

Integrating the peri-urban community of Jos-Bukuru for inclusivity and wellbeing: Addressing resource disparities

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ABSTRACT: Resources are fundamental to urban development, influencing economic growth, sustainability, and overall quality of life, while promoting equitable access to essential services. However, in many Peri-urban areas, unequal resource distribution intensifies social inequality. This study aimed to investigate the availability and accessibility of resources in four Peri-urban settlements of the Jos–Bukuru Metropolis—Gwafan, Dong, Shen, and Kwata-Zawan—and identify the key actors involved in their management. A multi-method research approach was employed, combining interviews with four key informants comprising directors and heads of departments, ministries and agencies, as well as direct observation of identified resources, and field surveys administered to 250 residents, of whom 230 responded. Interview data were analysed using Atlas.ti, with emphasis on social and economic dimensions including land ownership, land-use balance, infrastructure provision, and social inclusiveness. Spatial analysis using GIS revealed significant disparities in the distribution of facilities. These disparities manifest as uneven access to essential and insufficient services across the settlements. The findings identify land as the primary determinant of access to infrastructure and economic opportunities, underpinning inclusive well-being. Agricultural land conversion and rural–urban blending emerged as dominant trends, highlighting urban growth and equity. Uncoordinated land-use changes were found to hinder equitable access to resources and pose risks to ecological and social stability. The study recommends enhanced intergovernmental collaboration to promote local economic development and improve infrastructure provision. Additionally, empowering residents in decision-making processes is critical for fostering inclusive, well-integrated, and sustainable peri-urban development.

Keywords: Accessibility, inequality, key resources, social stability, suburbs.

INTRODUCTION

Resources are fundamental to urban development, influencing economic growth, infrastructure quality, environmental sustainability, and social equity. Their effective management and fair distribution are essential for building resilient and inclusive cities. Sustainable development further depends on enhancing innovation and efficiency within regional systems (Liu *et al.*, 2024). Urban ecosystems provide crucial services that support residents' well-being both within cities and in surrounding rural zones; however, rising urban populations continue to increase demand for these services (Huang *et al.*, 2022; Sylla and Lasota, 2019).

As city spaces become limited, residents increasingly move to Peri-urban areas, leading to the conversion of farmlands and green spaces into built-up zones (Adu-Gyamfi, 2021; Cahya *et al.*, 2018). While spatial decision-making tools exist to manage this growth, they often fail to consider the proximity of essential amenities to local communities (Beames *et al.*, 2018). In Africa, promoting spatial integration and inclusiveness has become vital to achieving sustainable urban development, strengthening governance, and improving living conditions (Cobbinah and Darkwah, 2017). Peri-urban areas, shaped by both rural and urban forces, require access to essential

services, such as schools, jobs, green spaces, and shops, to enhance liveability (Beames *et al.*, 2018; Biegańska *et al.*, 2018).

Jos and Bukuru combined are medium-sized cities experiencing increasing pressure from urban expansion. Timely and accurate evaluation of urban growth patterns and their associated environmental impacts is essential for effective urban planning, informed policy-making, and sustainable natural resource management (Adzandeh *et al.*, 2015). Despite growing attention to Peri-urbanisation, limited research exists on its methods and indicators (Ahani and Dadashpoor, 2021a), and data on resource provision in Jos–Bukuru’s Peri-urban communities remain scarce. This highlights the need to examine how well resources are provided and distributed to promote inclusivity and well-being. Peri-urban challenges include inadequate infrastructure, limited access to basic services, housing deficits, unemployment, environmental degradation, and social inequality (Farooq and Ullah, 2025; Seifollahi-aghmiuni *et al.*, 2022). Addressing these issues requires understanding how adequate and appropriate existing resources are. Therefore, this study aims to assess resource provision in the Jos–Bukuru Peri-urban areas, evaluating their accessibility and suitability to inform strategies that enhance inclusivity and community well-being. The study examines the peri-urban areas of Jos–Bukuru, two formerly separate settlements that have merged and expanded into surrounding suburbs, particularly Gwafan, Dong, Shen and Kwata-Zawan. Jos-Bukuru has an estimated population of between 1.2 and 1.5 million (Dung-Gwom and Jugu, 2017), with growth accelerating from the 1980s and further intensified by the 2001 crisis, which pushed residents towards the urban fringes. The residents of the study area would be hugely empowered economically by having access and tapping to the available resources and socially being integrated to promote their wellbeing.

LITERATURE REVIEW

Urbanisation continues to accelerate globally, with approximately 75–80% of people in developed nations now living in cities. Over the past twenty years, developing countries have also witnessed rapid urban growth, causing cities, especially large metropolitan areas, to expand into nearby territories. These peripheral regions are commonly classified as contiguous, intermediate, or rural peri-urban areas, each undergoing distinct physical and socio-economic transformations (Ahani and Dadashpoor, 2021b). The term Peri-urban, derived from “peripheral” (Tiwari, 2019), denotes the transitional zone between rural and urban areas. Such zones typically feature low population density, scattered housing, and dependence on transport for commuting, fragmented communities, and weak spatial governance. Consequently, they face increasing pressure from in-migration and unplanned

development (Sylla and Lasota, 2019).

Therefore, drawing hypothetically on the preceding discussion of rapid growth in developing countries—particularly the physical and socio-economic transformations occurring in Peri-urban areas, alongside increasing pressure and unplanned development—this study formulates a set of hypotheses. These hypotheses articulate the relationships between measurable variables and provide clear implications for testing the identified independent and dependent variables (Spencer, 2024). The hypotheses are structured to identify development pressures in the Peri-urban areas of the Jos–Bukuru metropolis as the independent variable. Accordingly, land tenure, infrastructure provision, and economic activities are treated as dependent variables, each assumed to exert a significant influence on the development of these areas.

The theoretical framework underpinning this study is grounded in peri-urbanisation theory and urban–rural continuum theory, which explain the dynamic nature of transitional spaces around metropolitan centres. Peri-urban regions are conceptualised as interface zones between the urban core and the rural hinterland, where land use, socio-economic structures, and demographic patterns are in constant transition. Scholars such as Mortoja *et al.* (2020) and Sahana *et al.* (2023) emphasise that these areas are shaped by rapid spatial transformation driven by urban expansion. This aligns with the urban–rural continuum perspective, which views space not as strictly urban or rural, but as a gradient characterised by mixed land uses and hybrid livelihoods. The framework further draws on urban land market theory, which posits that limited access to serviced and affordable land within the city compels lower- and middle-income households to relocate to the periphery. These areas offer relatively cheaper housing, tourism prospects, and attractive residential environments. However, despite their physical relocation, residents maintain strong functional linkages with the urban core, depending on it for employment, commerce, and education. This reflects the concept of functional interdependence between the city and its peri-urban fringe. The framework incorporates elements of land use change theory, which highlights the consequences of urban encroachment on agricultural land. As agricultural land is converted into residential plots, agricultural productivity declines (Cahya *et al.*, 2018), creating tension between urban growth and food security.

By 2050, an estimated 66% of the world’s population will live in urban areas, further intensifying the encroachment of cities into Peri-urban zones. This expansion contributes to environmental challenges such as agricultural land loss, habitat fragmentation, biodiversity decline, and reduced ecosystem services. Moreover, these regions are vulnerable to climate change impacts. The rapid spread of urban development into Peri-urban landscapes, therefore, demands urgent attention to mitigate its adverse ecological and social effects (Bahiru, 2024; Mortoja *et al.*, 2020).

