

**EXAMINING THE CHALLENGES OF ACHIEVING SUSTAINABLE DENSITY IN
SUBURBAN AREAS OF MAITUMBI, NIGER STATE****^{1,*} John Agmada Bawa and ²Igo Samson Ode**¹Baze University, Abuja, Nigeria²Federal University of Technology, Minna, Nigeria**Received 25th August 2024; Accepted 20th September 2024; Published online 23rd October 2024**

Abstract

This study explores the complexities surrounding the pursuit of sustainable urban density in the suburban areas of Maitumbi, Niger State, Nigeria. It investigates the evolving dynamics of suburban growth, the critical role of sustainable urban planning, and the challenges posed by infrastructure development, population expansion, and environmental concerns. A mixed-methods research approach was employed, combining quantitative data collection through surveys with qualitative data gathered from field observations. The study reveals a suburban landscape in transition, marked by rapid population growth, increasing infrastructure demands, and changing land-use patterns. Challenges related to inadequate infrastructure, traffic congestion, environmental degradation, and limited access to essential services are identified as significant impediments to achieving sustainable density. Additionally, findings underscore the need for integrated planning, community engagement, and policy alignment to address these challenges effectively. The findings are discussed in the context of sustainable urban development principles, emphasizing the importance of balanced growth, green infrastructure, and compact urban forms. The study highlights the need for proactive policies and collaborative efforts among stakeholders, including local authorities, residents, and developers, to navigate the path toward sustainable suburban density. This research contributes to the discourse on sustainable suburban development in Maitumbi, Niger State, offering insights into the challenges and opportunities of achieving density while preserving environmental quality and enhancing the quality of life for residents. It calls for a holistic approach to suburban planning that integrates environmental, social, and economic considerations to create resilient and sustainable suburban communities.

Keywords: Environmental sustainability, Population growth, Suburban areas, Sustainable.**INTRODUCTION**

As the global population continues to grow, urban and suburban areas face unprecedented challenges related to sustainability and livability. One crucial aspect of urban planning and development is the pursuit of sustainable density, which seeks to optimize land use, promote efficient resource allocation, and enhance the overall quality of life for residents (Newman & Kenworthy, 1999). While urban centers often receive substantial attention in the discourse on sustainable development, suburban areas play a pivotal role in this narrative, especially in rapidly urbanizing regions such as Maitumbi, Niger State. In recent years, the expansion of suburban areas in Maitumbi, like in many other parts of the world, has been characterized by sprawling development patterns, low-density housing, and increased automobile dependence. However, achieving sustainable density in these suburban areas poses a unique set of challenges that necessitate careful examination. This article delves into the multifaceted challenges faced in Maitumbi, Niger State, as it endeavors to transition toward a more sustainable suburban environment. Maitumbi, located in Niger State, Nigeria, represents a prime example of suburban areas experiencing significant growth and transformation. As the population expands and urbanization accelerates, the need to address sustainable density becomes increasingly pressing. Achieving this objective demands a comprehensive understanding of the key challenges and barriers in Maitumbi's suburban context. This article seeks to explore these challenges in greater depth, offering insights into

how Maitumbi, Niger State, can navigate the path towards sustainable suburban development. By addressing these challenges, Maitumbi can position itself as a model for achieving sustainability in suburban areas, with potential implications for suburban areas globally.

