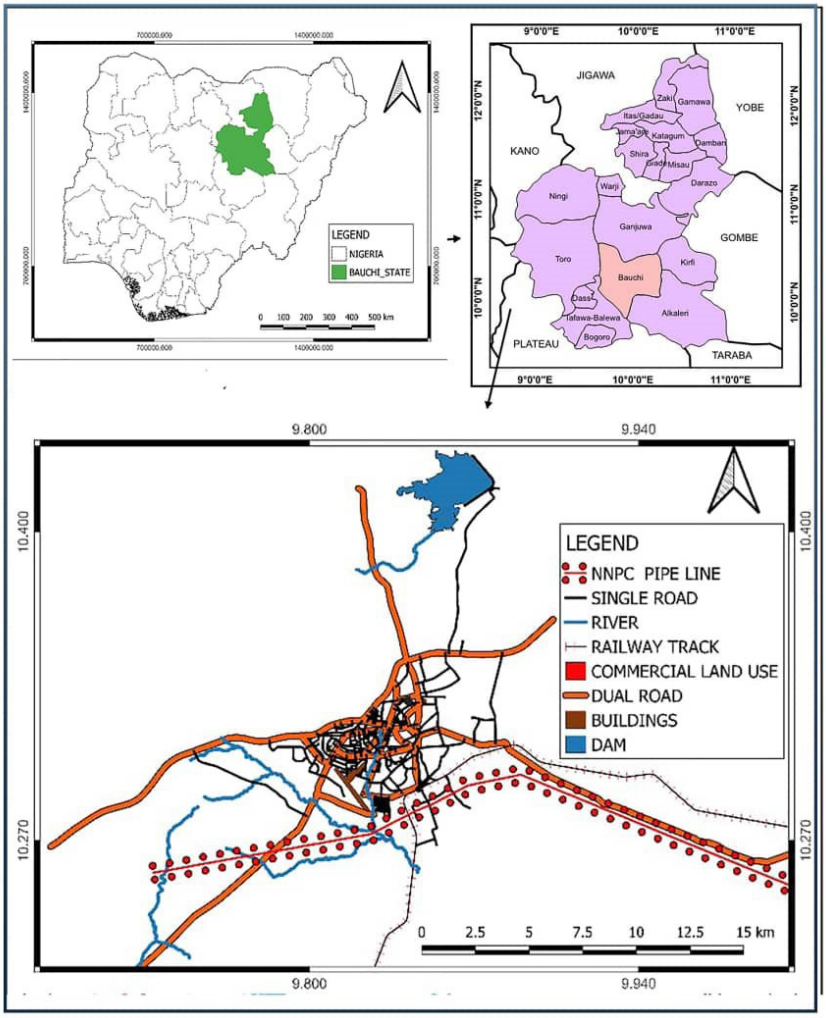

Figure 2: Major Roads in Bauchi Metropolis
Source: ArcGIS Version 10.6 Digitized by the Researchers' (2024)

Table 1: Registered Urban Farmers

S/N	Wards	Numbers of Registered Farmers	Location of Farmlands
1	Maji Dadi A	50	Army Barracks, Gudum, State Secretariat, Industrial Area, Gombe Road, Ningi Road, Bigi, Urban Fringe
2	Maji Dadi B	41	Gwallaga, State Secretariat, Federal Polytechnic Bauchi Premises, Urban Fringe, Gubi Dam, Ningi Road, Maiduguri Road, Abubakar Tafawa Balewa University Bauchi Premises, Wuntin Dada, Government Girls' College Premises Bauchi,
3	Makama/Sarki Baki	55	Nasarawa, Wuntin Dada, Federal Government Girls College Bauchi, College of Agriculture, Army Barracks, Gudum, Gombe Road.
4	Dandango	13	Gudum, Industrial Area, Bigi, Urban Fringe
5	Birshi/Miri	85	Yelwa, General Hassan Usman Katsina Unity College Premises, Wuntin Dada, Federal Poly, Doka, Bauchi Radio Corporation Premises, S/Kaura, Lushi, Abubakar Tafawa Balewa University Bauchi, Birshi-Gandu, Bayara, Tsakani-Bayara, Tudun-Maizamani, Dass Road
6	Kangere/Turwun	138	Gudum, Bayan Nitel, Tirwun, Maiduguri Road, Ningi Road, Army Barracks, Gubi Dam Area, Federal Government Girls College Bauchi, Dojinji, Madina Quarters