Socio-economic and demographic conditions are deeply intertwined with Peri-urban development. Weak land governance and mismanagement of peripheral land often fuel informal and irregular urban expansion (Baye *et al.*, 2020). Marshall *et al.* (2024) emphasise the need to integrate environmental, poverty, and health goals to enhance Peri-urban well-being. Accelerating climate and landscape changes have further intensified land degradation, revealing the complexity of Peri-urban zones as socio-environmental systems undergoing rapid transformation (Seifollahi-Aghmiuni *et al.*, 2022).

Peri-urban areas are dynamic and transitional, constantly evolving physically, socially, and environmentally. Today's Peri-urban zones may become tomorrow's urban centres, highlighting their strategic role in spatial planning. They embody both rural and urban characteristics, functioning not merely as boundaries but as hybrid spaces through which people, goods, finances, and services flow. While often confused with urban sprawl, peri-urbanisation specifically describes the transformation of rural lands into urban ones as a result of urban expansion (Haldar *et al.*, 2024; Tiwari, 2019).

Globally, peri-urban zones face similar challenges and are often described through terms such as urban outgrowth, rural, suburban, or exurban. These areas represent shifting interfaces where rural livelihoods, land use, and social systems adapt to urban pressures. The transformation of cities into surrounding lands introduces issues including informal employment, unequal access to resources, and weakened social structures. Managing land use and providing adequate infrastructure and services remain major challenges within these evolving rural-urban transition zones (Mallick, 2024). Hence, the objectives of the study are to assess land ownership, infrastructure provision and economic endowment of Jos-Bukuru.

METHODOLOGY

Description of the study area

The Jos Plateau, situated in Nigeria's Middle Belt, covers about 8,600 km², extending roughly 104 km north-south and 80 km east-west. It rises sharply about 600 metres above the surrounding plains, with its southern portion reaching into the Benue Lowlands. The Jos-Bukuru area lies between latitudes 8°50'N and 9°00'N and longitudes 9°45'E and 9°50'E, about 8 km south of Jos, covering approximately 22 km² at an average elevation of 1,150 metres, while Shere Hill stands as the highest point at 1,777 metres. Historically, it served as a key mining centre, with settlements such as Maiadiko and Gold Camp emerging during the tin boom (Jiya and Musa, 2012; Lekwot *et al.*, 2015).

As one of Nigeria's oldest urban centres, Jos-Bukuru has experienced over a century of expansion. Population

growth has been rapid—from 26,898 in 1963 to 950,000 in 2006, with projections of over 1 million residents by 2025 (Macrotrends, 2025). The Greater Jos area, including Bukuru and adjoining towns, now accommodates about 1.5 million people (Dung-Gwom and Jugu, 2017). Known as the "Tin City," Jos became the capital of Benue-Plateau State in 1967 and later Plateau State in 1975, attracting diverse ethnic groups and developing into a cosmopolitan administrative, commercial, and tourist hub (Doxiadis Associates, 1975; Inusa, 2019).

Geographically, the Jos-Bukuru region and its environs occupy about 26,899 km², bordered by Barkin-Ladi to the southeast, Jos South and Riyom to the southwest, and Bassa to the north. Despite facing environmental and infrastructural challenges, the peri-urban zones play a crucial role in linking urban growth with rural livelihoods, making them central to the region's sustainable development (Wash *et al.*, 2020).

Study design

A multimethod design was employed to evaluate resource provision in the Jos-Bukuru Peri-urban areas, integrating qualitative and quantitative approaches for data collection and analysis. The research combined Geographic Information System (GIS) mapping (Lahoti *et al.*, 2019), a survey questionnaire (Ala-Hulkko *et al.*, 2019; Moreno-Llorca *et al.*, 2019), and semi-structured interviews to assess the spatial distribution, accessibility, and developmental impact of resources.

Data collection

This research used a multiple research design, incorporating both quantitative and qualitative data to address the research questions. The analysis encompasses both types of data (Creswell, 2014). The collection of data lasted for four months, running from January to April, 2025.

GIS-Based qualitative data: A GIS-based spatial approach, the Geometrical Data Analysis and Point Mode was used to map and assess the accessibility and distribution of resources across the study area. The GIS survey provided the primary qualitative data, capturing variations in resource location, equity of access, and usage levels. This spatial data was supported by existing maps and administrative records from the Ministry of Land Survey and Town Planning, Jos.

Quantitative survey data: The quantitative component involved a questionnaire survey targeting residents aged 15 and above in selected Peri-urban zones. Participants were randomly selected from areas approved by the relevant planning authority. A total of 250 questionnaires

were administered, of which 230 were completed and returned. The instrument, structured on a five-point Likert scale, was designed around the conceptual framework derived from existing theories and literature. It measured the perceived developmental impact of resource provision, considering variables such as land ownership, infrastructure provision, and economic activities.

Qualitative interview data: Complementary qualitative data were gathered through interviews with key four (4) informants, including local resource providers and administrators. These interviews explored the contextual factors influencing resource distribution, governance, and community participation through the use of structured questions. Observational notes were also taken to support the interpretation of field realities.

Data analysis

GIS data were analysed to identify and visualise the spatial distribution of infrastructural resources. Spatial statistical tools were employed using a handheld Global Positioning System (GPS), applying geometric data analysis and the point pattern method to evaluate patterns of accessibility and equity. ArcGIS software was used to provide a visual and interpretive understanding of disparities in resource allocation, as well as to support the interpretation of observations.

WarpPLS (quantitative analysis): Survey data were analysed using **WarpPLS**, applying Pearson's least squares regression technique. The analysis included **structural model assessment**, addressing hypothesis testing and determining the relationships between resource provision and developmental outcomes.

Thematic (qualitative analysis): The recorded interviews collected from four informants—the Director, Ministry of Land Survey and Town Planning; the Land Officer, Jos North LGA; the Head of the Planning Section, Federal Ministry of Works and Housing, Jos; and the Acting Director of Planning, Plateau State Ministry of Housing and Urban Development—were transcribed and analysed thematically using Atlas.ti. Codes and themes were developed inductively from the interview questions to capture perceptions of resource accessibility, fairness in provision, and policy challenges. The thematic findings complemented the spatial and statistical results, enabling data triangulation and a more comprehensive interpretation.

RESULTS

Report of GIS analysis (qualitative)

The peri-urban zones of Jos–Bukuru serve as transitional

spaces between urban and rural areas but face growing environmental and infrastructural challenges. Many residents live in informal settlements lacking adequate housing, drainage, and basic services, leading to environmental degradation and frequent flooding. These areas typify urban decay, characterised by deteriorating building conditions and unplanned expansion.

Identification of resources

The findings regarding the available resources across the Jos-Bukuru Peri-Urban, the study identifies and evaluates the locations and gives a brief situation of the man-made and natural, which include public and private facilities. The locations could be identified by their bearings as shown juxtaposed to give the catalogue of the facilities. The section also contains maps produced, indicating the locations of the resources as superimposed from the catalogue.

Through the research process, the available facilities were identified and recorded using the GPS. The records presented the true positions of their locations by the X and Y coordinates, as can be seen superimposed on Figure 1. While Figures 2, 3, 4 and 5 show the distribution of the facilities, indicating their positions and names for easy identification. Interestingly, Table 1 reveals the list of facilities by areas, showing their category.

The challenges range from distance to the facility areas, which is 1-15km, to a type of activity where 80% were privately owned by individuals for business purposes, and the quantity to the threshold population is inadequate. Others are public institutions- schools, health security facilities. It further discusses the haphazard distribution and uneven development as it affects zoning/subsectors.