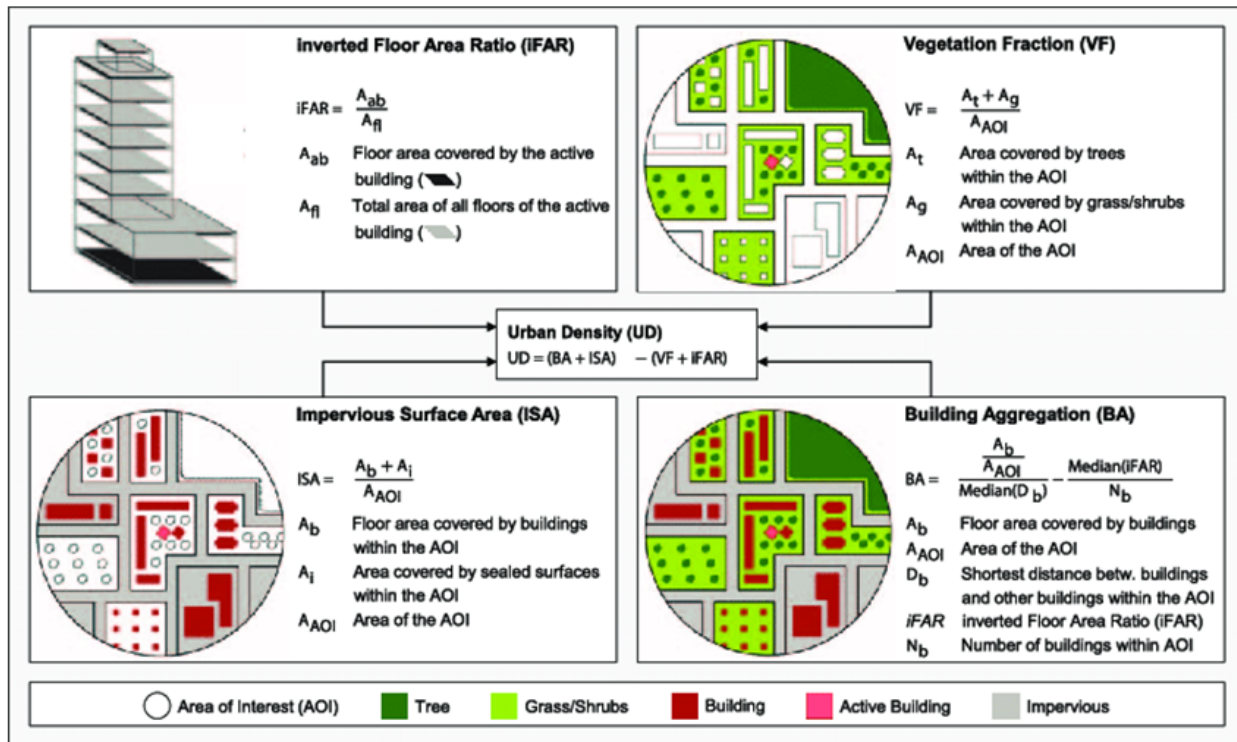
The aim of this study is to explore the complexities surrounding the pursuit of sustainable urban density in the suburban areas of Maitumbi, Niger State, Nigeria. This is achieved through the following objectives:

- Assess public awareness and perceptions of sustainable density,
- Identify infrastructure deficiencies and their impact on sustainable density, and
- Investigate significant impediments to achieving sustainable density

LITERATURE REVIEW

Urbanization and suburbanization have emerged as defining trends of the 21st century, transforming landscapes and presenting both opportunities and challenges for sustainable development. As populations gravitate towards urban centers, suburban areas have witnessed a surge in growth, often characterized by sprawling development patterns that raise concerns about environmental impacts, social equity, and economic viability. Berger *et al.* (2023) explained the four input parameters used to infer urban density in Figure 1. Vegetation fraction which is the area covered by green areas in this study is fast depleted in the study area.

*Corresponding Author: *John Agmada Bawa*,
Baze University, Abuja, Nigeria.



Source: Berger et al (2023)

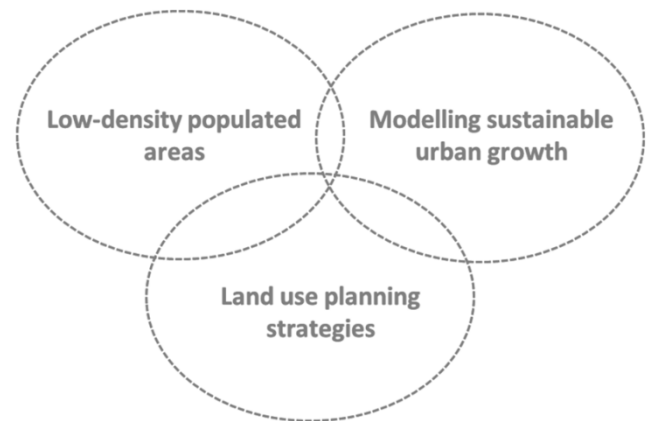
Figure 1. The four input parameters used to infer urban density

Maitumbi, located in Niger State, Nigeria (Figure 2), exemplifies this trend, experiencing rapid suburbanization amidst the broader urbanization phenomenon. Achieving sustainable density in suburban areas like Maitumbi requires a comprehensive understanding of the multifaceted issues at play and a commitment to balancing growth with environmental, social, and economic considerations.

foster a vibrant and livable environment. However, implementing sustainable density in suburban areas, particularly in developing countries like Nigeria, poses a complex set of challenges that demand a comprehensive and context-specific approach.



