

Research article

MAPPING HOUSING AFFORDABILITY STRESS AND RESIDENTIAL DISPLACEMENT IN CALABAR METROPOLIS, NIGERIA: A GIS-BASED ASSESSMENT OF MIGRATION FLOWS TO LOW-COST PERI-URBAN SETTLEMENTS

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ABSTRACT

This study examined housing affordability stress and residential displacement in Calabar Metropolis, Nigeria, with emphasis on the role of house agents in rental inflation and the spatial movement of residents to low-cost peri-urban settlements. An integrated descriptive survey and GIS-based spatial analytical design was adopted. Data were obtained from 1,650 respondents through structured questionnaires, field observation, GPS-based spatial tracking and housing records. Descriptive statistics, hotspot analysis, kernel density estimation and origin-destination flow mapping were used for analysis. Findings showed marked spatial variation in rental costs, with Etta Agbor, Marian, Goldie and Calabar South recording the strongest housing pressure. House agents exerted strong influence on rent inflation through agency fees, artificial rent increases, weak rent regulation and limited tenant negotiation power. Relocation flows were strongest from Marian to Ikot Nakanda, Etta Agbor to Ikot Esu and Calabar South to Ikot Edem Odo. The study concludes that unregulated rental intermediation is intensifying affordability stress, displacement and peri-urban infrastructure pressure, requiring stronger rent governance and inclusive spatial planning.

KEYWORDS

Housing affordability;
residential displacement;
rental inflation; GIS mapping;
peri-urban expansion; house
agents; Calabar Metropolis;
spatial planning.

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Introduction

Housing affordability has become one of the most critical urban sustainability challenges in many developing cities. As populations grow, formal housing supply often fails to expand at the same pace, while land values, construction costs and rents continue to rise. The consequence is a widening gap between household income and the cost of decent accommodation. This gap is not only an economic problem; it is also a spatial and social problem because it determines who can remain in the urban core, who is displaced to the urban fringe and who bears the burden of commuting, insecure tenure and weak infrastructure. Recent studies have shown that housing affordability stress is increasingly connected with rental inflation, market speculation, land competition and uneven access to planned housing (Alasmari, 2025; Dantzler & Urban Policy Collective, 2022; Lee et al., 2022; Omowa et al., 2023). In rapidly urbanising contexts, housing stress does not remain confined to individual

households. It reshapes the geography of cities. When rents increase beyond the capacity of low- and middle-income households, residents often relocate from established urban neighbourhoods to peri-urban settlements where land and accommodation are cheaper. Such movement may reduce immediate housing cost, but it can increase transport burden, weaken access to urban services and accelerate unplanned expansion at the edge of the city. This is why residential displacement should be treated as a major indicator of urban inequality and not merely as household mobility. Studies across different urban contexts have linked high housing cost to intra-urban migration, spatial segregation and changes in the social composition of neighbourhoods (Adu-Gyamfi et al., 2022; Crisci et al., 2025; Etienne, 2025; Schnelzer, 2025).

The Nigerian housing market reflects these wider pressures. Cities such as Lagos, Abuja, Port Harcourt, Uyo, Aba and Calabar have experienced persistent demand for rental accommodation as a result of population growth, student migration, public-sector employment, informal-sector activity and limited public housing delivery. The result is that access to adequate housing is increasingly mediated by income, location, rental networks and the behaviour of market intermediaries. In many Nigerian cities, house agents occupy a powerful position between landlords and tenants. Their role can be useful when they connect renters to available properties, but it can also become exploitative where inspection fees, agency fees, speculative rent advice and restricted landlord access increase the final cost of accommodation (Akande et al., 2024; Nchor, 2022; Okey, 2025). Calabar Metropolis provides an important setting for examining these dynamics because it is a compact administrative, educational and commercial centre with strong residential demand. The city contains neighbourhoods of different housing quality and rental levels, including Marian, Etta Agbor, Goldie, Calabar South, Satellite Town and Ikot Ansa. Over time, higher-demand neighbourhoods have become increasingly expensive, while low- and middle-income residents face difficulty securing decent accommodation in areas close to employment, schools, markets and public institutions. The burden is especially visible among students, civil servants, young households, informal workers and small business operators whose incomes do not rise at the same pace as rent.