The analysis reveals notable variations in facility distribution across the settlements, as shown in Table 1 and Figure 6. Gwafan has the highest concentration, with 16 facilities, particularly schools and recreational amenities, which together account for over 60% of its total. However, this provision is inadequate for its population of 14,195. Dong is moderately resourced, with 8 facilities, showing a strong emphasis on schools (50%) and a relatively balanced provision of health and security facilities. Nevertheless, these remain insufficient in relation to its population of 10,056. Kwata Zawan, with 9 facilities, demonstrates a more even distribution across schools, health, and recreation, but is comparatively weaker in security provision. Overall, the facilities still fall short of meeting the needs of its population of 9,455. Shen, despite having the fewest facilities (7), is distinctively dominated by community and public infrastructure, which constitutes approximately 43% of its total. Although it has the smallest population (3,889), it nonetheless suffers from a shortage of key resources.

The study exposes major inequalities in facility distribution across the Jos-Bukuru Peri-Urban areas, with some locations lacking basic services altogether.

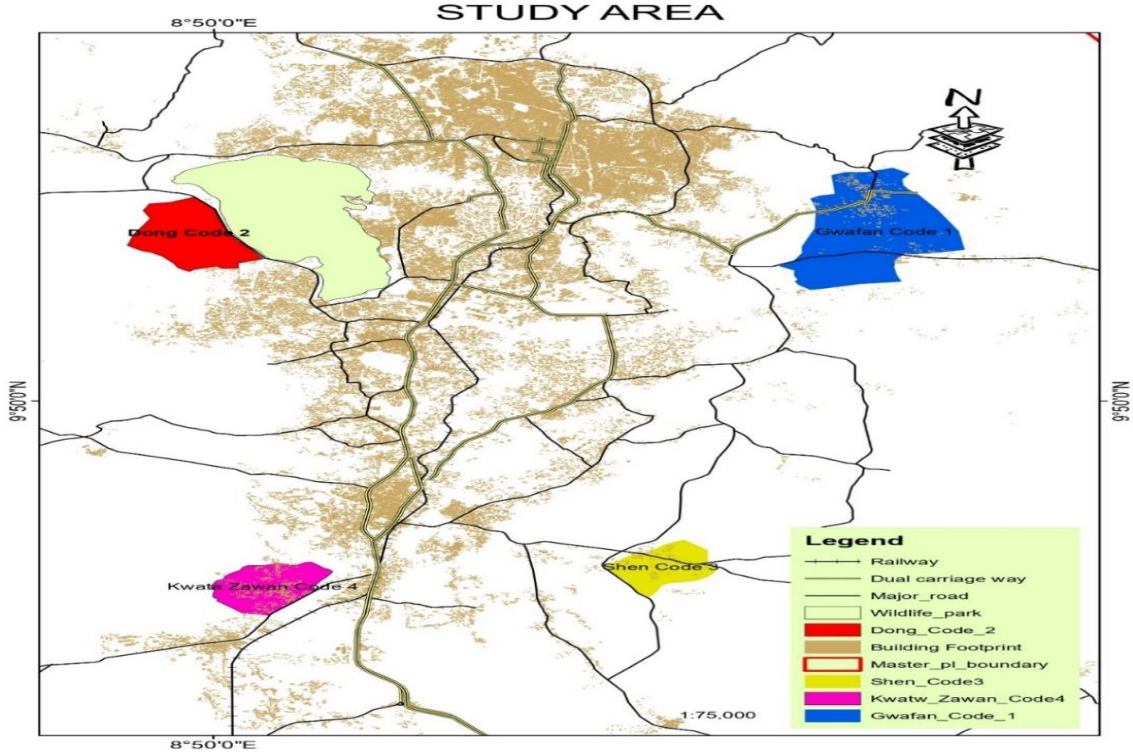


Figure 1. Study areas (Source: PMLS&TP, 2025).

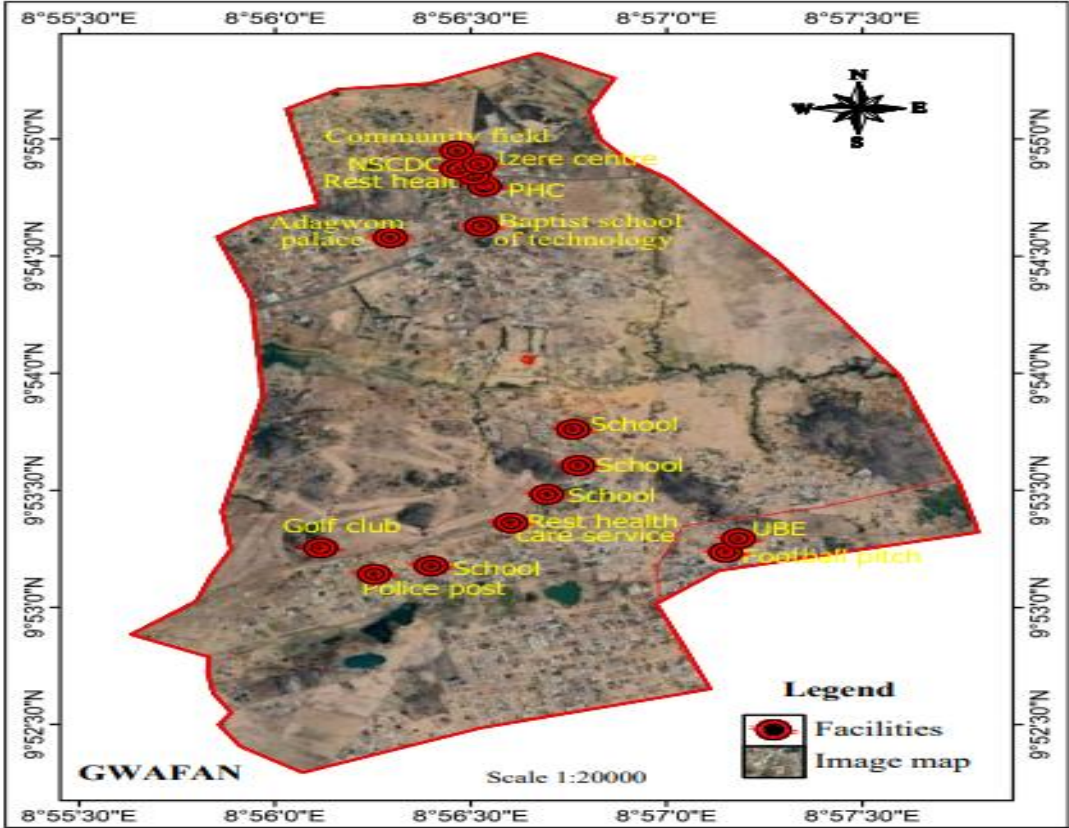


Figure 2. Gwafan (Source: PMLS&TP, 2025).