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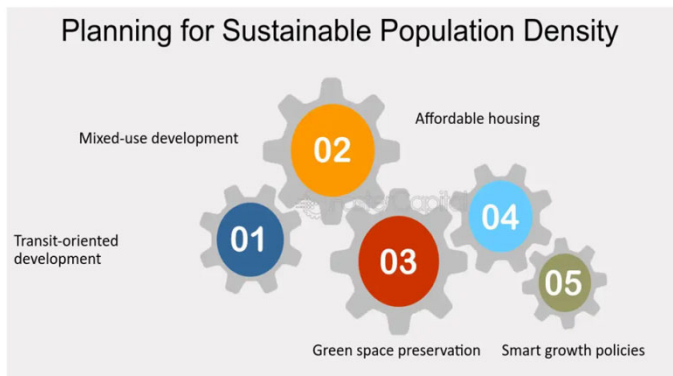
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Sustainable Density

Sustainable density, a cornerstone of sustainable urban and suburban planning as illustrated in Figure 3, aims to achieve a harmonious balance between efficient land use, reduced environmental impact, and enhanced quality of life for residents (Newman & Kenworthy, 1999; Jabareen, 2006). It advocates for compact, mixed-use, and walkable communities that promote resource conservation, minimize sprawl, and

Achieving sustainable density requires striking a delicate balance between efficient land use and maintaining a high quality of life for residents. Newman and Kenworthy (1999) argue that compact urban forms can reduce resource consumption and promote sustainable transportation modes, while Jabareen (2006) emphasizes the importance of creating walkable, mixed-use neighborhoods that foster social interaction and a sense of community. However, achieving this balance demands careful consideration of local context and community needs. Sustainable density should not come at the expense of affordability and social equity. Bramley *et al.* (2009) argue that sustainable urban development must address housing affordability and social inclusion, ensuring that diverse income groups can access quality housing in

sustainable communities. Rafiu and Oyekale (2019) suggest exploring innovative financing mechanisms and incentives to promote affordable housing options within sustainable density initiatives as suggested by (Faster 2024) and shown in Figure 4.



Source: Faster (2024)

Challenges of Achieving Sustainable Density in Suburban Areas

The rapid pace of urbanization, particularly in developing countries, often outpaces the development of infrastructure, leading to strained services, deteriorating conditions, and challenges in achieving sustainable density in suburban areas. This issue has been extensively discussed in the literature, with various studies highlighting the need for infrastructure investments and policy interventions to address these challenges (UN-Habitat, 2016; Mberu, 2006; Owoeye, 2017; Abubakar & Doan, 2017). The UN-Habitat report (2016) on "Urbanization and Development: Emerging Futures" emphasizes the strain on infrastructure and services caused by rapid urbanization, particularly in developing regions. The report calls for integrated urban planning and infrastructure development to support sustainable urbanization and improve quality of life. Mberu (2006) examines the challenges of infrastructure provision in rapidly urbanizing areas, highlighting the mismatch between infrastructure development and population growth. He argues that inadequate infrastructure can hinder economic growth, exacerbate social inequalities, and impede efforts to achieve sustainable development. Owoeye (2017) specifically discusses the challenges of achieving sustainable density in suburban areas due to inadequate infrastructure and outdated land use policies. He argues that these factors contribute to insufficient transportation networks, limited access to amenities, and fragmented land development patterns, hindering efforts to increase density in a sustainable manner. Abubakar and Doan (2017) examine the role of policy interventions in addressing the infrastructure challenges associated with rapid urbanization. They argue that effective policies are crucial for guiding infrastructure investments, promoting sustainable land use patterns, and ensuring equitable access to services. These studies collectively highlight the need for a comprehensive approach to addressing infrastructure challenges in rapidly urbanizing areas, particularly in suburban contexts where sustainable density goals are often hindered by inadequate infrastructure and outdated land use policies. The pursuit of sustainable density in suburban areas often encounters challenges related to housing affordability and community resistance, as highlighted in the literature (Rafiu & Oyekale, 2019; Ishaya & Bwala, 2017). These challenges can hinder efforts to increase density in a manner that is both socially

