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Urban Gardening, Access to farmland and local food security in Jos South LGA

Dr. Omomoh Emmanuel, Dr. Nannim Sunday, Moses Omitunde Omirinde, Nmega Donald Uzoma, & Gwamzhi Ponsah Emmanuel

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ABSTRACT

In contemporary cities, agriculture increasingly forms part of the urban landscape, particularly in developing countries where rapid urbanization, unemployment, poverty and food insecurity have increased the importance of local food production. The significance of urban agriculture has become even more apparent as Jos continues to experience population growth and spatial expansion. The study was conducted in Jos South Local Government Area of Plateau State, Nigeria, with particular emphasis on the continuously built-up and urbanizing portions of the LGA where arable farming occurs. The climatic conditions of Jos South are particularly favorable for crops such as Irish potato, carrot, cabbage, lettuce, tomato, green pepper and other vegetables. The settlement class experienced the most significant change during the study period. Settlement area increased from 43.82 km² in 2014 to 79.32 km² in 2024, representing an absolute increase of 35.50 km² and a percentage increase of approximately 81.01%. Water bodies experienced only a minor reduction, declining from 4.57 km² in 2014 to 4.46 km² in 2024. This represents a decrease of approximately 0.11 km², equivalent to 2.41%. Market gardens declined from 10.177 km² in 2014 to 8.958 km² in 2024. This represents a loss of approximately 1.219 km², or 11.98% of the 2014 market-garden area. Thus, nearly 12% of the market-garden area recorded in 2014 was no longer classified as market garden by 2024. The substantial increase in settlement area indicates growing competition for urban land. At the same time, the reduction in market-garden land suggests that agricultural spaces are becoming increasingly vulnerable to urban development.

1. Introduction

1.1 Background to the Study

Urban agriculture is not a new phenomenon; rather, it is a longstanding component of human settlement systems and has historically persisted wherever urban populations have required access to food, income and livelihood opportunities. In contemporary cities, agriculture increasingly forms part of the urban landscape, particularly in developing countries where rapid urbanization, unemployment, poverty and food insecurity have increased the importance of local food production. Earlier estimates by the United Nations Development Programme indicated that hundreds of millions of urban residents were engaged in commercial or subsistence agriculture within cities and their surrounding areas (UNDP, 1996; Smit et al., 1996). Subsequent studies have similarly demonstrated that urban agriculture can provide food, employment, supplementary income and livelihood support for urban households, especially in African cities (Drakakis-Smith, 1995; Lado, 1990; Lee-Smith, 1991; Potts, 1989; Sanyal, 1986).

The continuing importance of urban agriculture has become more pronounced with rapid urban population growth. In sub-Saharan Africa, urbanization is occurring alongside persistent poverty, unemployment and food insecurity, making the capacity of cities to produce part of their own food supply increasingly significant. A recent review by Kiribou (2024) found that urban farming contributes to food and nutritional security, employment and income generation while also reducing some of the costs associated with transporting agricultural products into cities. However, the study also identified rapid urbanization, climate change, weak urban agricultural policies and limited institutional support as major challenges to the sustainability of urban farming in the region.

In Nigeria, urban agriculture has similarly become an important livelihood and food-production strategy. The rapid expansion of Nigerian cities has increased demand for food while simultaneously placing pressure on peri-urban and urban agricultural land. Consequently, urban farming provides an opportunity for households to produce food close to consumers, generate income and diversify their livelihoods. Omali et al. (2024) argue that urban agriculture is particularly relevant to Nigeria because increasing urbanization and economic pressures have encouraged city residents to engage in farming as a means of obtaining food, income and other household necessities. The authors further emphasize the importance of geospatial technologies for identifying, mapping and monitoring urban agricultural land and understanding its relationship with urban development.

Within this broader context, urban agriculture has historically been an important component of the physical, economic and social development of Jos. The development of agriculture in and around Jos is closely associated with the history of commercial tin mining on the Jos Plateau. Commercial mining of tin and associated minerals began in the region in the early twentieth century and subsequently contributed to significant demographic, economic and landscape transformations. An important agricultural consequence of the mining economy was the development and expansion of irrigated or dry-season agriculture, particularly in fadama environments. Hausa and Kanuri miners introduced and developed irrigated cultivation on the Plateau, initially concentrating production on flood plains located only a few meters above river channels. The subsequent introduction of mechanical pumps, which

gradually replaced the traditional shadoof system, enabled irrigation to expand beyond the immediate flood plains to higher areas wherever suitable water resources were available (Phillips-Howard et al., 1990).

The significance of urban agriculture has become even more apparent as Jos continues to experience population growth and spatial expansion. The population of the Jos urban area increased substantially over successive decades, creating greater demand for food, housing, transportation and other urban services. The expansion of built-up areas, however, creates competition for land between agricultural production and urban development. Earlier geospatial research in Jos North demonstrated a substantial decline in urban agricultural land between 1986 and 2005, while built-up land expanded considerably. The study estimated that urban agricultural land declined from approximately 19.2% of the study area in 1986 to 11.26% in 2005.