7	Dan'iya Hardo	25	Zango, State Secretariat, Industrial Area, Bigi, Abubakar Tatari Ali Polytechnic Bauchi Premises, Jos Road, Urban Fringe, Army Barracks, Tirwun, Birshi-Gandu
8	Dawaki	20	State Secretariat, Gwallagan Mayaki, Army Barracks, Maiduguri Road, Gudum Area, Urban Fringe
	Total	**427**	

Source: BSADP (2024)

In order to have an approximate and reliable number of urban farmers operating in the study area, the researcher, with the help of twenty-four (24) field assistants and Agricultural extension field workers, identified and quantified the unregistered farmers by field observations using the chain referral sampling technique. This Technique was adopted from Ola (2020) in his study on, 'building a food-resilient metropolis through Urban agriculture'. The field assistants were engaged on temporary basis from each political wards, and trained on how to enumerate the farmers. At the end of the exercise, a total of 1,073 unregistered urban farmers were identified in the Bauchi metropolis. Therefore, a total of 1,500 farmers were found to practice urban agriculture in Bauchi metropolis. Krejice and Morgan (1970) sample size determination tables assisted the researcher in the estimation of the

Table 2: Registered and Unregistered Urban Farmers

S/N	Political wards	Registered Farmers	Unregistered Farmers	Total	Sample Size
1	Maji Dadi A	50	20	70	14
2	Maji Dadi B	41	32	73	15
3	Makama/Sarki Baki	55	24	79	16
4	Dandango	13	158	171	35
5	Birshi/Miri	85	505	590	120
6	Kangere/Turwun	138	149	287	59
7	Dan'iya Hardo	25	100	125	26
8	Dawaki	20	85	105	21
	Total	**427**	**1,073**	**1,500**	**306**

Sources: Researchers' Fieldwork (2024) and BSADP (2024)

sample size for the study. Consequently, three hundred and six (306) copies of structured questionnaire were administered to the urban farmers in each political ward based on their population in relation to the total number of farmers identified for the study. The questionnaire administration was achieved with the help of twenty-four (24) field assistants in twenty-one (21) days. The languages of administration were English, Hausa and pidgin to eliminate communication barriers during the survey. The time of administration of the questionnaire was between the early hours of the morning (7:00am to 9:00am) and the early hours of the evening (5:00 to 6:30pm). Some of the farmers were found at home, while some were sampled at their respective farms across the metropolis. A total of 285 copies of the questionnaire were eventually completed.

The Google imagery of the study area was downloaded using Google Earth technology. The geographic coordinates were imputed into the ArcGIS computing environment in order to map out the existing locations of urban farm sites in the study area. The data collected were processed with the Statistical Package for Social Sciences (SPSS). Two statistical analyses were employed to summarize the data and make inferences. Descriptive statistics involving frequency tables and percentages was used to report the socioeconomic characteristics and existing practices of UA, while the Respondent Agreement Index (RAI) was used to measure constraints to Urban Agriculture in the study area.

RESULTS AND DISCUSSIONS

The socioeconomic characteristics of the respondents are presented in Table 3. The results show that the number of male respondents is significantly higher than females, indicating that urban farming is a male dominated activity in the study area. The majority of respondents (34.4%) are between 51 to 60 years old, while the 18-30 age group represents the least participation in urban agriculture. Furthermore, 69.8% of respondents are married, while separated urban farmers accounted for only 3.9% of the responses. Single individuals may have more flexibility to manage their time and resources, making it easier to engage in urban agriculture. Married couples can share responsibilities and work together on urban agriculture projects, promoting teamwork and collaboration. They can also benefit from the economic savings of growing their own food if they practice urban farming. In the case of divorced or separated individuals, by engaging in productive activities like urban agriculture, it can serve as a therapeutic outlet. In terms of educational

status, 28.8% have informal qualifications, 26.3% have secondary education, 25.3% have tertiary education, and 19.6% have primary school qualifications. The occupational distribution shows that 37.5% are farmers, 18.6% are civil servants or artisans, 14.0% are engaged in other minor occupations such remote works and retirees. Only 11.2% are traders. There are occupations that have flexible schedules and others with limited schedules. For example, retirees may have more time to devote to urban gardening and can benefit from the physical activity and its associated social connections. Commute-intensive occupations such as drivers may have limited time and energy to practice urban farming. Similarly, essential workers who are civil servants, such as doctors, pharmacists and nurses, usually have non-traditional shifts for work, and this may be a challenge for practicing urban farming. Finally, the monthly income distribution reveals that the majority of respondents earn less than ₦29,000. This implies that majority of the urban farmers are low-income earners and for this reason they may struggle to compete with commercial farmers in terms of scale, technology, and market access. Furthermore, securing or purchasing lands for urban agriculture will be a major challenge due to their limited income.