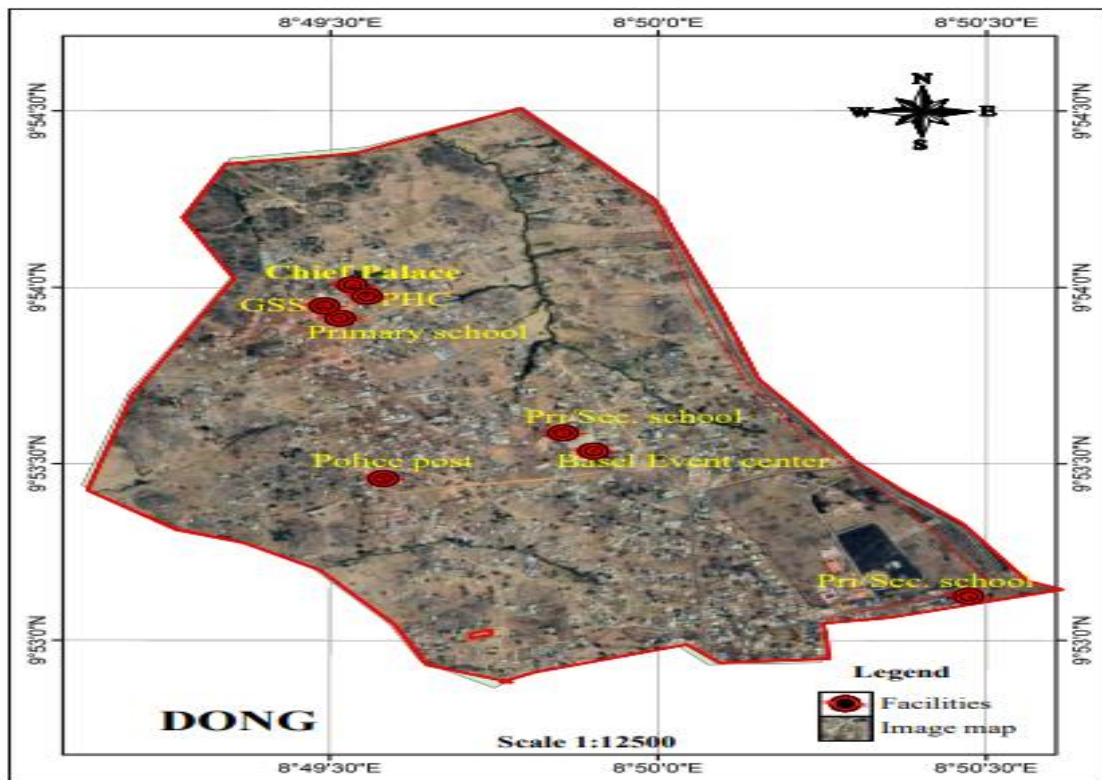


Figure 3. Dong (SOURCE: PMLS&TP, 2025).

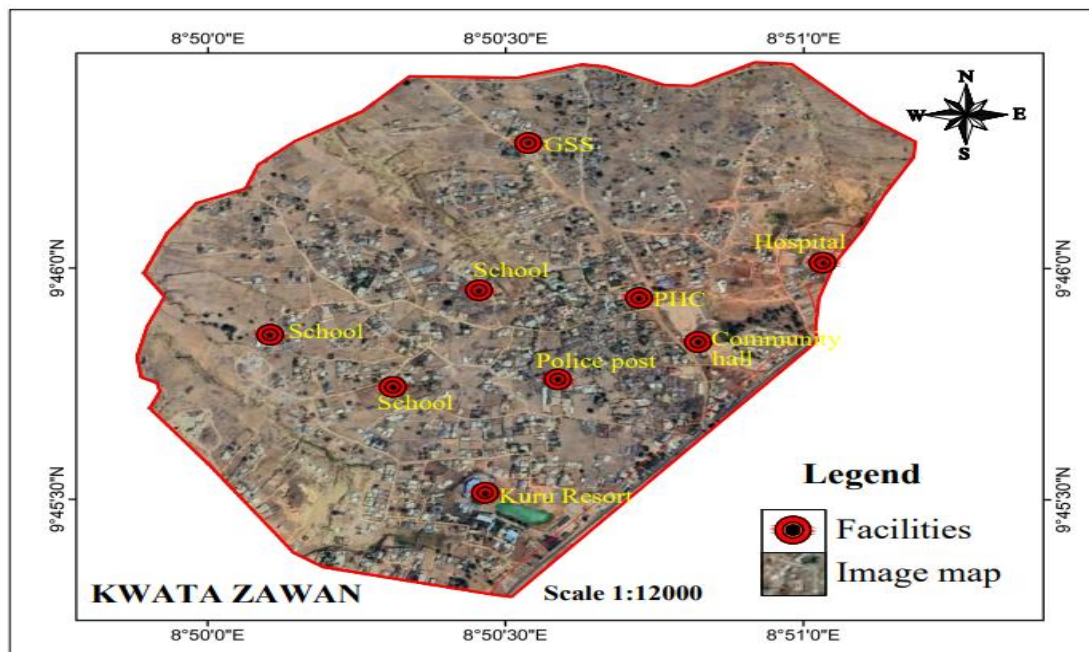


Figure 4. Kwata-Zawan (SOURCE: PMLS&TP, 2025).

Economically disadvantaged outskirts are particularly affected, forcing residents to travel long distances—up to 15km—to access facilities concentrated in city centres.

Maps and survey data (Figures 2, 3, 4 and 5) confirm these disparities, hence highlighting residents' challenges. Overall, the findings call for a more equitable and policy-

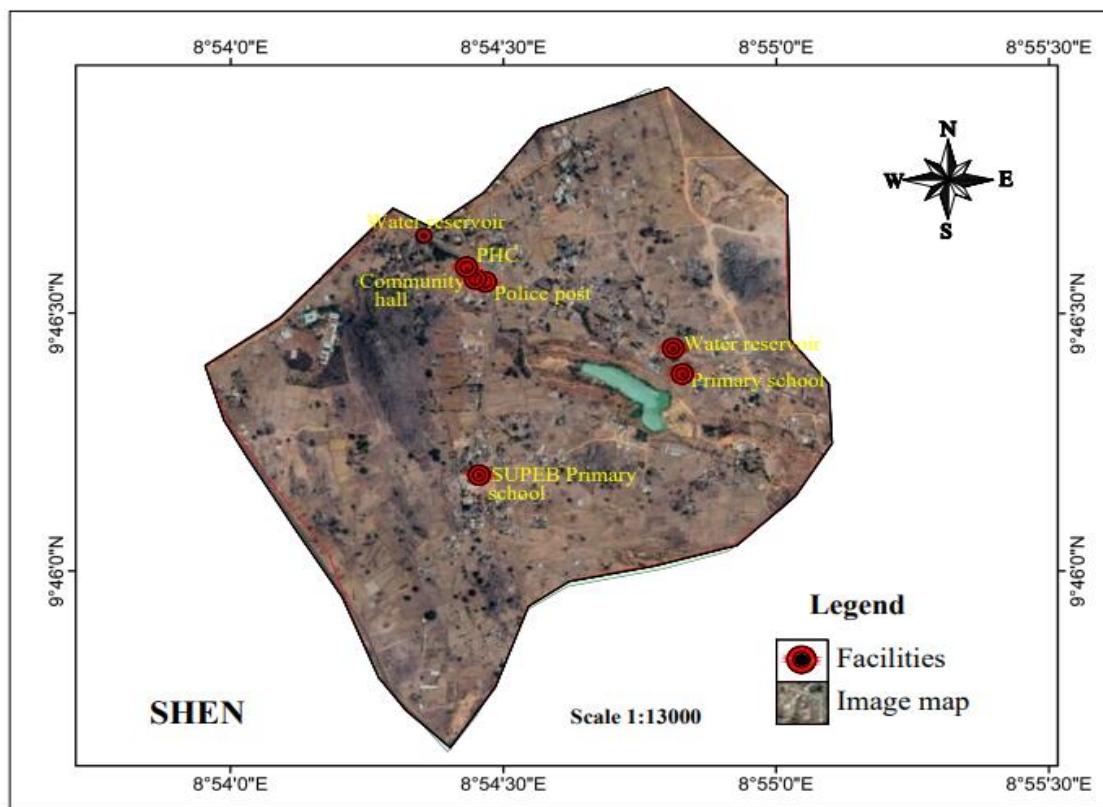


Figure 5. Shen (SOURCE: PMLS&TP, 2025).

Table 1. Facility type.

Facility Type	Gwafan	Dong	Kwata- Zawan	Shen
Health Facilities	2	1	2	1
Schools	6	4	3	2
Security facilities	3	1	1	1
Recreational/sports	4	1	2	0
Community/public	0	0	1	3
Palaces	1	1	0	0
Total	16	8	9	7
Population projection	14,195	10,056	9,455	3,889

guided approach to facility provision in peri-urban areas.