This pattern highlights an important dilemma confronting Jos: the same urban growth that increases demand for agricultural products also threatens the land on which those products are produced. More recent research continues to demonstrate the persistence of this tension. A 2026 geospatial study of Jos South reported substantial expansion of settlement areas alongside changes in agricultural land use, while another recent study identified land-tenure insecurity, limited irrigation water, pest and disease pressure, inadequate fertilizer and competition from urban development as important constraints affecting urban agriculture in the Jos area.

The aim of this study is to generate comprehensive data and information on the nature and status of arable farming in Jos Metropolis. The objectives of this study are: to determine the extent of urban agricultural landuse particularly between 2005 and 2010, identify the people engaged in urban agriculture, examine the ways farmers gain access to land, to identify the types of crops grown by the farmers, explain the farming practices involved in urban cultivation and examine the constraints to urban agricultural landuse.

2. Study Area

The study was conducted in Jos South Local Government Area of Plateau State, Nigeria, with particular emphasis on the continuously built-up and urbanizing portions of the LGA where arable farming occurs. Jos South is located in the north-central part of Plateau State and has its administrative headquarters at Bukuru. It has an average elevation of about 1250 m above sea level and stands at a height of about 600 m above the surrounding plains and lies between latitudes 9º 36′ 41.92″ and 9º 54′ 29.37″N and longitudes 8º 41′ 39.98″ and 8º 58′ 28.95″ East. It is a distance of about 300 km from the Federal Capital Territory, Abuja. The LGA shares boundaries with Jos North to the north, Jos East to the east, Barkin Ladi to the south, Riyom to the southwest and Bassa to the northwest. The official Jos South LGA profile gives an approximate land area of over 586 km² and describes the area as having a mixture of urban and rural characteristics.

The LGA comprises the major districts of Du, Gyel, Kuru and Vwang. Its location on the Jos Plateau provides relatively favorable climatic conditions for the production of vegetables, Irish potatoes and other crops. Agricultural activities occur under both rain-fed and dry-season conditions, with dry-season cultivation particularly associated with flood plains, river channels, fadama environments and areas around accessible water sources.

Jos South has also experienced substantial urban expansion. Previous remote-sensing research covering 1993–2013 found a marked increase in built-up land and a corresponding concern regarding the loss and transformation of arable land. The 2014–2024 period is therefore particularly important for examining whether these earlier patterns have continued and how urban agricultural land has responded to intensified development pressure.

For the purpose of this study, the study area is defined according to the official administrative boundary of Jos South LGA, while particular attention is given to the urbanizing and continuously built-up portions of the LGA where market-gardening activities occur. This distinction is important because the LGA contains substantial rural areas that should not automatically be classified as urban agricultural space.

2.1 Relief and Topography

Jos South is situated within the elevated landscape of the Jos Plateau. The terrain consists of relatively undulating surfaces interspersed with valleys, low-lying areas, hills, inselbergs and rocky outcrops. Elevation varies across the Local Government Area, with much of the landscape occurring at considerably higher elevations than the surrounding lowlands. The topographic variation has important implications for agriculture. Relatively level valley floors and low-lying areas provide favorable locations for cultivation, particularly during the dry season. These areas can accumulate moisture and sediments and are frequently associated with streams, drainage channels and floodplain environments. The undulating nature of the landscape also influences drainage, soil development, settlement distribution and accessibility. Areas with gentle slopes are generally more suitable for cultivation and settlement than steep or highly dissected terrain.

