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TRANSFORMING IBADAN PERI-URBAN LANDSCAPE: INNOVATIVE SOLUTIONS FOR SLUM PREVENTION, SUSTAINABLE DEVELOPMENT AND EQUITABLE GROWTH

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Abstract
This study examines the transformation of Ibadan's peri-urban landscape, focusing on Eleyele, Adetokun, Alafara, and Ologuneru, to develop innovative solutions for slum prevention, sustainable development, and equitable growth. Utilizing a mixed-methods approach, we administered a survey to a stratified random sample of 346 residents across a 3,600-hectare area, which as of 2020 was 71% developed and 29% undeveloped. Geographic Information Systems (GIS) satellite imagery was employed to assess land use changes. Our findings indicate a dramatic shift in land use, with 95.1% converted to residential purposes, while commercial, institutional, and recreational uses accounted for only 2.9%, 1.2%, and 0.6% respectively. Additionally, our observational analysis identified significant slum formation associated with informal developments situated on power lines, pipelines, government-acquired lands, and within waterway setbacks. These informal settlements often arise from inadequate urban planning and rapid population growth, posing challenges to sustainable development and social equity. The study highlights the urgent need for integrated urban planning strategies that consider both existing residents' needs and the environmental impacts of unregulated development. We propose a framework that incorporates community engagement, regulatory enforcement, and infrastructural investment to mitigate slum formation while promoting sustainable growth. The results underscore the importance of adopting innovative solutions tailored to the unique socio-economic and environmental contexts of Ibadan's peri-urban areas. This research contributes to ongoing discussions on urban transformation in developing countries and provides a foundation for policy recommendations aimed at achieving equitable and sustainable urban development in rapidly growing cities.
Key Words: *Equitable Growth, Peri-Urban Development, Sustainable Development, Urban Transformation*

Introduction

The rapid urbanization of peri-urban areas, particularly in developing countries like Nigeria, has led to significant challenges, including the proliferation of slums (Salem and Tsurusaki, 2024). In Ibadan, one of Nigeria's largest cities, the expansion of informal settlements

threatens both social cohesion and environmental sustainability. Understanding the dynamics of peri-urbanization is critical for developing strategies that can prevent slum formation while fostering resilient communities (Sareen and Haque, 2023).

Ibadan, the capital of Oyo State in southwestern Nigeria, has a rich historical background characterized by its status as one of the largest cities in Africa. As urban areas expand, peri-urban regions often bear the brunt of rapid urbanization, contributing to the emergence of slums (Adewoyin *et al*., 2024). The United Nations (2021) defines slums as areas characterized by inadequate housing, insufficient living space, and lack of basic services. This trend is evident in Ibadan, where rapid population growth and urban sprawl have spawned informal settlements and increased poverty.

The peri-urban landscape faces numerous challenges, including inadequate infrastructure, limited access to basic services (such as clean water and sanitation), and socioeconomic disparities (Sareen and Haque, 2023). Urban poverty in Ibadan is alarmingly high, with a considerable percentage of the population living on less than $1.90 per day (Nigerian Bureau of Statistics, 2022). Transformative solutions are critical for preventing the proliferation of slums, promoting sustainable development, and ensuring equitable growth in Ibadan.

The population of Ibadan has been steadily increasing, leading to an influx of rural migrants seeking better opportunities (UN-HABITAT 2020). Urban populations in Nigeria are expected to double by 2050, necessitating urgent action to manage urban growth (The World Bank, 2021). The existing infrastructure in Ibadan's peri-urban areas is insufficient to cater to the growing population. Roads, sanitation, and waste management systems are often outdated or non-existent, leading to unsustainable living conditions (World Bank, 2022). Inequitable access to resources, education, and employment opportunities aggravate poverty in Ibadan's peri-urban areas. The need for inclusive economic growth strategies that address these disparities has been recognized (Oyo State Economic and Development Plan 2020).

The adoption of integrated urban planning approaches involving local communities, government, and stakeholders is fundamental. Participatory planning ensures that residents voice their needs and priorities (UN-HABITAT, 2021). This method can holistically address challenges related to housing, transportation, and service delivery. The establishment of affordable housing projects can mitigate slum proliferation (Tiwari and Pal, 2023). Innovations in low-cost construction techniques, such as prefabrication and sustainable materials, can drastically reduce housing costs while ensuring quality. For instance, the Nigerian government's implementation of the National Housing Programme aims to provide 100,000 affordable homes annually (Nigerian Ministry of Works and Housing, 2021).