Report of Warp PLS analysis (quantitative)

The findings of the statistical data analysis of the quantitative data using WarpPLS. The structural model assessment presents and addresses the research questions and hypotheses testing of the study. The structural model evaluates the relationships among land ownership, infrastructure provision, economic activities, and development impact through path coefficients (β), significance levels (p-values), and explained variance (R^2).

It measures how endogenous constructs influence one another, providing a direct test of the proposed theoretical framework.

Results from the PLS analysis (Figure 7) show that three (3) of the constructs, being the land tenure/ownership, infrastructure provision and economic activities, statistical tests were assessed at a 5 per cent level of significance at variance with accessibility, with a path coefficient of 0.09. The path coefficient estimated for hypothesised relationships is significant, having 0.57, 0.16 and 0.35 with p-values of 0.01 each. A path coefficient estimate is considered statistically significantly different from zero at 5% significant level when its p-value is below 0.05. R^2 of

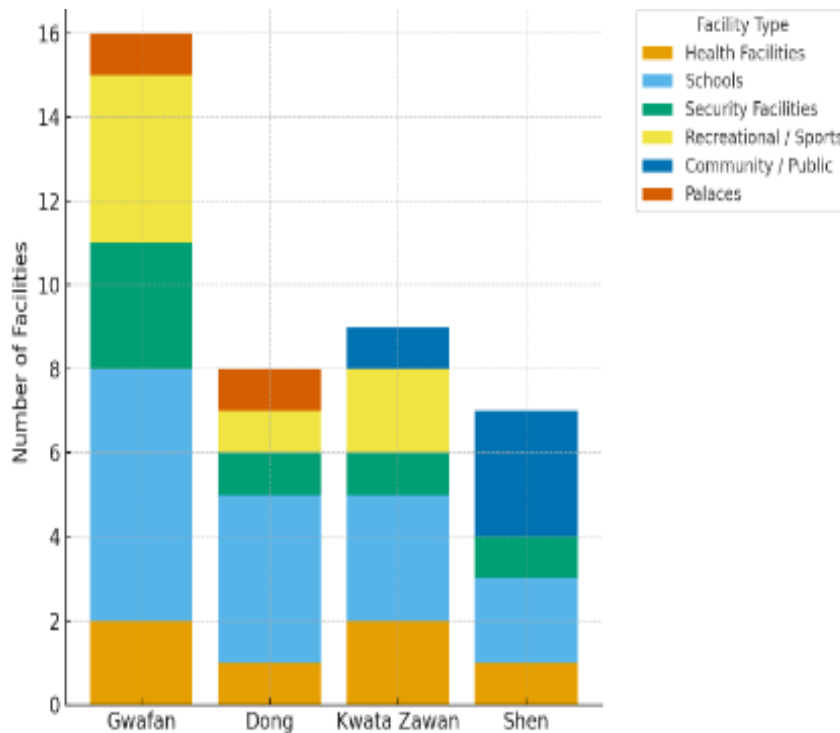


Figure 6. Facility type.

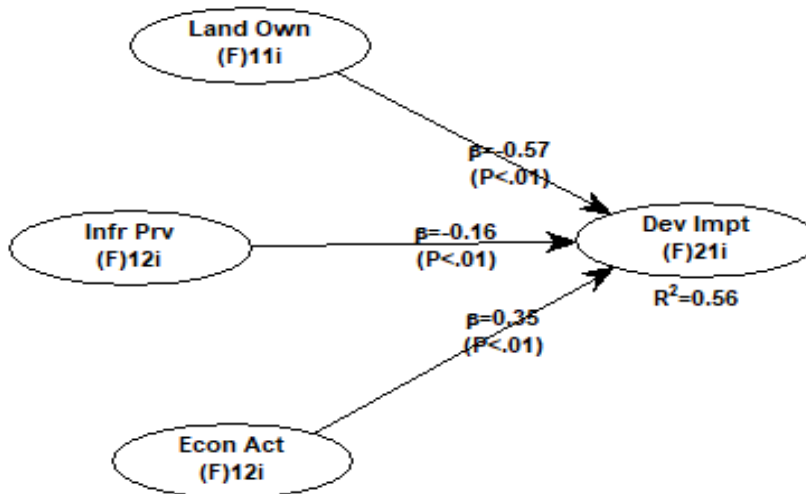


Figure 7. Structural model assessment.

0.56 seems good enough.

Hypothetical testing

The hypothesis testing (Table 2) examines relationships among land ownership, infrastructure provision, and development impact in the Jos–Bukuru Peri-urban areas. Results indicate that the spatial distribution of facilities

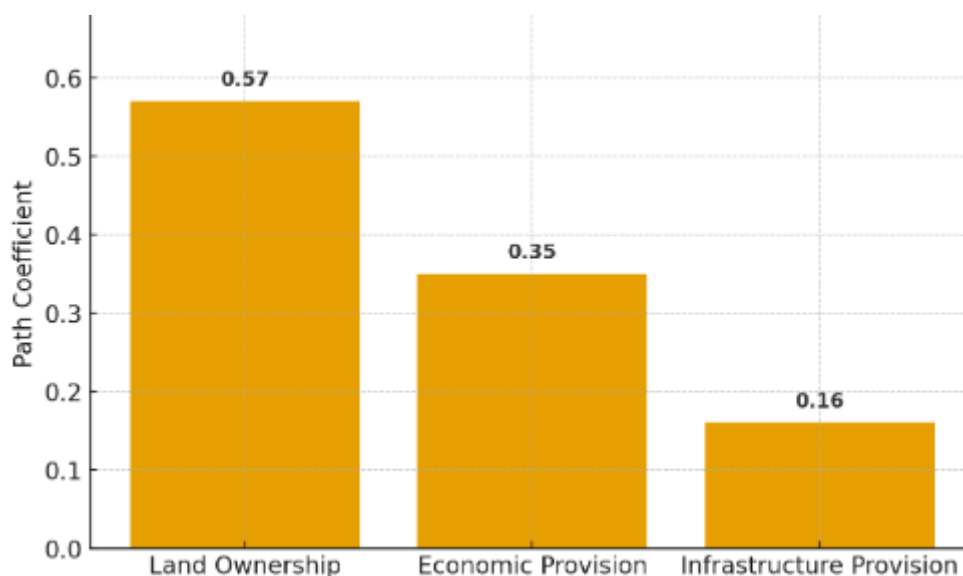
significantly influences access to land ownership (H1), supported by a path coefficient of 0.57 and an R² value of 0.56, both statistically acceptable.

Similarly, the distribution of infrastructure significantly affects development impact (H2), with a path coefficient showing a low but significant value (p = 0.01). The third hypothesis (H3) is also supported, confirming that spatial and infrastructural provisions meaningfully influence the effectiveness of development impact within the acceptable

Table 2. Hypothesis testing.

Hypothesis	Path Coefficient	P-values	Decision
H1: Land Ownership	0.57	0.01	Supported
H2: Infrastructure Provision	0.16	0.01	Supported
H3: Economic provision	0.35	0.01	Supported

Source: Researcher, 2025.

**Figure 8.** Structural model assessment: path coefficient.

R² range (0.56).

The study reveals that all three hypotheses are supported, with p-values below 0.05, confirming their statistical significance. Land ownership is identified as the most influential factor, economic provision holds a moderate effect, and infrastructure provision, while significant, exerts the weakest impact on development outcomes. The ranking (Figure 8) of influence is as follows: Land Ownership > Economic Provision > Infrastructure Provision.