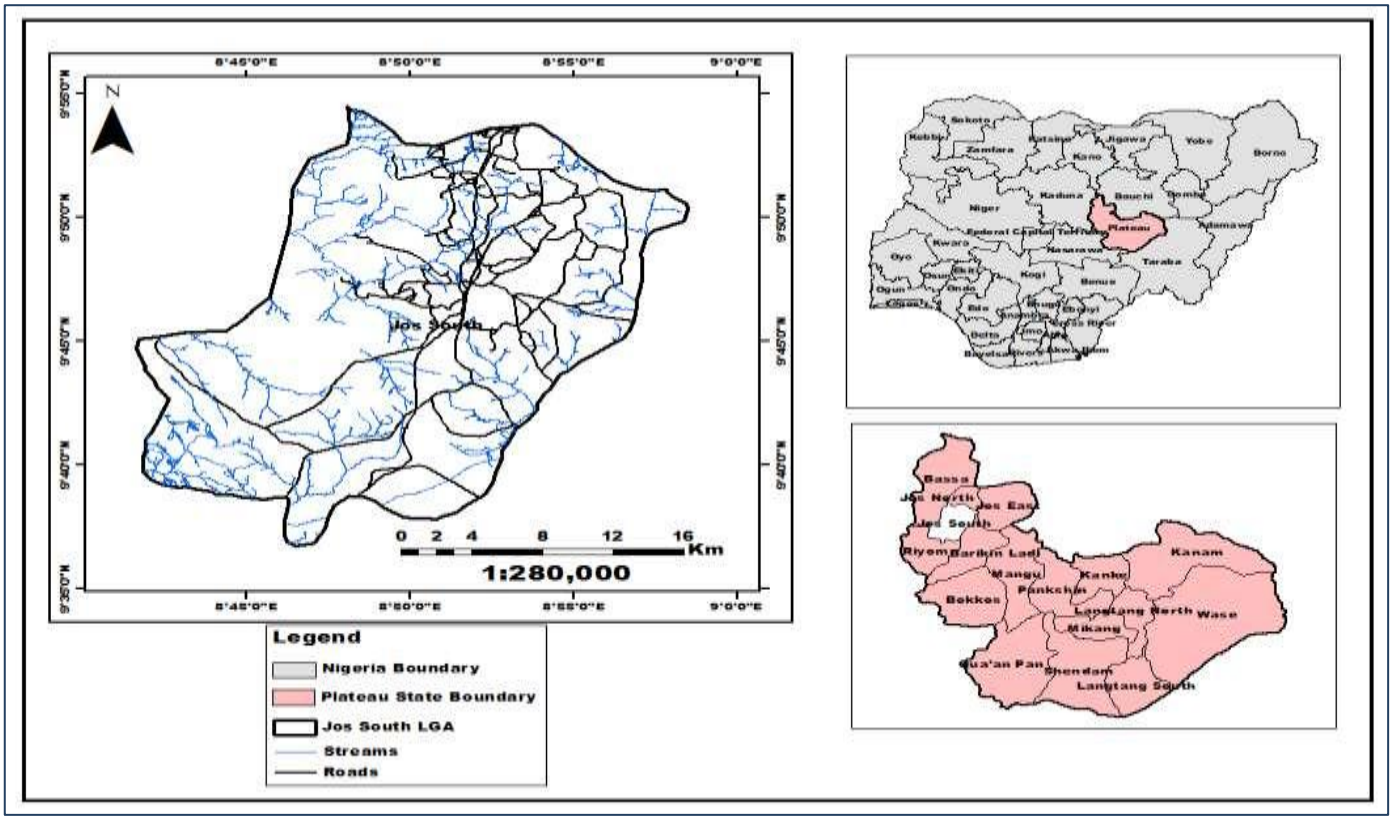

Figure 1: Study Area Showing Drainage and Road Networks

2.2 Geology

The geology of Jos South is predominantly associated with the Precambrian Basement Complex of the Jos Plateau, together with younger granitic formations associated with the geological evolution of the Plateau. Major rock types include granites, gneisses, migmatites and related crystalline rocks. The geological history of the Jos Plateau is particularly important because of its association with extensive deposits of tin and other minerals. Commercial exploitation of these mineral resources profoundly influenced the historical development of Jos and surrounding areas.

Mining resulted in extensive excavation, the creation of spoil heaps, abandoned mine pits and other forms of landscape modification. Some abandoned mining excavations subsequently became water-holding features and have contributed to the availability of water for agricultural activities in parts of the Plateau. Consequently, the present agricultural landscape of Jos South cannot be completely separated from its mining history. Former mining landscapes, drainage modifications and water-holding excavations have in some locations become incorporated into contemporary agricultural systems.

2.3 Climatic Characteristics

The description of the climatic characteristics of Jos-Bukuru Metropolis in this study is based on the work of Groove (1952), Alford and Tuley (1974), Hill and Rackham (1974), Ajaegbu et al., (1989) and the report on climate, soil and vegetation by Eziashi (1995) and Olowolafe, et al. (2000). Recent climatic data on temperature, rainfall and relative humidity were also obtained from the University of Jos climatic station (Tables 1 and 2).

Generally, the climate of Jos Plateau is influenced by its altitude and its position across the seasonal migration of the Inter-Tropical Convergence Zone (ITCZ). Altitude lowers the temperatures and induces rainfall of the orographic type. The mean annual temperature is about 22°C; the mean monthly maxima vary from about 27°C to about 31°C in March/April, and the mean monthly minima range from about 12°C to about 18°C in December/January (Alford and Tuley, 1974; Hill and Rackham, 1974). In exceptionally cool harmattan period, the temperate may reduce to well below 10°C. The cool weather permits sound agriculture and horticultural practices. The weather conditions have contributed to increased cultivation of various temperate like fruits and vegetables in Jos-Bukuru metropolis.

Rainfall distribution in Plateau State depends on the position of the landmass and associated hill ranges in relation to the prevailing winds over the region (Alford and Tuley, 1974). Mean annual rainfall on the Plateau is about 1465mm, varying however from about 1,800 mm in the southwest area to just about 1,000 mm in the southeast (rain shadow) part (Ajaegbu et al, 1989). The hydrological peak of the rainy season occurs generally in August, while that of the dry season is during early May. In effect, total rainfall is generally adequate although the incidence may be unpredictable or accompanied by frost, hailstone or heavy winds that sometimes destroy the fruits and vegetables in the farms. Rainwater usually accumulates in the numerous mine ponds scattered all over the area which provides irrigation water for dry season cultivation Land preparation and planting of most rainfed crops starts from late April to May while for dry season crops is from October.

The relative humidity is on the average highest during the rainy season at the peak of which approaches 100% between July and September. High relative humidity also explains why the cultivation of some vegetables such as tomatoes, cabbage, lettuce, green beans and carrot is not viable during the rainy season. At the peak of the dry season, between February and March relative humidity is as low as 20%.