The findings, as shown in Figures 3, 4 and 5, reveal that urban farming is extensively practiced within the premises of public institutions and at the urban fringes of Bauchi metropolis. Table 4 outlines the existing UA sites in the city. Observations across Bauchi metropolis indicate that various forms of UA are currently being practiced,

Table 3: Socioeconomic Characteristics of Urban Farmers

Characteristics	Category	Urban Farmers	Per cent
Gender	Male	215	75.4
	Female	70	24.6
	Total	**285**	**100.0**
Age Group (in years)	18-30	19	6.7
	31-40	32	11.2
	41-50	77	27.0
	51- 60	98	34.4
	61 and above	59	20.7
	Total	**285**	**100.0**
Marital Status	Single	24	8.4
	Married	199	69.8
	Divorced	16	5.6
	Separated	11	3.9
	Widowed	35	12.3
	Total	**285**	**100.0**
Educational Status	Primary	56	19.6
	Secondary	75	26.3
	Tertiary	72	25.3
	Others	82	28.8
	Total	**285**	**100.0**
Occupation	Civil servants	53	18.6
	Artisans	53	18.6
	Trading	32	11.2
	Farmers	107	37.5
	Others	40	14.0
	Total	**285**	**100.0**
Monthly Income (in Naira)	Below 29,000	84	29.5
	30,000 - 50,000	70	24.5
	51,000 - 70,000	59	20.7
	71,000 - 90,000	49	17.2
	91,000 & above	23	8.1
	Total	**285**	**100.0**

Source: Researchers' Fieldwork (2024)

such as guerrilla farming, sack farming, and backyard gardening. Guerrilla farming is a farming practice on abandoned or unused plots of land over which the farmer has no legal rights. Farmers often choose these unusual sites because they are generally free or low-cost. Apart from setbacks and right-of-way areas, river banks are also popular sites for guerrilla farming. Additionally, some farmers in Bauchi metropolis utilize vacant plots of land that are yet to be developed by the owner, or they search for lands at the urban fringes, either on lease or mortgage, for their UA practices. UA is more prevalent in the fringes of Bauchi metropolis, particularly in areas like Yelwa, Bayara, Birshi, Gudum, Gubi Dam Axis, Wuntin Dada, Inkil, and Turum, where there is more available land and less competition for access.

Table 4: Existing UA Sites in Bauchi Metropolis

S/N	Locations	Area in Hectares
1	Abubakar Tafawa Balewa University, Yelwa Campus, Bauchi	56.58
2	Federal Polytechnic, Bauchi	238.65
3	Abubakar Tafawa Balewa University Teaching Hospital	29.38
4	Shadawanka /School of Armour Army Barracks	1,897.1
5	Police Training School, Yelwa, Bauchi	29.66
6	Federal Government Girls' College, Bauchi	26.54
7	College of Agriculture Bauchi	48.54
8	Abubakar Tatari Ali Polytechnic, Bauchi	23.17
9	State Secretariat, Bauchi	13.39
10	Premises of Bauchi Radio Corporation, Yelwa, Bauchi	15.42
11	Specialist Hospital Bauchi	6.68
12	General Hassan Usman Katsina Unity College	25.09
13	Government Girls' College Bauchi	3.18
14	Green House at College of Agriculture, Bauchi	2.50
15	Other UA Sites in some parts of the metropolis	10,102.48
	Total	12,518.36

Source: Researchers' Fieldwork (2024)