Supporting community-led initiatives such as cooperatives can empower residents and ensure economic viability (Wang *et al*., 2022). Microfinance programs that provide small loans for entrepreneurship can help lift families out of poverty, reducing dependency on informal settlement growth (IFC, 2021). Leveraging technology can enhance urban services. Smart water management

systems, waste recycling initiatives, and affordable solar energy projects can significantly improve the quality of life in peri-urban areas. Cities in Nigeria, like Lagos, are implementing smart city technologies that Ibadan can adopt (World Bank, 2022).

Promoting urban agriculture can provide fresh produce, enhance food security, and create employment opportunities (Vasarus *et al*., 2024). Initiatives that integrate community gardens or rooftop farming can optimize land use and promote sustainability (FAO, 2022). Adopting climate-resilient urban planning strategies can help mitigate the impacts of climate change. Infrastructure improvements, such as better drainage systems, can prevent flooding, which disproportionately affects peri-urban communities (UNDP, 2021). Incorporating parks and green spaces into urban planning not only enhances biodiversity but also offers recreational spaces for residents, improving mental health and community well-being (Addas, 2023).

Implementing inclusive policy frameworks that prioritize marginalized communities can foster equitable growth (Singh *et al*., 2023). Policies should target education, healthcare access, and job creation, particularly in underprivileged neighborhoods (Nigerian Economic Recovery and Growth Plan, 2017). Empowering local leaders through training and education can foster sustainable community development. Programs focused on leadership, conflict resolution, and resource management can create a more resilient populace (Market Imperatives, 2021). Engaging the private sector through PPPs can mobilize resources for infrastructure development and service delivery. Successful PPP models from other regions can serve as frameworks for investment in Ibadan (McKinsey Global Institute, 2022).

Ibadan peri-urban landscape reflects the broader challenges facing many rapidly urbanizing cities globally. Addressing slum prevention, promoting sustainable development, and ensuring equitable growth requires collaboration among local communities, government, and private stakeholders (Smith, 2023). By incorporating innovative solutions and proactive strategies, Ibadan can transform its peri-urban areas into sustainable environments that foster dignity, opportunity, and resilience for all its residents.

The aim of transforming Ibadan's peri-urban landscape is to create a sustainable, equitable, and resilient environment that supports the well-being of its inhabitants. The objectives of this transformation include: preventing the proliferation of slums through inclusive and participatory urban planning; promoting sustainable development by integrating green infrastructure, renewable energy, and eco-friendly transportation systems; fostering equitable growth by providing access to affordable housing, quality education, and healthcare services; and enhancing the overall quality of life for residents, while minimizing environmental degradation and social inequality. By achieving these objectives, Ibadan peri-urban landscape can be transformed into a thriving, sustainable, and inclusive hub that sets a model for urban development in Nigeria and beyond.

Literature Review

This study explores key concepts in sustainable urbanism, peri-urban theory,

social ecology, and urban resilience as they relate to proactive peri-urban planning and the prevention of slum formation in Ibadan, Nigeria. The rapid urbanization in peri-urban areas presents challenges that necessitate innovative planning strategies to foster sustainability, equity, and resilience (Fronczak *et al.,* 2021).

Sustainable urbanism emphasizes the integration of environmental, social, and economic factors in urban planning. Underscoring the importance of creating compact, connected, and efficient urban spaces, sustainable urbanism should prioritize green spaces and mixed-use developments to enhance livability and reduce urban sprawl (Tzoulas *et al.*, 2021). In the context of Ibadan, applying sustainable urbanism principles could help address the issues arising from informal settlements by promoting inclusive development practices that meet community needs (Iddrisu *et al.*, 2023).

Peri-urban theory examines the transitional spaces between urban and rural areas, where unique social, economic, and environmental dynamics occur (Gomes, 2021). These areas often experience rapid population growth and infrastructural deficits, making them susceptible to slum formation (Dahiya and Singh 2022). Understanding the characteristics of peri-urban regions is crucial for developing tailored interventions. This theory suggests that proactive measures must be context-specific, addressing the unique drivers of urban growth in Ibadan.

Social ecology focuses on the interplay between social structures and environmental conditions, emphasizing the role of community engagement in urban planning (Haldar *et al.,* 2024). Environmental justice and social equity are foundational to achieving sustainable urban outcomes (Martinez-Alier, 2020). This perspective highlights that effective peri-urban planning should not only address physical infrastructure but also the social fabric of communities. Engaging local populations in the planning process can help ensure that development strategies reflect their needs and aspirations, thereby fostering social cohesion.