Annual rainfall on the Jos Plateau is generally sufficient to support rain-fed agriculture during the wet season. However, dry-season production requires access to irrigation water. Consequently, the availability of streams, rivers, shallow groundwater, reservoirs and other water sources is an important factor in the development of market gardening. The climatic conditions of Jos South are particularly favorable for crops such as Irish potato, carrot, cabbage, lettuce, tomato, green pepper and other vegetables. This climatic advantage has historically contributed to the prominence of horticultural production in the Jos Plateau region.

Table 1: Mean Monthly Temperature (°C) of Jos Metropolis

Year/Month	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Ave
Jan	19.6	19.1	19.1	19.7	19.7	18.9	18.1	19.3	19.3	19.9	19.9	17.54
Feb	22	25.2	25.2	25.2	24.4	24.4	21	21	21.6	24.7	24.7	23.3
Mar	25.2	29.1	29.1	27.4	27.4	26.6	26.6	25.9	25.9	21.4	21.4	26.4
Apr	25	26.1	26.1	25	25	27.3	27.3	27.1	27.1	28	28	26.55
May	27	29.6	29.6	31.3	31.2	28	27	25.8	26.8	26.3	25.3	28.2
Jun	29.5	27.3	24.1	22.9	23.5	21.3	21.2	20.9	20.4	19.9	19.5	23.1
Jul	29.9	22.5	21.3	21.2	20.9	20.4	19.9	20.5	19.6	20.2	19.6	21.5
Aug	19.7	18.9	18.2	18.4	18.3	18.9	17.9	17.6	17.3	22.5	24.9	19.3
Sep	22.1	21.2	21	19.4	19.5	18.3	21.3	22.3	25.1	26.3	27.3	22.5
Oct	28.9	28.3	27.2	23.6	21.8	20.8	20.2	21.3	20.7	20.5	20.2	23.95
Nov	19.1	18.7	18.7	18.8	20.7	25.3	26.8	27.7	28.7	29.2	29.7	23.95
Dec	27.6	27.4	26.6	23.8	21	19.5	18.8	17.7	17.3	16.6	16.7	21.18

Source: University of Jos Meteorological Station, Jos

Table 2: Average Monthly Rainfall (mm) of Jos Metropolis

Year/month	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0	0	0	0	1	0	35	0	0	0	0
Mar	10.8	0	9	0	14.1	0	0	11.1	3	0	48.4
Apr	52.7	99.2	155.9	199.9	216.7	88.2	51.1	82.5	69.2	87.6	76.6
May	191.2	202.2	81.9	185.2	223.8	123.9	222.9	176.6	244	135.8	142.1
Jun	234.8	105	365.4	183.7	246.3	310.6	146.6	310	117.1	100.4	218.1
Jul	169.3	301.5	406.2	160.9	249.4	223.8	168.2	303.5	272.7	167.8	245.3
Aug	297.8	264.6	266	283.1	129	263.4	307.9	286	307.6	299.4	345.4
Sep	165	263.1	209.3	257.5	41	138.1	245.6	184.1	195.2	190.3	263.5
Oct	38.4	11.8	91	36.3	0	55.9	67.9	1.8	93.6	176	93.2
Nov	0	0	0	1.8	0	0	0	0	0	30.4	0
Dec	0	0	0	0	0	0	0	0	24.7	0	0
Ave	96.667	103.95	131.9	109.03	100.97	100.32	103.8	112.966	108.7	98.97	119.383

Source: University of Jos Meteorological Station, Jos

2.4 Drainage and Water Resources

The study area contains a network of streams, rivers, drainage channels and low-lying valley environments. These drainage features are important to both the natural environment and agricultural production. The availability of surface water has facilitated the development of dry-season agriculture, particularly in valley-bottom and fadama environments. Farmers in some locations use pumps to abstract water from streams, ponds and other water bodies for irrigation. The relationship between water resources and market gardening is particularly important for the present study because market gardens require relatively reliable water supplies during periods of low rainfall. The study therefore considers water bodies as an important component of the land-use system and examines their spatial relationship with market gardens between 2014 and 2024.

2.5 Population and Socioeconomic Characteristics

Jos South supports a substantial and growing population distributed across urban, peri-urban and rural settlements. Population growth and associated socioeconomic development have contributed to increasing demand for residential land, food, water, transportation and other services.

The population is socially and culturally diverse, with indigenous communities existing alongside people from other parts of Plateau State and Nigeria. This diversity has contributed to the development of a dynamic local economy involving agriculture, commerce, services, small-scale enterprises and other activities.

Agriculture remains an important livelihood activity, particularly in the rural and peri-urban parts of the LGA. Within the urbanizing environment, market gardening provides an opportunity for farmers to generate income while responding to the demand for fresh vegetables in Jos and neighboring urban markets.