Report of qualitative data

The qualitative findings highlight the complex dynamics of the Jos–Bukuru Peri-urban zone as a transitional space linking rural and urban systems socially, economically, and spatially. While it supports population growth, trade, and industry, rapid and unplanned expansion has outpaced existing plans and infrastructure, as coded and presented in Figure 9. Migration and urbanisation have transformed Peri-urban farmlands into residential and commercial areas, displacing agricultural livelihoods and increasing environmental stress. Weak land governance, traditional land sales, and unregulated development have fuelled

land speculation, informal settlements, and recurrent conflicts, pushing many residents into informal economic activities. Although the Peri-urban zone offers opportunities for affordable housing, business, and tourism, poor planning and weak regulation have resulted in uncontrolled land use, underscoring the need for stronger land management and the protection of cultural and ecological assets to ensure sustainable development.

Rapid Land Conversion: Migration and urbanisation have converted farmlands into residential and commercial uses, displacing agricultural livelihoods. Unregulated development, land speculation, and environmental stress have increased, pushing many residents into informal economic activities.

Land Tenure and Urban Expansion: Traditional land sales and weak regulation have led to informal settlements, speculative land markets, and frequent conflicts. Government-led projects attract further settlement but often lack the infrastructure and coordination needed to support orderly growth.

Balancing Land Use: The peri-urban zone provides affordable housing, business, and tourism opportunities but suffers from weak governance, poor planning, and uncontrolled land use. Stronger land regulation and the protection of cultural and ecological assets are essential

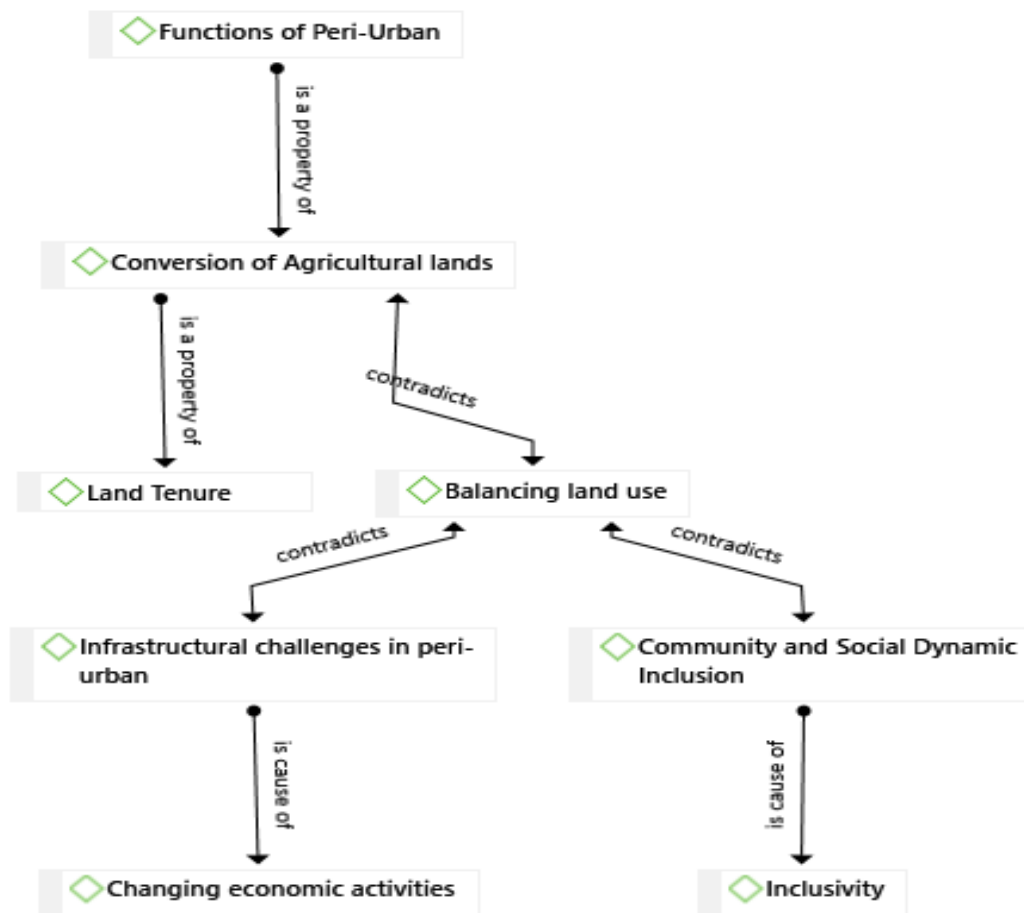


Figure 9. Thematic Network diagram.

for sustainable development.

Infrastructural Challenges: Population growth has surpassed infrastructure capacity, causing shortages in water, electricity, and roads. Settlements such as Dong, Shen, and Kwata-Zawan are expanding without coordination, though initiatives like the Greater Jos Master Plan aim to improve service delivery and planning.

Community and Social Inclusion: Cultural diversity and strong community ties characterise the area, but weak organisation, limited trust in institutions, and unequal access to resources hinder inclusivity. Government efforts to upgrade infrastructure and promote local participation seek to address these disparities.

Therefore, The Jos–Bukuru Peri-urban area is evolving into a vibrant but challenged transitional region, as generally validated in Table 3. Sustainable development will depend on stronger planning, effective governance, and equitable infrastructure and land management.

Thematic and validity

The thematic network in figure 9 illustrates the intercom-

nections and flow among variables, providing a visual framework for understanding relationships within the study. While, Table 3 validates the research findings by highlighting their novelty and contribution to knowledge on Peri-urban development. Using a qualitative approach, the analysis assesses how development affects infrastructure through themes such as land tenure, infrastructural challenges, community and social inclusion, and agricultural land conversion. Among these, agricultural land conversion and the blending of rural–urban characteristics emerged as the most influential factors, appearing 24 and 21 times respectively. The land-use balance challenge showed the strongest linkage to other variables, with a density value of 5. Less significant variables were removed or merged to enhance analytical clarity and strengthen thematic coherence.

Triangulation of results

The triangulated findings show that well-being and inclusivity in Jos–Bukuru’s Peri-urban areas are shaped by the interaction of spatial service distribution, structural

Table 3. Validity of peri-urban development data

Name	Grounded	Density	Group
Aftermath of sells of land	10	1	0
Alleviate urban housing shortage	8	1	0
Architectural buildings	11	1	0
Areas of transition zone	18	1	0
Balancing land use	14	5	0
Challenge blending urban and rural characteristics	21	1	0
Challenge of weak governance	9	2	0
Changing economic activities	16	1	0
Community and social dynamic inclusion	16	4	0
Conversion of agricultural lands	24	3	0
Efforts for master plan	13	4	0
Functions of per-urban	19	1	0
Inclusivity	8	4	0
Infrastructural challenges in peri-urban	10	2	0
Land tenure	7	3	0

conditions, and socio-cultural experiences. GIS analysis highlights significant inequalities in access to social infrastructure, with settlements such as Gwafan benefiting from higher facility concentration, while others, particularly Shen, face spatial exclusion. Structural modelling reveals that secure land ownership and economic opportunities are more influential for inclusive wellbeing than infrastructure alone. Thematic analysis reinforces these results by showing how land tenure changes, agricultural land conversion, and rapid urbanisation affect livelihoods, inequality, and perceptions of development, underscoring the importance of equitable land systems, coordinated planning, and participatory governance for sustainable wellbeing.

Spatial disparities identified through GIS reflect deeper structural inequalities confirmed by the model and clarified through thematic insights on tenure and inclusion. Overall, the integrated evidence shows that achieving inclusive wellbeing in Peri-urban development requires more than infrastructure; it demands secure land rights, livelihood opportunities, and socially responsive planning that values community participation, fair land access, and context-specific infrastructure delivery.