Urban resilience refers to the capacity of urban systems to anticipate, prepare for, respond to, and recover from various challenges, including climate change and economic shocks (Adedire *et al*., 2023). Resilience planning should incorporate diverse stakeholder perspectives and adaptive strategies (Meerow *et al.,* 2016). In peri-urban contexts, this means integrating flexible policies that can evolve with changing conditions. Resilience strategies should prioritize investment in green infrastructure and social services to mitigate the impacts of urbanization and prevent slum formation (Hamin and Gurran, 2020).

Recently, emphasis was laid on the need for proactive strategies that integrate affordable housing, infrastructure development, and community participation (Duncan, 2022). This underscores the importance of incorporating affordable housing into urban development plans as a way to prevent slum emergence (Wamuziri, 2021). Additionally, the integration of green infrastructure, as discussed by Thorne *et al*. (2022), can enhance urban resilience and improve the quality of life in peri-urban areas. The synergy of these elements is essential for creating sustainable urban environments that can

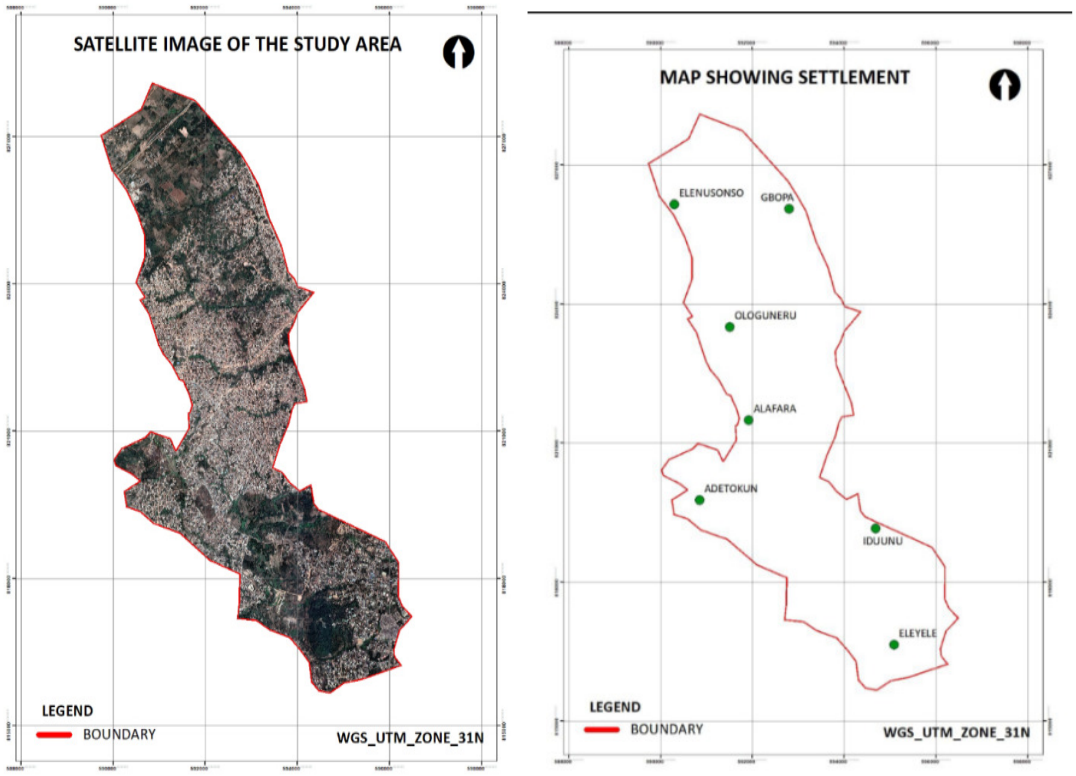
accommodate growth while mitigating risks associated with informal settlements.

Effective community engagement is critical for ensuring that urban planning reflects local needs. Participatory planning processes empower communities and facilitate better decision-making outcomes (Lacey *et al.* 2020). By involving residents in the planning stages, authorities can gather valuable insights and foster a sense of ownership, leading to more successful and sustainable interventions.

The necessity of integrating sustainable urbanism, peri-urban theory, social ecology, and urban resilience into proactive peri-urban planning strategies cannot be over emphasized (ElFayoumi *et al.,* 2021). In Ibadan, addressing the multifaceted challenges of slum formation requires a comprehensive approach that incorporates local knowledge, fosters community participation, and emphasizes sustainable development practices Deng *et al*. (2022). Future research should continue to explore these interconnections to inform effective planning frameworks that promote equitable and resilient urban growth.