2.6 Agricultural Activities

Agriculture is one of the major land uses in Jos South. The favorable highland climate, availability of cultivable land and access to water resources support the production of a wide range of crops. The agricultural system includes both rain-fed and irrigated production. Rain-fed cultivation is generally concentrated during the wet season, while irrigation permits production to continue during the dry season. Major crops cultivated in the area include Irish potato, tomato, carrot, cabbage, lettuce, onion, green pepper,

green beans, maize and other vegetables and arable crops. The prominence of vegetable production is closely associated with the relatively favorable climatic conditions of the Jos Plateau and the strong urban demand for fresh produce.

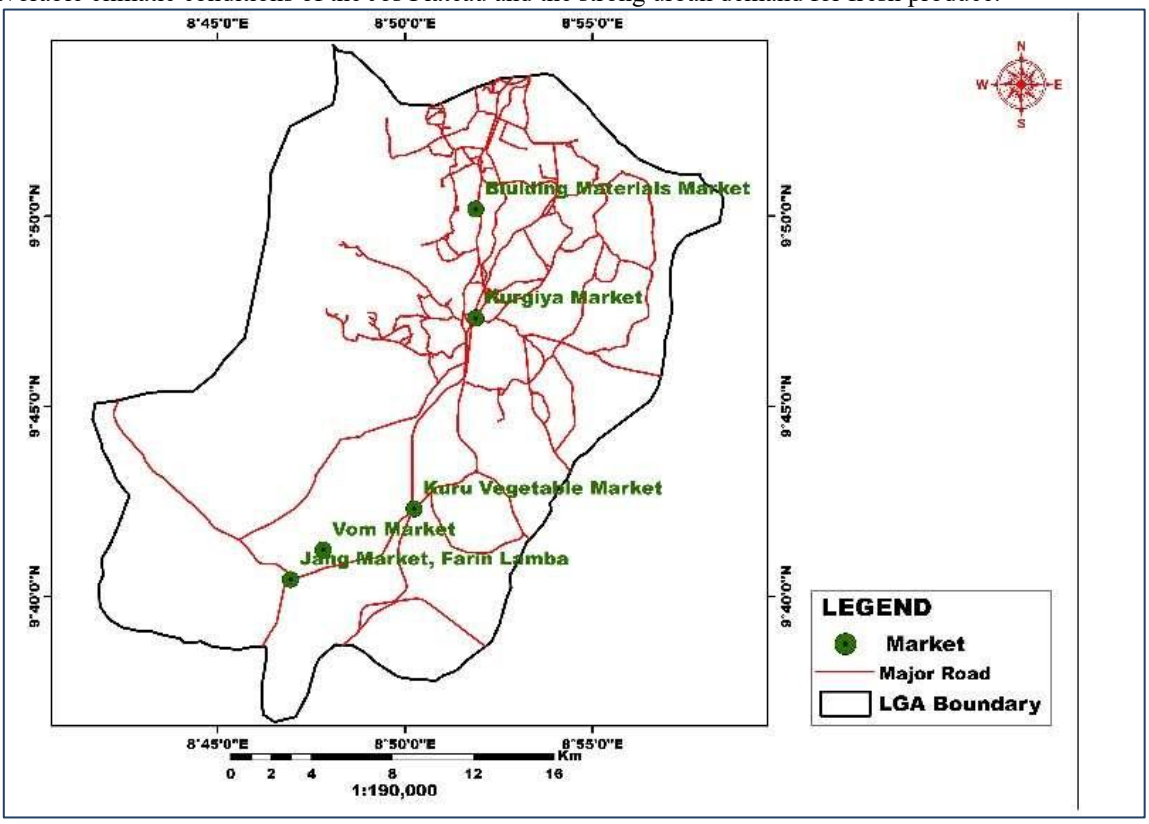

Figure 2: Map Showing Vegetable and Produce Markets Alongside Road Network in Jos South LGA

2.7 Market Gardening

Market gardening represents one of the most important forms of intensive agriculture associated with the urbanizing environment of Jos South. It involves the cultivation of vegetables and other high-value crops primarily for sale rather than exclusively for household consumption. Market gardens occur in a variety of locations, including: valley bottoms, fadama areas, river margins, areas around ponds, vacant urban spaces, residential plots, peri-urban open spaces and other locations with suitable soil and water conditions.

The production system is characterized by relatively intensive land use and, in many cases, multiple cropping cycles within a year. Irrigation is particularly important during the dry season. Farmers employ a range of irrigation techniques, including motorized pumps, portable pumps, watering cans, hoses and, where available, sprinkler and other improved irrigation systems. The spatial distribution of market gardens is therefore expected to be strongly influenced by water availability, soil conditions, accessibility, proximity to markets and pressure from urban development.

In summary, Jos South LGA is characterized by a distinctive highland environment, complex geological history, favorable agricultural climate, extensive human modification and rapid urbanization. Its historical association with tin mining has contributed to a landscape containing abandoned mine pits, modified drainage systems and water bodies that have subsequently acquired agricultural uses. Market gardening has developed as an important component of the local agricultural economy, particularly in areas where favorable soils, suitable climatic conditions and accessible water resources coincide. However, increasing settlement expansion has created competition for agricultural land.

These characteristics provide the environmental and socioeconomic context for examining the observed changes in market-garden land between 2014 and 2024. The study therefore treats Jos South not simply as an administrative unit but as a dynamic landscape in which urban growth, agricultural production, water resources, historical land use and socioeconomic activities interact to shape contemporary land-use patterns.