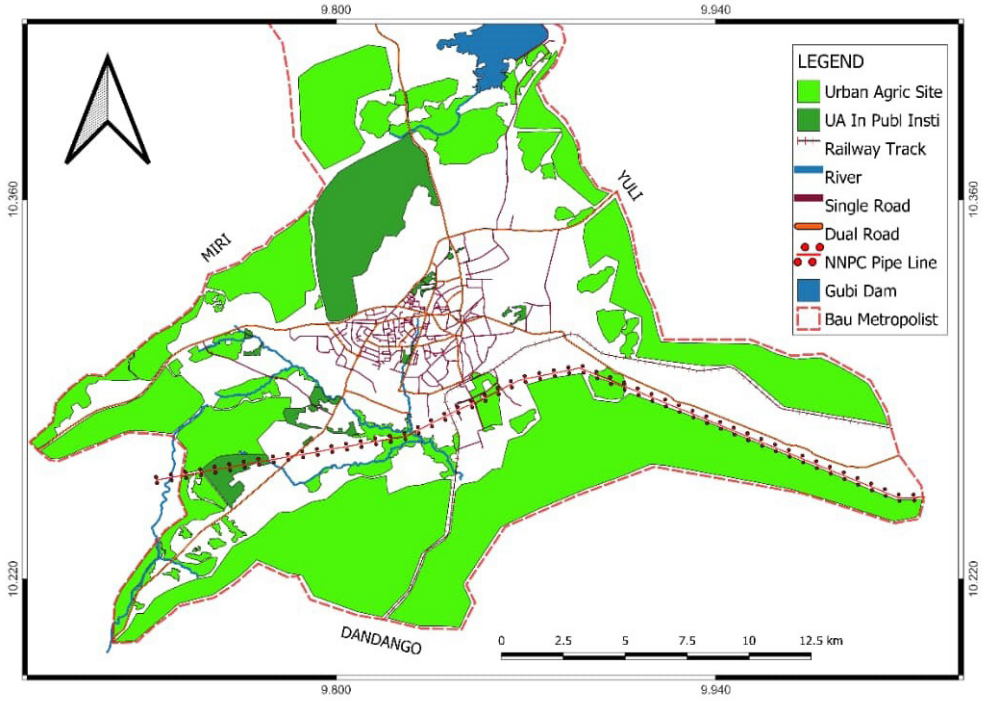

Figure 3: Existing UA Sites in Bauchi Metropolis
Source: ArcGIS Version 10.6 Digitized by the Researchers' (2024)

Figure 4: Green House Urban Agriculture Innovation in College of Agriculture Bauchi
Source: Researchers' Observations (2024)

Figure 5: Fruits and Vegetable Farms at Bauchi State Secretariat
Source: Researchers' Observations (2024)

According to Table 5, about 37.5% of respondents are full-time urban farmers, while 62.5% are part-time. Regarding the years of practicing urban agriculture, the majority (23.9%) have been engaged for 5-9 years, followed by less than 5 years (22.1%), 10-14 years (21.1%), 15-20 years (19.3%), and 21 years or more (13.7%). This suggests that urban agriculture has been a persistent practice, albeit with fluctuating levels of engagement over time. The lack of supportive policies may contribute to the uneven participation. These findings corroborate with the study of Bhat and Paschapur (2020) that exposed the major issues hindering participation in UA such as non-recognition of urban farming in agricultural policies and urban planning thus, ignoring its importance in agriculture production system and development. In terms of land use, most farmers (31.9%) cultivate on lands with sizes less than 540m2, 30.5% use 540-1800m2, 23.9% utilize 1800-10,000m2, and only 13.7% have more than 10,000m2 utilized for urban farming. This indicates that urban agriculture is primarily practiced on small land parcels, likely due to competition with other land uses and urbanization pressures. This result is similar with observations by Bolanle and Oluwafisayo (2018) that UA is practiced on small size of farm lands, and if more lands are available for urban farming, there will be more food to feed the increasing urban population. Furthermore, the land tenure arrangements reveal that only 13% of farmers own the land they cultivate on, while the majority squat on people's lands (23.5%), renting (8.4%), borrowing (7.7%), or leasing (17.9%). The farm locations are also diverse, with 40.7%

on vacant plots, 33.3% on public institution land, 18.6% at the urban fringe, and 7.4% within residential premises. This uncoordinated pattern suggests a lack of designated areas for urban agriculture in the master plan of Bauchi metropolis. This is in line with the findings of the report of FAO (2016) that intra-urban agriculture takes place within the built-up areas in a city. Urban farming practitioners make use of vacant and underutilized land area or private lands that can have an interim use for urban agriculture. The distances between residences and farmland vary, with 22.5% confirming a distance of less than 1km, 17.5% within 1-4km, 18.6% within 4.1-7km, 20% within 7.1-10km, and 21.4% over 10km. This indicates that as the city expands, farmers may likely travel outward and further to access land for farming. The findings of Ola (2020) and Ramsey and Danielle (2011) suggests that the increasing urbanization and sub-urbanization may explain the reasons for the increasing relocation of farms, which in turn increases distance between farmers' residence and their farmlands and increased cost of production. The primary modes of transportation to the farms are motorcycles (32.6%), commercial vehicles (29.1%), trekking on barefoot (20.7%), cycling (10.2%), and the use of the farmer's private vehicle (7.4%).