DISCUSSION

Achieving wellbeing and inclusivity in Peri-urban development requires a holistic approach that addresses interlinked inequalities in infrastructure provision, land governance, economic opportunities, and social planning. The integrated findings of this study demonstrate that no single factor operates in isolation; rather, the interaction between spatial, structural, and socio-cultural dimensions collectively shapes quality of life and the distribution of opportunities within Peri-urban communities. In Jos–

Bukuru, uneven development across these dimensions has reinforced spatial and social disparities, highlighting the need for coordinated and multi-sectoral interventions.

Infrastructure remains a foundational driver of inclusion and well-being. As Kanai and Schindler (2022) observe, fragmented and uneven infrastructural development often marginalises Peri-urban and peripheral settlements by limiting access to essential services and opportunities. Similarly, Baye (2025) and, Morteja and Yigitcanlar (2023) emphasise that closing infrastructure gaps is critical to achieving equitable urban growth. In Jos–Bukuru, disparities in access to water, electricity, roads, education, and recreational facilities constrain mobility, economic participation, and social wellbeing, particularly in less-served settlements. These findings underscore the importance of coordinated infrastructure planning, intergovernmental collaboration, and targeted public investment to ensure that peri-urban areas are not left behind in broader urban development strategies.

Secure land rights are equally central to inclusive Peri-urban development. Studies by Ansah and Chigbu (2020) and Teklemariam and Cochrane (2021) demonstrate how rapid rural-to-urban land conversion, when poorly regulated, generates tenure insecurity, speculative land markets, and conflicts that disproportionately affect vulnerable groups. In the Jos–Bukuru context, traditional land transactions combined with weak statutory oversight have contributed to uncertainty over ownership, rising land values, and social tensions. Strengthening land governance through clearer tenure arrangements, transparent land administration, and conflict-resolution mechanisms is therefore essential to protecting livelihoods, reducing inequality, and enabling residents to invest confidently in housing and local enterprises.

Economic dynamics further shape patterns of inclusion and exclusion in Peri-urban spaces. Cattivelli (2021)

highlights how Peri-urban economies blur rural–urban boundaries, creating hybrid livelihood systems that combine agriculture, informal trade, and emerging urban services. However, Mohammed *et al.* (2020) caution that weak governance and unregulated expansion often lead to livelihood disruption, displacement, and increased precarity. In Jos–Bukuru, practices such as voluntary eviction reflect adaptive economic strategies in response to land conversion and rising land values, yet they also perpetuate inequality by displacing lower-income households and informal workers. These dynamics point to the need for inclusive, resilience-oriented economic policies that support diversified livelihoods, protect vulnerable groups, and integrate Peri-urban economies into wider urban and regional development frameworks.

Socially inclusive planning provides the connective framework linking infrastructure, land, and economic systems. Tan *et al.* (2024) and De Toro *et al.* (2023) emphasise the importance of collaborative, multi-actor governance aligned with the Sustainable Development Goals (SDGs) to balance ecological sustainability, social equity, and economic growth. However, in Jos–Bukuru, limited community participation and weak local institutional capacity undermine the effectiveness of planning processes. The exclusion of residents from decision-making reduces trust, weakens policy legitimacy, and limits the responsiveness of development interventions to local needs. Strengthening participatory planning mechanisms and empowering community actors are therefore critical to achieving more inclusive and context-sensitive Peri-urban development.

Overall, wellbeing and inclusivity in Peri-urban Jos–Bukuru depend on integrated governance that simultaneously addresses infrastructure deficits, land tenure insecurity, economic vulnerability, and social exclusion. Combating structural inequalities and fostering participatory decision-making are essential to managing Peri-urban transformation in a sustainable and equitable manner. By aligning spatial planning, land governance, economic policy, and community engagement, Peri-urban areas can better fulfil their role as dynamic and inclusive spaces linking urban and rural systems.

Conclusion

The overall study shows that inclusivity and well-being in the Jos–Bukuru peri-urban areas are shaped by the combined effects of land governance, economic opportunity, and infrastructure provision. Secure land tenure emerges as the most critical driver of stability, investment, and orderly development, while diversified local economies help link rural and urban systems, reduce poverty, and enhance livelihoods. Although infrastructure plays a comparatively smaller role, equitable access to basic services remains essential for productivity and social

fairness. Rapid peri-urbanisation has generated new opportunities but has also intensified inequality, land conflict, environmental stress, and service deficits, largely due to weak planning and governance. Despite these challenges, strong community networks and cultural diversity provide a foundation for inclusive growth. Achieving sustainable peri-urban development, therefore, requires integrated policies that strengthen land governance, empower local economies, and deliver targeted infrastructure through participatory and culturally sensitive planning. Such a holistic approach is vital to managing urban expansion, reducing conflict, and reinforcing the peri-urban zone as a crucial interface between rural and urban development systems.

Recommendation

From the findings of this study, the following recommendations are put forward:

1. The government should establish transparent land registration and titling systems to reduce speculation and conflicts. Introduce community-based land management committees to oversee allocation and prevent haphazard layouts. Enforce zoning and land use plans to protect agricultural land, cultural sites, and ecological areas.
2. The government should support small-scale industries, agro-processing, and peri-urban markets that link rural producers to urban consumers. Encourage entrepreneurship through microfinance, training, and incentives for youth and women. Designate mixed-use hubs where businesses, housing, and services can grow in a more organised manner.
3. The government should prioritise roads, water, sanitation, and electricity in rapidly growing settlements like Dong, Gwafan, and Shen. Invest in sustainable infrastructure (e.g., solar power, boreholes, eco-friendly waste management). Integrate peri-urban settlements into metropolitan planning to avoid duplication and reduce service gaps.
4. The government should preserve cultural heritage sites and local festivals as assets for tourism and community identity. Protect green belts, water sources, and farmlands from encroachment through stricter environmental regulations. Encourage eco-tourism and leisure developments that align with natural landscape preservation.
5. There should be a cordial collaboration between local governments, traditional authorities, and urban planning agencies. Develop long-term peri-urban master plans that anticipate future expansion beyond current layouts. Monitor and evaluate land use changes regularly to guide adaptive planning.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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REFERENCES