3. Methodology

The methodology combines remote sensing, GIS, field survey and socioeconomic investigation to assess urban arable farming in Jos South LGA over the 2014–2024 period. The use of multi-temporal satellite imagery provides a means of quantifying changes in agricultural land and examining the spatial relationship between agricultural land and urban expansion. Field verification and GPS measurements provide ground-based validation, while questionnaire surveys and key-informant interviews provide information on farmers, land-access arrangements, crops, production practices and constraints.

3.1 Sources of Data

The study incorporated the use of both primary and secondary data. Primary data were obtained through field observation, GPS coordinates of agricultural plots, physical measurement of selected farms, questionnaire administration to urban farmers, key-informant interviews, ground-truthing of satellite imagery and photographic documentation of agricultural activities.

Secondary data include satellite imagery for 2014 and 2024, administrative boundary data for Jos South LGA, road-network data, drainage and river-network data, topographic information, population and demographic information, existing land-use/land-cover datasets, agricultural reports, relevant government publications and published academic literature.

4. Results and Discussion

The study covers the period 2014 to 2024, representing a ten-year period of contemporary land-use change. Spatially, the study focuses on the continuously built-up and urbanizing portions of Jos South LGA, rather than treating the entire administrative area as uniformly urban. This distinction is important because Jos South contains both urban and rural landscapes.

The agricultural component focuses primarily on arable farming, including dry-season and rain-fed cultivation where such activities occur within the defined urban study area. Particular attention is given to agricultural plots located on, flood plains, river channels and their margins, fadama lands, vacant/open urban spaces, residential plots, roadsides where cultivation occurs, areas surrounding mine ponds and other temporarily or informally cultivated spaces.

Table 3: Changes in Settlements, Waterbody and Market Gardens Between 2014 And 2024

Class	2014 Area (km²)	2024 Area (km²)	Absolute Change (km²)	%Change
Settlements	43.82	79.32	+35.50	+81.01%
Waterbody	4.57	4.46	−0.11	−2.41%
Market Gardens	10.18	8.96	−1.22	−11.98%

Table 3 presents the changes in settlements, water bodies, and market gardens within the study area between 2014 and 2024. The results indicate a substantial expansion of settlement areas accompanied by a decline in the area occupied by market gardens, while water bodies remained relatively stable (Figures 3 and 4).