equitable and environmentally sustainable. Rafiu and Oyekale (2019) specifically examine the impact of housing affordability on sustainable density in suburban areas. They argue that high land prices and construction costs often limit the availability of affordable housing options, making it difficult to achieve the density levels needed for sustainable development. They suggest that policymakers explore innovative financing mechanisms and provide incentives to developers to create affordable housing options. Ishaya and Bwala (2017) explore the challenge of community resistance to higher density in suburban areas. They argue that residents' concerns about increased traffic congestion, noise pollution, and changes to neighborhood character can significantly hinder the implementation of sustainable density initiatives. They emphasize the importance of effective community engagement and transparent communication strategies to address these concerns and build support for sustainable development. These studies underscore the need to address housing affordability and community resistance as critical factors in achieving sustainable density in suburban areas.

The environmental implications of increased density in suburban areas are a critical consideration for sustainable development. While higher density can offer benefits such as reduced land consumption and more efficient resource use, it can also lead to adverse environmental consequences if not managed properly. Several studies have explored this issue, highlighting the need to integrate environmental sustainability principles into sustainable density initiatives (Adedeji *et al.*, 2020; Ajayi & Dada, 2015). Adedeji *et al.* (2020) examine the potential environmental impacts of increased density in suburban areas, emphasizing the need for careful planning and management to mitigate negative consequences. They argue that higher density can lead to increased pollution, reduced green spaces, and strain on natural resources if not accompanied by measures to promote sustainable practices and protect environmental quality. Ajayi and Dada (2015) focus on the role of transportation infrastructure in suburban sustainability, arguing that automobile dependence can undermine efforts to increase density and create sustainable communities. They advocate for investments in public transit, pedestrian-friendly infrastructure, and cycling routes to reduce reliance on cars and promote more environmentally friendly transportation options. These studies underscore the importance of integrating environmental sustainability principles into sustainable density initiatives. This literature review highlights the critical challenges associated with achieving sustainable density in suburban areas. It underscores the need for a holistic approach that combines effective policy measures, community engagement, affordability solutions, and environmental considerations. In the context of Maitumbi, Niger State, these challenges take on local nuances, emphasizing the importance of tailored strategies to promote sustainable suburban development.

METHODOLOGY

To comprehensively examine the challenges of achieving sustainable density in Maitumbi, a rigorous mixed-method approach was adopted, combining surveys and field observations. This methodology provided a holistic understanding of the issue by capturing both quantitative and qualitative data, enabling informed decision-making and effective policy interventions.

Structured Surveys

A carefully designed survey was administered to a representative sample of Maitumbi residents to gather data on their perceptions, experiences, and attitudes towards sustainable density (Dillman, Smyth, & Christian, 2014). The survey instrument covered the following key areas: awareness and comprehension of sustainable density concepts, perceptions of current infrastructure and land use policy deficiencies, housing affordability and community resistance, and environmental impact and transportation challenges. The survey data was subjected to rigorous statistical analysis to identify trends, patterns, and correlations, providing insights into the community's overall understanding and acceptance of sustainable density principles.

Systematic Field Observations

Complementing the survey data, systematic field observations were conducted to gather data on the physical and social environment of Maitumbi (Creswell, 2014). Researchers meticulously observed and documented aspects such as; existing land use patterns and density distribution, transportation infrastructure, usage patterns, and potential for improvement, housing typologies, conditions, and potential for sustainable development. Field notes, photographs, and sketches were used to capture these observations, providing a rich understanding of the real-life context in which sustainable density principles could be implemented.