Study Area

The study area comprises of the peri-urban interface within the Ibadan North West and Ido Local Government Areas in the city of Ibadan, Oyo State, Nigeria. The area reflects the true peri-urban dynamics of transformation in nature, mixed ethnics and gradual expansion of residential/other uses and reduction in agricultural land uses. The selected areas are Eleyele and Adetokun communities on one part, Alafara and Ologuneru on the other part. The former are in Ibadan North West Local Government area while the latter are in Ido. These four locations comprise of 26 communities, 74 Community Developments Associations (CDAs) and 1,826 Housing Units. (Adewoyin *et al.*, 2024). Figures 1 (a-b) indicates the established study area as captured through the satellite imagery of the study area and settlements.



a b

Fig. 1 (a-b): Established Study Area, its Satellite Imagery and Settlements.
Source: Adewoyin *et al.* (2024)

Research Methodology

Data Collection

The study utilized mixed-methods research design, combining quantitative and qualitative approaches. This design allows for a comprehensive understanding of the complex dynamics of peri-urbanization in Ibadan and facilitates triangulation of data for robust findings.

The research focused on Eleyele, Adetokun, Alafara, and Ologuneru selected peri-urban areas of Ibadan, Nigeria. These areas have been identified as critical zones where rapid urbanization and slum formation are prevalent. These specific neighborhoods are chosen based on demographic factors, existing urban infrastructure, and indicators of vulnerability to slum development.

Structured questionnaires were administered to a stratified random sample of residents in the selected peri-urban areas. The survey gathered data on socio-economic demographics, housing conditions, access to services, and perceptions of slum formation. Approximately 346 households were targeted in the four cluster settlements to ensure a representative sample.

Geographic Information System (GIS) tools were employed to analyze land use patterns, infrastructure availability, and spatial distribution of slums. Satellite imagery and existing urban planning documents were utilized to assess changes in land use over time. (Figure 1).

Semi-structured interviews were conducted with key stakeholders,

including local government officials, urban planners, community leaders, and representatives from non-governmental organizations (NGOs). These interviews explored perceptions of slum formation, urban planning policies, and strategies for community engagement.

Focus groups were organized with community members to facilitate discussions on their experiences, needs, and aspirations regarding urban development. This qualitative approach provided deeper insights into local perspectives on slum prevention strategies. Community workshops were held to engage residents in participatory mapping exercises. This method allowed residents to identify key resources, hazards, and areas at risk of slum formation, fostering a sense of ownership and involvement in planning processes.

Data Analysis

Statistical analysis was performed using SPSS software. Descriptive statistics summarized the demographic data, while inferential statistics (e.g., regression analysis) examine the relationships between socio-economic factors and slum formation indicators. Qualitative data from interviews and focus group discussions were analyzed using thematic analysis. This process will involve coding the data to identify key themes and patterns related to slum formation, community needs, and effective planning strategies. The study adhered to ethical guidelines, ensuring informed consent from all participants. Anonymity and confidentiality were maintained throughout the research process.

Discussion

The rapid urbanization of Ibadan, Nigeria has led to significant challenges in its peri-urban areas, characterized by inadequate infrastructure, poverty, and environmental degradation. This research highlights the need for innovative solutions to prevent slum formation, promote sustainable development, and ensure equitable growth

Prevailing Changes in Land Use

A similar finding was observed in terms of the prevailing land use change in the study. As identified by majority (95.1%) of the respondents, the existing land use in the peri-urban communities were changed into residential use. In Eleyele, Adetokun, Alafara and Ologuneru communities, majority of the respondents opined that the prevailing change in land use was for residential purposes (Table 1). On the other hand, a minute proportion of the respondents in the study indicated that land use in the study area was changed for commercial (2.9%), institutional (1.2%), and recreational use (0.6%).

Table 1: Perceived Changes in Land Use

	Residential communities				
	Eleyele	Adetokun	Alafara	Ologuneru	Total
Use	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*
Residential	68 (97.1)	140 (94.6)	82 (95.3)	39 (92.9)	329 (95.1)
Commercial	1 (1.4)	4 (2.7)	2 (2.3)	3 (7.1)	10 (2.9)
Institutional	-	3 (2.0)	1 (1.2)	-	4 (1.2)
Recreational	-	1 (0.7)	-	-	1 (0.3)
None	1 (1.4)	-	1 (1.2)	-	2 (0.6)
Total	70 (100.0)	148 (100.0)	86 (100.0)	42 (100.0)	346 (100.0)