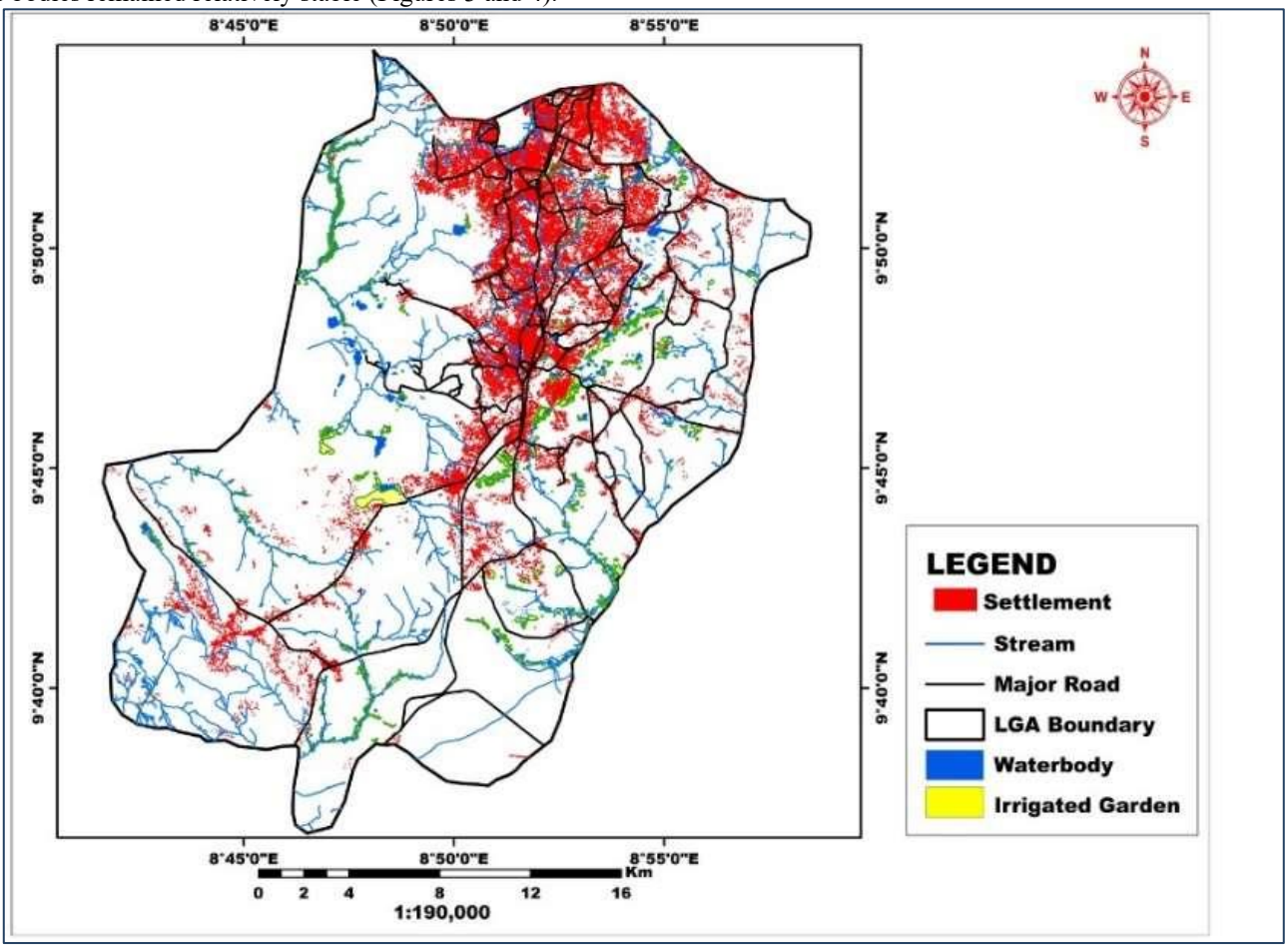

Figure 3: Urban Growth and Irrigated Agriculture in Jos South (2014)

4.1 Analysis of Land-Use/Land-Cover Changes, 2014–2024

4.1.1 Settlement Expansion

The settlement class experienced the most significant change during the study period. Settlement area increased from 43.82 km² in 2014 to 79.32 km² in 2024, representing an absolute increase of 35.50 km² and a percentage increase of approximately 81.01%. This indicates a rapid expansion of built-up areas within the study area. In practical terms, the settlement footprint in 2024 was approximately 1.81 times its 2014 extent. The result suggests substantial urbanization during the ten-year period, potentially driven by population growth, residential development, commercial activities, road expansion and associated infrastructure. The expansion of settlements is particularly important to the study of urban agriculture because agricultural land within or near the built-up environment is likely to face increasing competition from residential and other urban land uses.