Table 5: Existing Situation of Urban Farming Practice

Status	**Category**	**Urban Farmers**	**Per cent**
Mode of Engagement	Full time	107	37.5
	Part time	178	62.5
	Total	**285**	**100.0**
Duration of Practice	Less than 5 years	63	22.1
	5 – 9 years	68	23.9
	10 – 14 years	60	21.1
	15 – 20 years	39	13.7
	21 year and above	55	19.3
	Total	**285**	**100.0**
Estimated size of farmland	Less than 540m^2	91	31.9
	540m^2 - 1800m^2	87	30.5
	1800m^2 – 10,000m^2	68	23.9
	10,000m^2 & above	39	13.7
	Total	**285**	**100.0**
Land Ownership	Owned	37	13.0
	Freehold	84	29.5
	Renting	24	8.4
	Borrowing	22	7.7
	Squatting	67	23.5
	Leasehold	51	17.9
	Total	**285**	**100.0**
Location of farm	Within house	21	7.4
	Vacant plot	116	40.7
	At the urban fringe	53	18.6
	Public institution	95	33.3
	Total	**285**	**100.0**
Estimated Distance from Farmland to Residence	Less than 1km	64	22.5
	1.1 – 4km	50	17.5
	4.1 – 7km	53	18.6
	7.1km - 10km	57	20.0
	Above 10km	61	21.4
	Total	**285**	**100.0**

Mode of Transportation	Bicycle	29	10.2
	Motorcycle	93	32.6
	Commercial transport	83	29.1
	Private	21	7.4
	Total	**285**	**100.0**

Source: Researchers' Fieldwork (2024).

Constraints to Urban Agriculture

The results presented in Table 6, highlights the various constraints faced by urban agriculture (UA) practitioners in Bauchi metropolis. Regarding the challenges encountered by urban farmers in the study area, it reveals that lack of tenure security is one of the major obstacles of urban agriculture. Limited access to land and poor credit facilities and funding also contributed significantly as a hindrance to urban agriculture. Additionally, the farmers affirmed to having moderate knowledge of modern technologies and seasonal fluctuations in rainfall as other significant constraints, with mean values of 3.69 and 3.50 respectively. However, the urban farmers were undecided on whether farm inputs, regulatory/government policies, and theft constitute challenges to their farming activities. Moreover, the Average Relative Absolute Index (RAI) value of 3.64 suggests that the farmers agreed that all the items outlined constitute a challenge in the practice of urban agriculture in the study area.

Table 6: Respondent Agreement Index (RAI) on Constraints to UA

Constraints to UA	**5**	**4**	**3**	**2**	**1**	**SWV**	**RAI (MS)**	**MD (RAI)**
Tenure security	162	71	14	13	25	1187	4.16	1.252
Limited Land Area	147	80	16	24	18	1169	4.10	1.213
Poor Access to Finance	122	112	13	18	20	1153	4.05	1.166
Knowledge of Modern Technologies	94	107	15	40	29	1052	3.69	1.331
Seasonal Fluctuation of Rainfall	81	99	14	63	28	997	3.50	1.363
Farm Input	70	103	14	51	47	953	3.34	1.439
Regulatory Government Policies	70	88	16	62	49	923	3.24	1.465
Theft	61	70	22	79	53	862	3.02	1.459
Average RAI (MS)							3.64	1.336

Scale: Strongly agreed (5), agreed (4), undecided (3), disagreed (2) strongly disagreed (1) N =285
Source: Researchers' Analysis (2024).

CONCLUSION

The rapid urbanization in Bauchi metropolis, Nigeria, has led to a significant increase in the urban agricultural sector as a means of addressing food security challenges amid various constraints. This study highlights a substantial number of both registered and unregistered urban farmers practicing UA primarily in small land parcels across diverse urban and peri-urban locations. Many urban farmers engage in urban agriculture (UA) part-time, with the majority having practiced it for 5 to 14 years. However, they face significant barriers, including tenure insecurity, limited access to land, and inadequate funding, exacerbated by unplanned metropolitan expansion. The socioeconomic profile of urban farmers in Bauchi metropolis shows a predominance of male farmers, most of whom have minimal educational qualifications and earn very little income from UA. The diverse practices observed, ranging from guerrilla farming to backyard gardening, emphasize the innovative approaches urban farmers have adopted to survive. Yet, the uncoordinated development of UA and lack of supportive policies complicate their efforts. This research underscores the necessity for policymakers to prioritize and institutionalize urban agriculture, integrating it into broader urban planning frameworks to boost food security and economic resilience in rapidly growing urban centres like Bauchi metropolis.

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