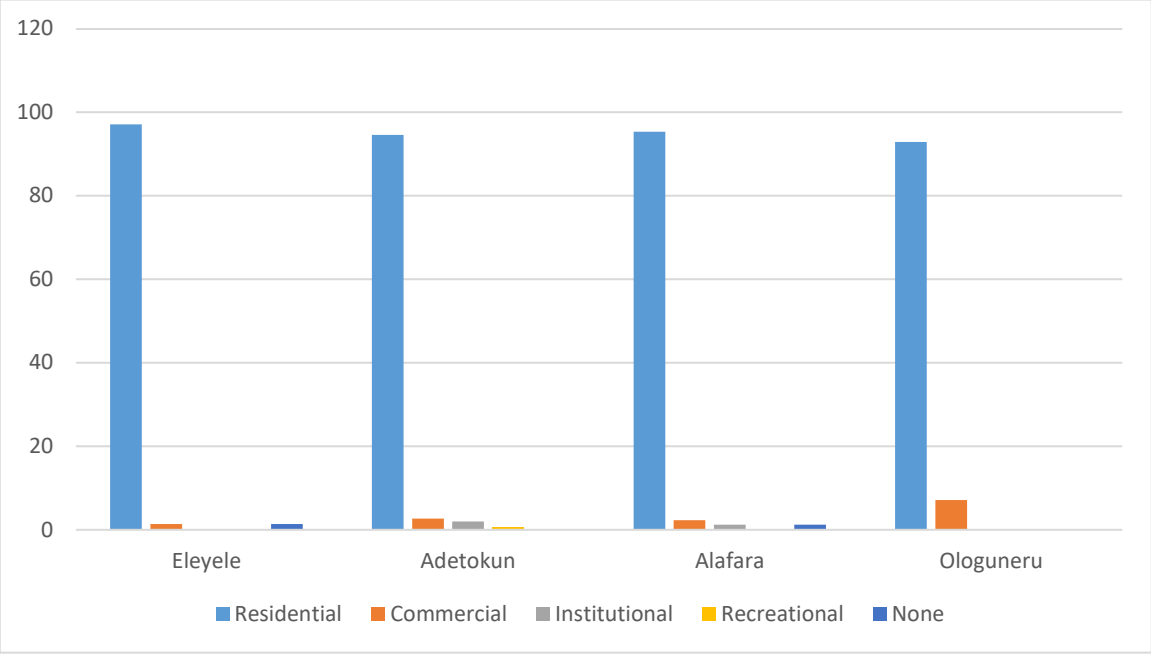


Fig. 2: Perceived Changes in Land Use

Awareness of Land Use Changes in the Neighbourhood

The extent to which residents were aware of land use changes and development in the different neighbourhood was examined. Findings from the study area revealed that 64.2% of the residents in the study area were aware of the rapid development and land use changes emanating from these changes in their neighbourhood (Table 2). It is important to note that the perceived land use changes and development were largely observed by respondents in Ologuneru (83.4%), Alafara (74.4%) and Adetokun (67.6%) communities. However, in Eleyele community, a large proportion (64.3%) of the respondents were skeptical of rapid development and land use changes experienced in their neighbourhood.

Table 2: Awareness of Rapid Development and Land Use Changes in the Neighbourhood

	Residential communities				
	Eleyele *Freq. (%)*	Adetokun *Freq. (%)*	Alafara *Freq. (%)*	Ologuneru *Freq. (%)*	Total *Freq. (%)*
Rarely	8 (11.4)	9 (6.1)	1 (1.2)	2 (4.8)	20 (5.8)
Slightly	37 (52.9)	39 (26.4)	20 (23.3)	5 (11.9)	101 (29.2)
Neutral	2 (2.9)	-	1 (1.2)	-	3 (0.9)
Strongly	17 (24.3)	53 (35.8)	29 (33.7)	12 (28.6)	111 (32.1)
Very strongly	6 (8.6)	47 (31.8)	35 (40.7)	23 (54.8)	111 (32.1)
Total	70 (100.0)	148 (100.0)	86 (100.0)	42 (100.0)	346 (100.0)