Synthesis of Findings: Integrating Quantitative and Qualitative Data

The findings from the surveys and field observations were integrated to provide a comprehensive understanding of the challenges and opportunities for achieving sustainable density in Maitumbi (Creswell, 2014). The quantitative data from the surveys revealed residents' perceptions and preferences, while the qualitative data from field observations provided contextual insights into the physical and social environment. The mixed-method approach enabled the researchers to identify specific areas where sustainable density principles could be applied effectively, taking into account the community's needs, preferences, and the existing infrastructure and development patterns. The findings also informed recommendations for policy interventions, public engagement strategies, and infrastructure investments that can promote sustainable density in Maitumbi, fostering a more livable and environmentally conscious community.

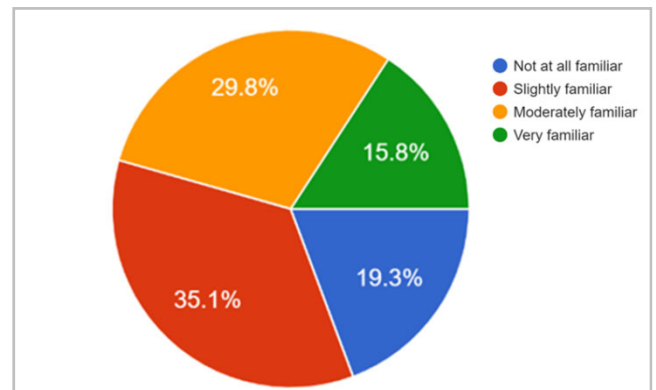
RESULTS AND DISCUSSION

The examination of the challenges associated with achieving sustainable density in suburban areas of Maitumbi, Niger State, sheds light on critical issues and complexities facing this evolving region. Drawing upon the extensive literature reviewed, this discussion synthesizes key findings and offers insights into the implications of these challenges for Maitumbi, as well as potential strategies to address them.

Perceptions and Challenges Related to Sustainable Density in Maitumbi

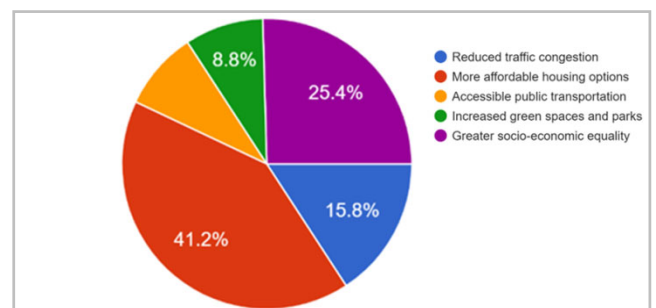
Figure 1 illustrated that a significant portion of respondents have some level of familiarity with the concept of sustainable

density. This suggests that there is a foundational understanding of the concept among the residents. Sustainable density was commonly associated with more affordable housing options and greater socio-economic equality (Figure 2).



Source: Field Work

Figure 5. Familiarity with sustainable density



Source: Field Work

Figure 6. Association with sustainable density

This indicates that residents perceive sustainable density as a means to address housing affordability and social equity. Bramley *et al.* (2009) argue that sustainable urban development should encompass social equity goals, including access to affordable housing and a reduction in socio-economic disparities. They suggest that sustainable density can contribute to these goals by providing a wider range of housing options, reducing transportation costs, and promoting mixed-income communities. The perception that lacks of affordable housing (38%) and socio-economic inequality (32%) are the biggest obstacles to sustainable density aligns with the associations made by respondents. Burton (2000) emphasizes the importance of addressing housing affordability as a central element of sustainable urban development. He argues that sustainable density can help alleviate housing affordability issues by increasing the supply of housing units, particularly in areas with high demand and limited supply. Addressing these challenges could be a critical component of sustainable density efforts.

Infrastructure Deficiencies and Land Use Policies

With a significant percentage (33%) of respondents rating the conditions of roads and streets as a problem (rating 5) (Figure 6), highlights the importance of addressing infrastructure issues. This resonates with the findings of Gxumisa, (2020), which emphasized that efficient and well-maintained infrastructure, including transportation systems, is essential for supporting higher population densities. As noted by Mberu, (2006), inadequate infrastructure can hinder sustainable

density efforts by limiting accessibility and connectivity. Investments in infrastructure, such as road improvements and transit systems, can enhance the walkability and transit-friendliness of suburban areas. Concerns about frequent power outages and challenges related to clean water supply in Maitumbi was also revealed, indicating that reliable utilities are fundamental to sustainable density. The importance of reliable utility services to sustain higher-density living environments cannot be overemphasized. Frequent power outages and water supply issues can deter residents from embracing higher-density housing options. To support sustainable density, ensuring consistent access to electricity and clean water is crucial (Owoeye, 2017).