- Adu-Gyamfi, A. (2021). The role of caretakers in improving housing conditions in peri-urban areas. *Cities*, 110, 103049.
- Adzandeh, E. A., Akintunde, J. A., & Akintunde, E. A. (2015). Analysis of urban growth agents in Jos metropolis, Nigeria. *International Journal of Remote Sensing and GIS*, 4(2), 41-50.
- Ahani, S., & Dadashpoor, H. (2021a). A review of domains, approaches, methods and indicators in peri-urbanization literature. *Habitat International*, 114, 102387.
- Ahani, S., & Dadashpoor, H. (2021b). Urban growth containment policies for the guidance and control of peri-urbanization: a review and proposed framework: A. Somayeh, H. Dadashpoor. *Environment, Development and Sustainability*, 23(10), 14215-14244.
- Ala-Hulkko, T., Kotavaara, O., Alahuhta, J., & Hjort, J. (2019). Mapping supply and demand of a provisioning ecosystem service across Europe. *Ecological Indicators*, 103, 520-529.
- Ansah, B. O., & Chigbu, U. E. (2020). The nexus between peri-urban transformation and customary land rights disputes: Effects on peri-urban development in Trede, Ghana. *Land*, 9(6), 187.
- Bahiru, M. A. (2024). *The impacts of urban expansion on human security: The case of Adama City Peri-Urban residents*. Doctoral dissertation, Ambo University.
- Baye, F. (2025). Exploring urban infrastructure challenges in informal peri-urban Woldia: barriers, implications, and informal strategies. *Frontiers in Sustainable Resource Management*, 4, 1555564.
- Baye, F., Wegayehu, F., & Mulugeta, S. (2020). Drivers of informal settlements at the peri-urban areas of Woldia: Assessment on the demographic and socio-economic trigger factors. *Land Use Policy*, 95, 104573.
- Beames, A., Broekx, S., Schneidewind, U., Landuyt, D., van der Meulen, M., Heijungs, R., & Seuntjens, P. (2018). Amenity proximity analysis for sustainable brownfield redevelopment planning. *Landscape and Urban Planning*, 171, 68-79.
- Biegańska, J., Środa-Murawska, S., Kruzmetra, Z., & Świaczny, F. (2018). Peri-urban development as a significant rural development trend. *Quaestiones Geographicae*, 37(2), 125-140.
- Cahya, D. L., Martini, E., & Kasikoen, K. M. (2018, February). Urbanization and land use changes in peri-urban area using spatial analysis methods (case study: Ciawi urban areas, Bogor Regency). In *IOP conference series: Earth and Environmental Science* (Vol. 123, No. 1, p. 012035). IOP Publishing.
- Cattivelli, V. (2021). Methods for the identification of urban, rural and peri-urban areas in Europe: An overview. *Journal of Urban Regeneration & Renewal*, 14(3), 240-246.
- Cobbinah, P. B., & Darkwah, R. M. (2017). Toward a more desirable form of sustainable urban development in Africa. *African geographical review*, 36(3), 262-285.
- Creswell, J. W. (2014). *Research Design Qualitative, Quantitative and Mixed Methods Approaches*. ISBN 978-1-4522-2609-5 (cloth) — ISBN 978-1-4522-2610-1 (pbk.) Thousand Oaks, CA: SAGE Publications.
- De Toro, P., Formato, E., & Fierro, N. (2023). Sustainability assessments of peri-urban areas: an evaluation model for the territorialization of the Sustainable Development Goals. *Land*, 12(7), 1415.
- Doxiadis Associates (1975). *Greater Jos Area Final Master Plan Report 1975-2000 (Vol. No.4)*. Plateau-Benue State Government.
- Dung-Gwom, J. Y., & Jugu, A. S. (2017). Characteristics and planning challenges of hilltop settlements in Jos Metropolis, Nigeria. *UPLanD-Journal of Urban Planning, Landscape & environmental Design*, 2(2), 129-149.
- Farooq, S., & Ullah, H. (2025). Sustainable Urbanization: Challenges and Strategies for Effective Urban Planning in Pakistan. *Journal of Asian Development Studies*, 14(3), 302-312.
- Haldar, S., Chatterjee, U., Bhattacharya, S., Paul, S., Bindajam, A. A., Mallick, J., & Abdo, H. G. (2024). Peri-urban dynamics: assessing expansion patterns and influencing factors. *Ecological Processes*, 13(1), 58.
- Huang, M., Xiao, Y., Xu, J., Liu, J. Y., Wang, Y. Y., Gan, S., Lv, S.X., & Xie, G. D. (2022). A review on the supply-demand relationship and spatial flows of ecosystem services. *J. Resour. Ecol*, 13(5), 925-935.
- Inusa, D. (2019). Jos and the Plateau State. Retrieved from <https://www.widernet.org/josproject/josplateau.htm>
- Jiya, S. N., & Musa H.D. (2012). Impact of Derived Tin Mining Activities Landuse/Landcover in Bukuru Plateau State Nigeria. *Journal of Sustainable Development*, 5(5), 90-100.
- Kanai, J. M., & Schindler, S. (2022). Infrastructure-led development and the peri-urban question: Furthering crossover comparisons. *Urban Studies*, 59(8), 1597-1617.
- Lahoti, S., Kefi, M., Lahoti, A., & Saito, O. (2019). Mapping methodology of public urban green spaces using GIS: An example of Nagpur City, India. *Sustainability*, 11(7), 2166.
- Lekwot, V. E., Yakubu, A. A., Kwesaba, D. A., & Sahabo, A. A. (2015). An analysis of inner city decay: a study of some selected slums in Jos metropolis, Plateau State, Nigeria. *International Journal of Scientific & Technology Research*, 4(2), 174-179.
- Liu, P., Han, G., Yang, H., & Li, X. (2024). A sustainable development study on innovation factor allocation efficiency and spatial correlation based on regions along the belt and road in China. *Sustainability*, 16(7), 2990.
- Macrotrends (2025). Jos, Nigeria Metro Area Population (1950-2025). In Macrotrends LLC. Retrieved from <https://www.macrotrends.net/global-metrics/cities/22003/jos/population>
- Mallick, S. K. (2024). Peri-urban interface: Challenges and opportunities in spatial planning and management. *Modern Cartography Series*, 11, 529-542.
- Marshall, F., Dolley, J., Bisht, R., Priya, R., Waldman, L., Randhawa, P., Scharlemann, J., Amerasinghe, P., Saharia, R., Kapoor, A., Rizvi, B., Hamid, Y., Arora, M., Chopra, I., & Teresa, K. S. (2024). Recognising peri-urban ecosystem services in urban development policy and planning: A framework for assessing agri-ecosystem services, poverty and livelihood dynamics. *Landscape and Urban Planning*, 247,

- 105042.
- Mohammed, I., Kosa, A., & Juhar, N. (2020). Economic linkage between urban development and livelihood of peri-urban farming communities in Ethiopia (policies and practices). *Agricultural and Food Economics*, 8(1), 21.
- Moreno-Llorca, R. A., Garcia-Morales, V. J., Llorens-Montes, J. F., Ramos-Ridao, A. F., Alcaraz-Segura, D., & Navarrete, M. J. (2019). A co-designed method to guide decision-making in protected area visitor centres. *Journal of Environmental Management*, 233, 586-594.
- Mortoja, M. G., & Yigitcanlar, T. (2022). Why is determining peri-urban area boundaries critical for sustainable urban development? *Journal of Environmental Planning and Management*, 66(1), 67-96.
- Mortoja, M. G., Yigitcanlar, T., & Mayere, S. (2020). What is the most suitable methodological approach to demarcate peri-urban areas? A systematic review of the literature. *Land Use Policy*, 95, 104601.
- Sahana, M., Ravetz, J., Patel, P. P., Dadashpoor, H., & Follmann, A. (2023). Where is the peri-urban? A systematic review of peri-urban research and approaches for its identification and demarcation worldwide. *Remote Sensing*, 15(5), 1316.
- Seifollahi-Aghmiuni, S., Kalantari, Z., Egidi, G., Gaburova, L., & Salvati, L. (2022). Urbanisation-driven land degradation and socioeconomic challenges in peri-urban areas: Insights from Southern Europe. *Ambio*, 51(6), 1446-1458.
- Spencer, H. (2024). The developmental hypothesis (1st edition). In: *Evolution in Victorian Britain*. Routledge. <https://doi.org/https://doi.org/10.4324/9781003490548>.
- Sylla, M., Lasota, T., & Szewrański, S. (2019). Valuing environmental amenities in peri-urban areas: Evidence from Poland. *Sustainability*, 11(3), 570.
- Tan, J., Gu, K., & Zheng, Y. (2024). Peri-urban planning: A landscape perspective. *Planning Theory*, 23(1), 42-63.
- Teklemariam, A. T., & Cochrane, L. (2021). The rush to the peripheries: Land rights and tenure security in peri-urban Ethiopia. *Land*, 10(2), 193.
- Tiwari, P. (2019). Dynamics of peri urban areas of Indian cities. *International Journal of Scientific & Engineering Research*, 10(4), 131-141.
- Wash, P. M., Badaruddin, M., & Mohd, I. (2020, April). Assessment of accessibility of recreational facilities through identification and mapping focus on Greater Jos, Plateau State Nigeria. In *IOP Conference Series: Earth and Environmental Science* (Vol. 452, No. 1, p. 012134). IOP Publishing.