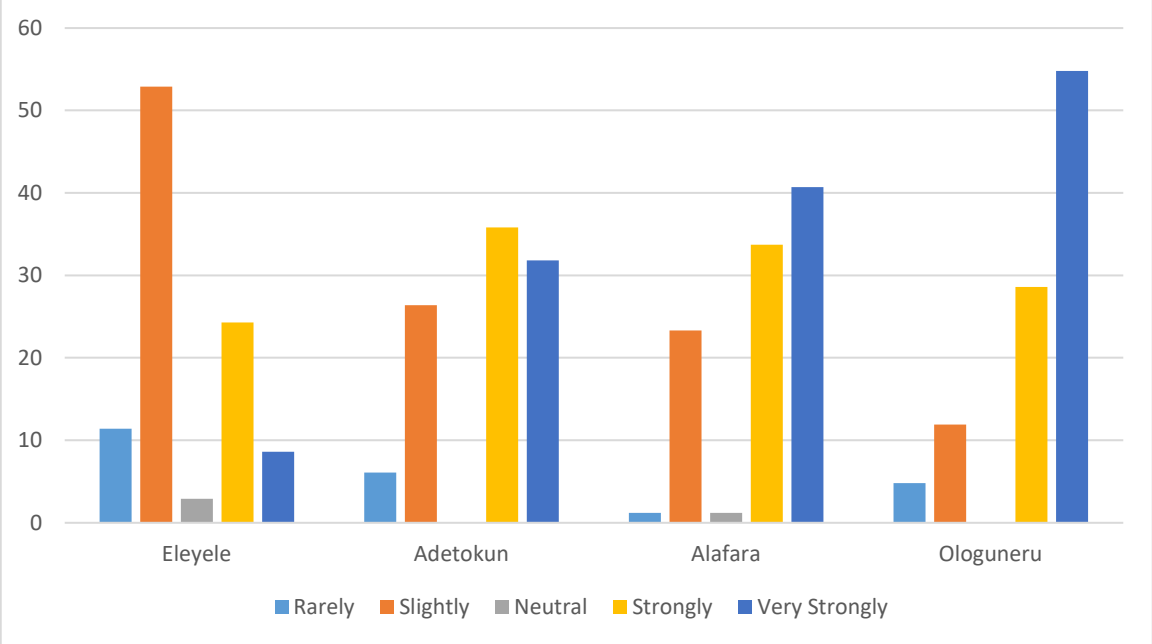


Fig. 3. Awareness of Rapid Development/Land Use Change in the Study

Effect of Land Use Changes on Agricultural Activities

Regarding residents' perceived effect of land use changes on agricultural activities in the neighbourhood, a large majority of residents in Eleyele (55.7%), Adetokun (45.3%) and Ologuneru (52.4%) communities provided a non-affirmative response to the fact that land use changes had an effect on agricultural activities. However, majority of the respondents (54.6%) at Alafara community agreed to the fact that land use changes affected agricultural activities in the neighbourhood (Table 3). A Chi-square test further confirmed a significant difference in the perceived responses of the respondent across the sampled communities ($\chi^2 = 21.247$, $p = 0.047$).

Table 3: Perceived Effect of Land Use Changes on Agricultural Activities in the Neighbourhood

	Residential communities				
	Eleyele	Adetokun	Alafara	Ologuneru	Total
	Freq. (%)	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*
Rarely	12 (17.1)	28 (18.9)	12 (11.9)	5 (11.9)	57 (16.5)
Slightly	27 (38.6)	39 (26.4)	17 (19.8)	17 (40.5)	100 (28.9)
Neutral	11 (15.7)	24 (16.2)	10 (11.6)	3 (7.1)	48 (13.9)
Strongly	9 (12.9)	38 (25.7)	31 (36.0)	13 (31.0)	91 (26.3)
Very strongly	11 (15.7)	19 (12.8)	16 (18.6)	4 (9.5)	50 (14.5)
Total	70 (100.0)	148 (100.0)	86 (100.0)	42 (100.0)	346 (100.0)