Affordable Housing and Community Resistance

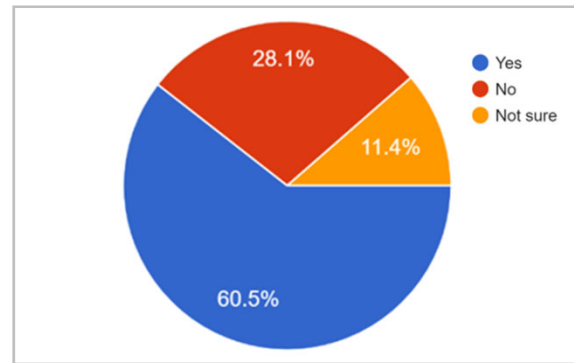


Figure 8. Affordability of housing in Maitumbi

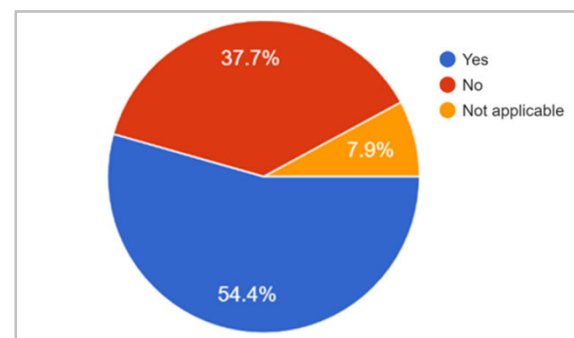
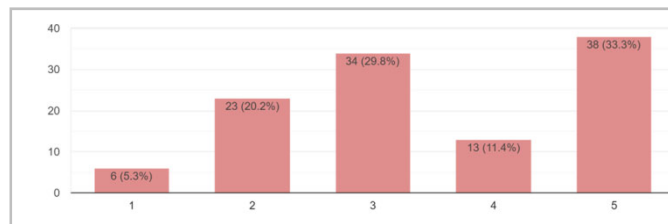


Figure 9. Difficulties in finding affordable housing



Source: Field Work

Figure 6. Condition of the roads and streets

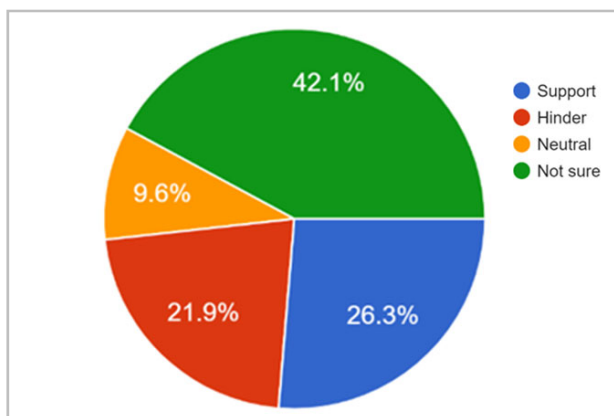


Figure 7. Support of land use policies for sustainable density

The uncertainty among Maitumbi residents (Figure 7) regarding the impact of existing land use policies on sustainable density highlights the need for clearer communication and potential reforms to align policies with sustainable development goals. This aligns with the arguments presented by Owoeye (2017) and other scholars who emphasize the critical role of land use policies in shaping urban form and influencing the feasibility of sustainable density initiatives (Talen, 2013; Dempsey & Jenks, 2010). However, there is a significant level of support for revisions to land use policies that encourage sustainable density. Owoeye (2017) underscores the role of land use policies and zoning regulations in either promoting or impeding sustainable density.

Talen (2013) argued that while regulations can play a crucial role in promoting sustainable outcomes, they can also inadvertently create barriers to sustainable density if not carefully designed and implemented. Outdated policies may restrict the development of mixed-use areas and limit housing options, contributing to low-density sprawl. To address this challenge, clear communication of policies and land use reform, as mentioned in the literature, are essential (Owoeye, 2017).