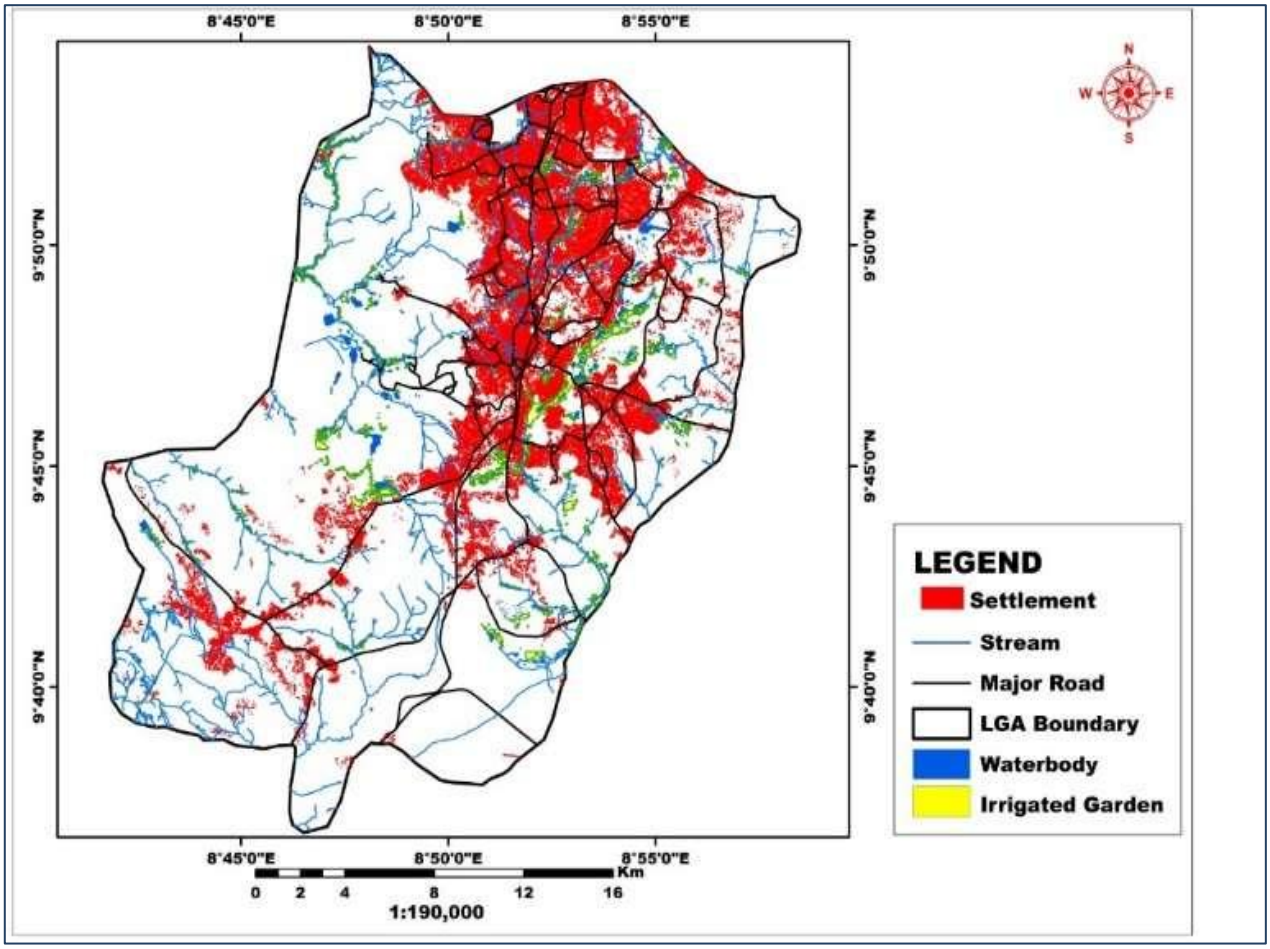

Figure 4: Urban Growth and Irrigated Agriculture in Jos South (2024)

4.1.2 Changes in Water Bodies

Water bodies experienced only a minor reduction, declining from 4.57 km² in 2014 to 4.46 km² in 2024. This represents a decrease of approximately 0.11 km², equivalent to 2.41%. The relatively small change suggests that the overall spatial extent of mapped water bodies remained relatively stable during the study period. However, the small decline should not necessarily be interpreted as evidence that water resources remained unchanged. Seasonal differences in image acquisition, variations in rainfall, sedimentation, irrigation withdrawals and changes in the physical condition of individual water bodies may influence their remotely sensed extent. For market-garden agriculture, however, the relative stability of water bodies is significant because access to water is an important factor supporting dry-season cultivation.

4.1.3 Decline in Market Gardens

Market gardens declined from 10.177 km² in 2014 to 8.958 km² in 2024. This represents a loss of approximately 1.219 km², or 11.98% of the 2014 market-garden area. Thus, nearly 12% of the market-garden area recorded in 2014 was no longer classified as market garden by 2024. This decline is particularly significant when considered alongside the 81.01% expansion of settlements. The results suggest that urban expansion may have placed considerable pressure on agricultural land. However, the table alone does not establish that all of the lost market-garden land was converted directly into settlements.

4.1.4 Implication for Urban Agriculture in Jos South

The findings have important implications for the sustainability of urban agriculture in Jos South Local Government Area. The substantial increase in settlement area indicates growing competition for urban land. At the same time, the reduction in market-garden land suggests that agricultural spaces are becoming increasingly vulnerable to urban development.

This situation may have several consequences:

- Reduction in agricultural land availability: Continued urban expansion may progressively reduce spaces available for vegetable and other arable crops production.
- Increasing pressure on remaining farms: As agricultural land declines, farmers may increasingly concentrate production on smaller available plots.
- Potential intensification of farming: Farmers may respond to land scarcity by increasing cropping intensity, irrigation and input use.
- Food-supply implications: A reduction in locally cultivated market gardens could increase dependence on agricultural products transported from outside the metropolitan area.
- Land-use planning implications: The findings demonstrate the need to consider productive agricultural spaces in urban planning rather than treating them simply as undeveloped land awaiting construction.

Farmers also identified several other constraints including: insecure land tenure, loss of farmland to urban development, shortage of irrigation water, high cost of inputs, inadequate fertilizer availability, pests and diseases, lack access to capital, inadequate extension services, theft of produce and farm inputs, poor access roads, marketing difficulties, environmental pollution, and climatic variability. But he most important pattern emerging from the table is the contrasting trajectories of settlements and market gardens. This suggests that the study area underwent considerable urbanization between 2014 and 2024, while market gardening experienced spatial contraction. The expansion of settlements has created increasing competition between agricultural and non-agricultural land uses. Agricultural plots that previously occupied vacant spaces or locations at the urban fringe may be converted to residential buildings, roads, commercial establishments and other forms of development.

5. Recommendations

In line with the findings from the study, the following are measures are recommended:

- Land allocations towards urban farming should be included in the municipal plans and efforts to safeguard land for this purpose should be a priority of relevant stakeholders.
- It is essential that farmers have ready access to necessary inputs, finances and markets. Thus. It is highly recommended that a workable framework to expedite and liberalize access to these factors of production be a priority of future planning.
- Other alternatives such as roof-top, multi-level and greenhouse farming along with other similar innovations employed in other climes could be developed to ease the dependence on large tracts of land for urban agriculture. This will further reduce the pressure on land resources and increase production, even while less land is used.
- Processing plants for the excess farm produce should be considered as a means of reducing post-harvest waste and maximizing the economic potential of urban farms within Jos South LGA and elsewhere on the Jos Plateau.

6. Conclusion

Jos South has experienced substantial settlement expansion over recent decades. The growth of Bukuru and other urban and peri-urban settlements has increased demand for residential, commercial and infrastructural land. As a consequence, much pressure is put on available arable and irrigable land to meet shortfalls in demand. This process makes Jos South an appropriate setting for investigating the relationship between urban expansion and agricultural land-use change. Understanding the results of this study and its findings may engender better landuse planning, irrigation management and food production in line with achieving Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger), SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production) and SDG 15 (Life on Land).

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