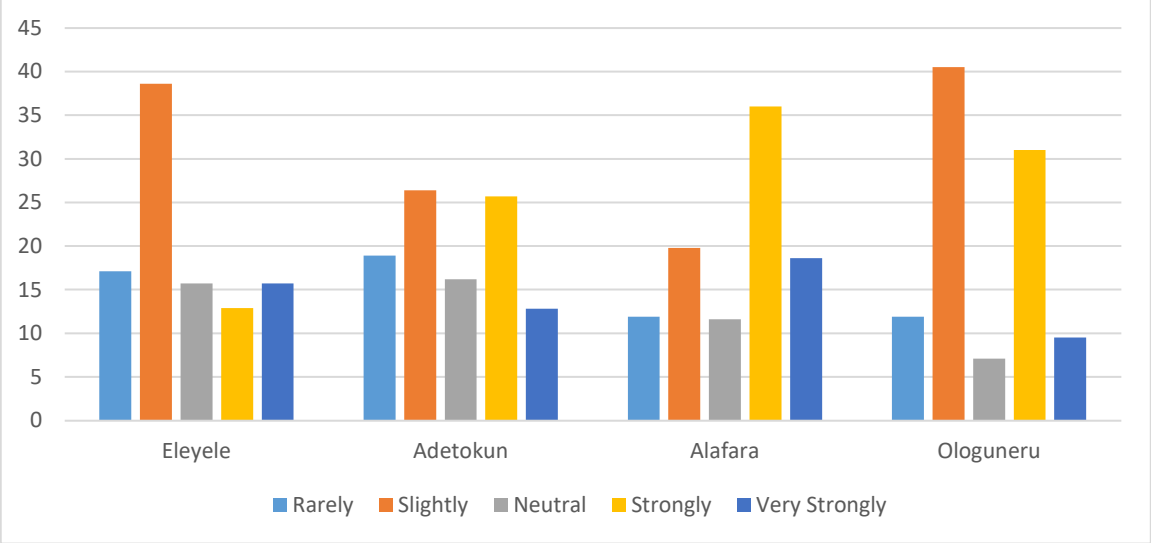


Fig. 4: Land Use Change Effects on Agricultural Activities

Socio-Economic Activities and Population Growth

Table 4 revealed that the majority (68.0%) of the respondents in the study area agreed to observe the improvement in socio-economic activities as a result of population increase. On the other hand, about 26.0% of the respondents claimed to rarely and slightly experience improvement in the socio-economic activities at the neighbourhood while 2.3% of the respondents had an indifferent perception. These perceived differences by respondents in the sampled peri-urban communities were statistically significant at p-value (χ^2= 27.434, p = 0.007).

Table 4: Residents' Improvement in Socio-Economic Activities due to Population Growth

	Residential communities				
	Eleyele	Adetokun	Alafara	Ologuneru	Total
	Freq. (%)	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*	*Freq. (%)*
Rarely	4 (5.7)	10 (6.8)	1 (1.2)	2 (4.8)	17 (4.9)
Slightly	15 (21.4)	49 (33.1)	12 (14.0)	10 (23.8)	86 (24.9)
Neutral	3 (4.3)	4 (2.7)	1 (1.2)	-	8 (2.3)
Strongly	25 (35.7)	63 (42.6)	45 (52.3)	17 (40.5)	150 (43.4)
Very strongly	23 (32.9)	22 (14.9)	27 (31.4)	13 (31.0)	85 (24.6)
Total	70 (100.0)	148 (100.0)	86 (100.0)	42 (100.0)	346 (100.0)

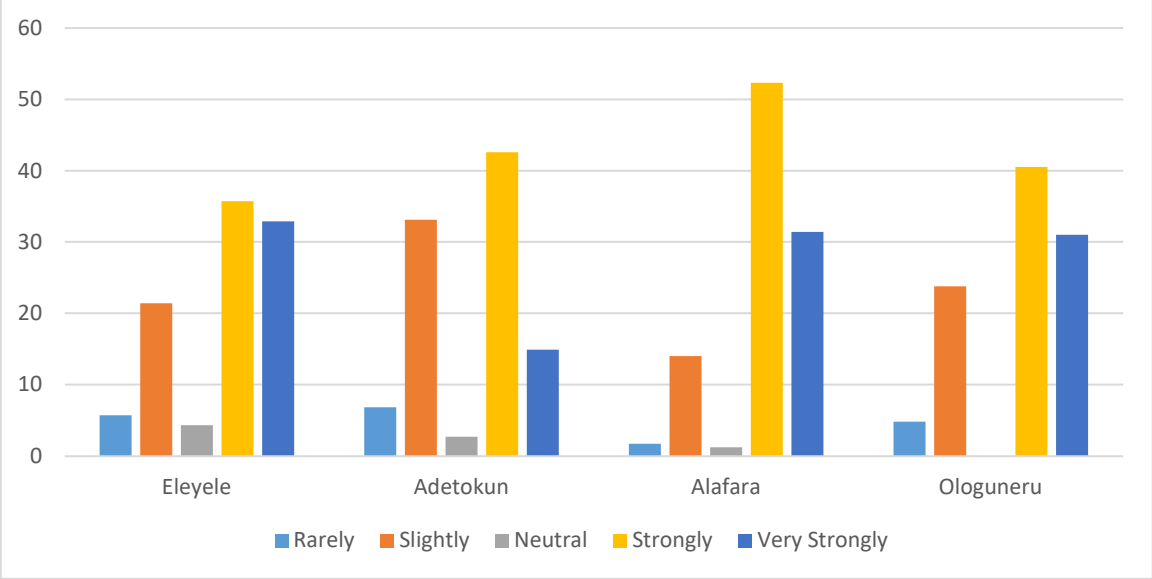


Fig. 5: Rise in Socio-economic Activities due to Population Growth

Innovative Strategies for Slum Prevention and Sustainable Development

In the sprawling landscape of Ibadan, where urban expansion meets pockets of informal settlements, innovative solutions for slum prevention, sustainable development, and equitable growth are imperative for the city's future. The synthesis of local knowledge, community engagement, and technology serves as the backbone of these solutions. Empowering local communities is crucial. Initiatives should focus on engaging residents in participatory planning, allowing them to voice their needs and priorities. Establishing local councils that include diverse community members can foster ownership and accountability in development projects. Workshops can educate residents about sustainable practices, while skill-training programs can enhance livelihoods and reduce poverty (Aguilar *et al.,* 2022).