A substantial portion of respondents believe that housing in Maitumbi is affordable for all income levels (Figure 9), possibly reflecting the availability of various housing options. However, as shown in Figure 6, over half of the respondents reported difficulties in finding affordable housing, indicating that affordability remains a challenge for many residents. The contrasting perceptions of housing affordability in Maitumbi, with some residents believing it is affordable for all income levels while others face difficulties finding affordable options, highlight the complex nature of housing affordability and the need for targeted interventions to address the affordability gap. This aligns with the arguments presented by Rafiu and Oyekale (2019) and other scholars who emphasize the importance of addressing housing affordability as a critical component of sustainable density initiatives (Mueller & Tighe, 2007; Bramley *et al.*, 2009). Factors contributing to this challenge include insufficient government housing, high prices, limited housing availability, and high construction costs. Mueller and Tighe (2007) argued that sustainable development goals cannot be fully realized without addressing the housing needs of all income groups.

The high cost of housing is a significant barrier to achieving sustainable density in suburban areas (Rafiu & Oyekale, 2019). Land acquisition and construction costs are often prohibitive. Policymakers can address this issue by exploring innovative financing mechanisms and providing incentives to developers to create affordable housing options. A notable percentage of respondents reported observing community resistance to development projects aimed at increasing sustainable density, with affordable housing projects facing the highest level of resistance. Concerns about increased traffic congestion as shown in Figure 10, align with the finding that many respondents occasionally experience traffic congestion during their daily commute.

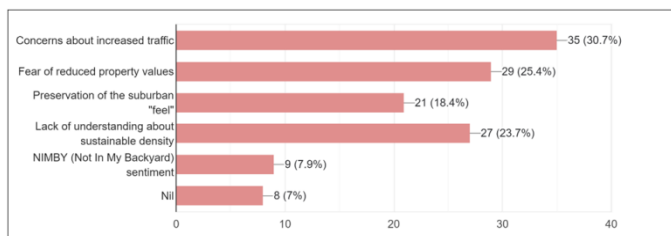


Figure 10. Reasons for resistance against sustainable density projects

The observed community resistance to sustainable density projects in Maitumbi, particularly towards affordable housing developments, highlights the need for proactive community engagement and transparent communication strategies to address residents' concerns and build consensus for sustainable development. This aligns with the arguments presented by Ishaya and Bwala (2017) and other scholars who emphasize the importance of addressing community resistance as a critical factor in the successful implementation of sustainable density initiatives (Searle & Legacy, 2019; Dempsey *et al.*, 2012). Residents' concerns about traffic, noise, and changes to neighbourhood character can stall such projects. Effective community engagement and transparent communication strategies are essential for bridging the gap between residents' concerns and the benefits of higher density living (Ishaya & Bwala, 2017).

Environmental Impact and Transportation

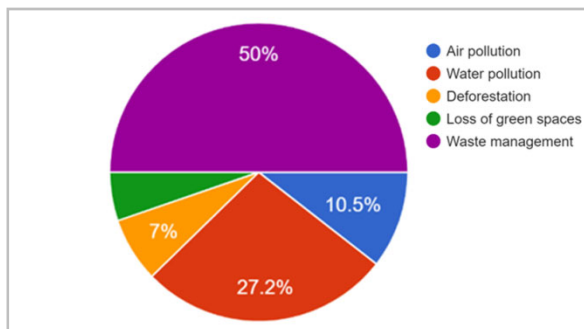


Figure 11. Environmental issue in Maitumbi

Waste management is identified as the most significant environmental issue, followed by water pollution (Figure 11). This underscores the importance of addressing environmental sustainability within sustainable density initiatives and the need for careful management of environmental concerns when pursuing higher-density living. Without proper management, increased density can lead to issues such as pollution and a reduction in green spaces (Adedeji *et al.*, 2020). Sustainable density plans should incorporate strategies for waste management, pollution control, and the preservation of green spaces to mitigate these adverse effects. Additionally, Maitumbi should incorporate green building standards, promote sustainable water management practices, and encourage the preservation of green spaces to mitigate these adverse effects (Adedeji *et al.*, 2020). Figure 12 shows respondents' satisfaction with transportation options in Maitumbi varies, with a significant percentage expressing to be very satisfied. Tricycle is the most commonly used mode of transportation for daily commuting. The majority of respondents experience traffic congestion occasionally, emphasizing the need for improved transportation infrastructure and alternatives.

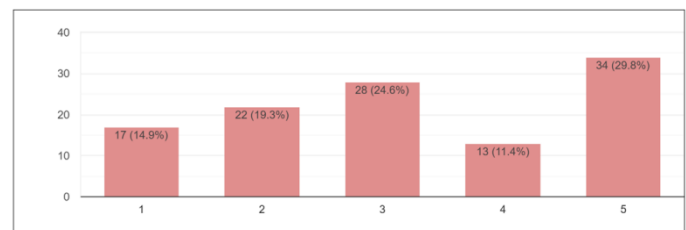


Figure 12. Respondents' satisfaction with transportation options

Studies has underscored the pivotal role of transportation infrastructure in suburban sustainability (Ajayi & Dada, 2015). Promoting sustainable transportation options, such as cycling, can complement sustainable density efforts. Investments in public transit, pedestrian-friendly infrastructure, and cycling routes are imperative to reduce automobile dependence and promote sustainable mobility (Ajayi & Dada, 2015). This further highlight the importance of improved transportation infrastructure and alternatives to reduce traffic congestion.

Policy and Recommendations

The challenges identified in this examination call for a multifaceted policy approach. Maitumbi's policymakers should prioritize infrastructure investment, modernize land use policies, and incentivize affordable housing development. Community engagement efforts should seek to build consensus and address residents' concerns. Additionally, environmental sustainability should be at the forefront of suburban planning efforts, with a focus on green initiatives. The challenges of achieving sustainable density in suburban areas of Maitumbi, Niger State, are reflective of broader global urbanization trends. By addressing these challenges strategically, Maitumbi can chart a path toward a more sustainable and livable suburban environment, serving as an exemplar for suburban areas facing similar complexities worldwide.

Conclusion

In conclusion, achieving sustainable density in Maitumbi requires a comprehensive approach that addresses infrastructure deficiencies, revises land use policies, promotes affordable housing, engages the community, encourages sustainable transportation, and incorporates environmental sustainability. By addressing these challenges and implementing the recommendations outlined, Maitumbi can transition towards a more sustainable, livable, and equitable community. The findings from the survey and field observations highlight the importance of understanding community perceptions and addressing local concerns to successfully implement sustainable density initiatives. Community engagement, transparent communication, and tailored solutions are crucial for fostering support and achieving long-term success. Sustainable density holds the potential to transform Maitumbi into a model for sustainable suburban development, showcasing how higher density living can coexist with environmental protection, social equity, and economic vitality. By embracing sustainable density principles, Maitumbi can set an example for other suburban areas grappling with similar challenges. As Maitumbi embarks on this journey towards sustainable density, it is essential to continuously monitor progress, adapt strategies as needed, and celebrate achievements along the way. Sustainable urban development is an ongoing process, requiring ongoing collaboration, innovation, and commitment from all

stakeholders. With a concerted effort and a shared vision for a more sustainable future, Maitumbi can pave the way for a more resilient, equitable, and environmentally conscious approach to suburban development, setting a precedent for other communities to follow.

Recommendations

Based on these findings, here are some recommendations for promoting sustainable density in Maitumbi:

1. Address Infrastructure Deficiencies: Prioritize investments in road improvements, reliable electricity and water supply systems, and sustainable waste management solutions.
2. Revise Land Use Policies: Clearly communicate existing policies and consider land use reforms that encourage mixed-use development, higher density housing, and preservation of green spaces.
3. Promote Affordable Housing: Explore innovative financing mechanisms, provide incentives for developers to create affordable housing options, and consider utilizing sustainable building materials to reduce construction costs.
4. Engage the Community: Implement effective community engagement strategies to address concerns about traffic congestion, noise, and changes to neighborhood character. Transparently communicate the benefits of sustainable density initiatives.
5. Encourage Sustainable Transportation: Invest in public transit, pedestrian-friendly infrastructure, and cycling routes to reduce automobile dependence and promote sustainable mobility.
6. Incorporate Environmental Sustainability: Integrate strategies for waste management, pollution control, and green space preservation into sustainable density plans. Promote green building standards and sustainable water management practices.

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