To combat slum proliferation, it is essential to provide affordable, quality housing. Public-private partnerships can facilitate the construction of low-cost housing units that adhere to sustainable building practices. Utilizing local materials and traditional designs can reduce costs and encourage community involvement. Additionally, implementing microfinance programs can help residents secure funding for home improvement, preventing informal settlements. Improving infrastructure - such as roads, water supply, sanitation, and waste management - should be a priority. A sustainable approach involves utilizing eco-friendly technologies, like solar-powered water systems and biogas for waste disposal. Regular maintenance programs should be established, involving local youth to create job opportunities and ensure ongoing community engagement (Baker *et al.,* 2023).

Promoting local entrepreneurship can drive equitable growth. Establishing small business incubators can support aspiring entrepreneurs with training, resources, and access to markets. Initiatives should also focus on promoting local agriculture through community gardens and

cooperatives, enhancing food security while providing income. Enhancing educational opportunities is vital for long-term sustainable growth. Developing partnerships with educational institutions can facilitate vocational training programs tailored to market needs. Initiatives aimed at adult literacy and skill development can empower residents to secure better employment and contribute to community growth (Barbosa *et al.,* 2022).

Integrating green spaces into urban planning can enhance the quality of life and foster community interaction. Initiatives could include creating parks, tree-planting programs, and community gardens. These efforts would not only beautify the area but also provide recreational opportunities and improve air quality (Bhatta *et al.,* 2022). Ensuring access to healthcare is critical for sustainable development. Mobile clinics and community health programs can address health disparities. Additionally, establishing social service networks can support vulnerable populations, offering services such as counseling and support for families.

Challenges such as flooding, poor drainage, and increasing temperatures occur in Ibadan. Implementing climate-resilient infrastructure like permeable paving and bioswales can mitigate runoff and enhance groundwater recharge. Community preparedness programs for climate-related disasters can equip residents with the skills they need to navigate difficult situations (Bramley *et al.,* 2023).

In summary, sustainable development in Eleyele, Adetokun, Alafara, and Ologuneru, Ibadan's fringe settlements require a multi-faceted approach grounded in local engagement, innovative practices, and a commitment to equitable growth. By embracing these solutions, the city can not only prevent the emergence of slums but can foster vibrant, resilient communities that thrive amidst the challenges of urbanization. The landscape of Ibadan can transform into a model of inclusive urban growth, where every resident has the opportunity to contribute to and benefit from the city's development.

Conclusion

Through a mixed-methods approach, the research identifies critical early warning signs and risk factors associated with slum formation, evaluates effective urban planning interventions, and emphasizes the importance of community engagement. The findings underscore that proactive planning, informed by local knowledge and inclusive practices, is essential for fostering sustainable and resilient urban environments (Akanle, 2024).

Recommendations

Local authorities should develop and enforce integrated urban planning policies that prioritize sustainable land use, affordable housing, and the provision of essential services. Policies must be flexible enough to adapt to the dynamic nature of peri-urbanization. Establish formal mechanisms for community participation in urban planning processes. Regular workshops, participatory mapping exercises, and public forums should be organized to ensure that local residents can voice their needs and contribute to decision-making (Anjerobi *et al*., 2023).

Government and private sector stakeholders should collaborate to create

affordable housing projects that integrate green infrastructure and social services. Such initiatives can alleviate the pressures of informal settlements and enhance the quality of life in peri-urban areas. Investment in infrastructure is crucial to support growing populations. Prioritizing the development of roads, water supply, sanitation, and waste management systems can help reduce vulnerabilities associated with rapid urbanization (Bonga, 2024).

Encourage the adoption of sustainable urban practices, such as the integration of green spaces, renewable energy sources, and sustainable transportation options. These practices can enhance resilience and improve environmental quality in peri-urban areas. Establish a framework for continuous research and monitoring of peri-urban dynamics. Regular assessments can help identify emerging trends and risks, allowing for timely interventions and adaptations to urban planning strategies (Ball, 2015).

Utilize technology, such as Geographic Information Systems (GIS) and remote sensing, to monitor urban growth and facilitate informed decision-making. Technology can also enhance community engagement by providing accessible platforms for information sharing.

By implementing these recommendations, stakeholders in Ibadan can take significant strides towards preventing slum formation and fostering a sustainable, equitable, and resilient urban environment that meets the needs of all residents.

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