The specific problem addressed in this study is the link between house agent-driven rental inflation, housing affordability stress and residential displacement from Calabar Metropolis to low-cost peri-urban settlements. The activities reported by residents include non-refundable inspection fees, high agency charges, discouragement of direct negotiation with landlords and agent-led rent escalation. These practices have increased the total cost of securing housing and have reduced the ability of tenants to bargain. As a result, many households and individuals are relocating from the urban core to places such as Nyanhasang, Edim Otop, 8 Miles, Atimbo and Akpabuyo settlements including Ikot Nakanda, Ikot Esu and Ikot Edem Odo. This pattern has important implications for sustainable urban development. Peri-urban settlements that receive displaced residents may not have adequate roads, drainage, water supply, schools, health facilities, waste systems or formal planning control. Rapid residential expansion in such areas may therefore produce congestion, infrastructure stress, environmental degradation and unregulated land conversion. At the same time, the urban core may experience social restructuring as lower-income households are gradually priced out of high-demand neighbourhoods. The issue is therefore not only affordability; it is also about urban equity, infrastructure planning and the long-term management of metropolitan growth.

Geographic Information Systems provide a useful approach for studying these processes because housing stress and displacement are spatial phenomena. Rental costs vary across neighbourhoods, relocation flows follow identifiable origin-destination patterns and receiving settlements expand in visible clusters. Hotspot analysis, kernel density estimation and origin-destination flow mapping allow researchers to visualise where housing pressure is concentrated and how displaced residents move across urban and peri-urban space. GIS-based approaches have been used in studies of migration, land-use change, housing strategy and urban expansion because they make spatial inequality visible to policymakers (Ebrahim, 2025; Mijani et al., 2022; St-Hilaire et al., 2024). This study therefore maps housing affordability stress and residential displacement in Calabar

Metropolis using a GIS-based assessment of migration flows to low-cost peri-urban settlements. The objectives are to analyse spatial variation in housing rental costs, evaluate the influence of house agents on rental inflation, examine residents' relocation dynamics and identify the implications of peri-urban settlement expansion for urban planning and sustainability. The study contributes to international urban sustainability scholarship by connecting rent intermediation, affordability stress and spatial displacement in a medium-sized Nigerian city where rapid peri-urban expansion is increasingly reshaping metropolitan settlement patterns.

Literature review

Housing affordability stress and urban exclusion

Housing affordability describes the relationship between household income and the cost of obtaining and maintaining adequate accommodation. It becomes stressful when rent, service charges, deposits, agency fees and transport costs consume a large proportion of household earnings. In developing cities, affordability stress is intensified by weak mortgage systems, limited social housing, informal employment, rising building costs and speculative land markets. Housing therefore operates as both shelter and a mechanism of social sorting, because households with stronger incomes can access better-serviced locations while weaker households are pushed to less formal and less serviced areas (Findeisen, 2022; Issar, 2022; Oyalowo, 2022).

The literature increasingly shows that housing stress is not produced by rent alone. It is generated by a combination of market structure, planning regulation, land availability, investment behaviour and the institutions that mediate access to housing. Lee et al. (2022) argues that housing unaffordability in advanced economies is driven by complex interactions between income, housing supply, financialisation and policy choices. Although their context differs from Calabar, the conceptual lesson remains relevant: affordability is not a private household problem alone; it is produced by wider market and governance conditions. In Nigerian cities, these conditions include inadequate implementation of housing policy, insufficient rental monitoring and limited public-sector intervention in low-income housing supply.

Rental housing is especially important in cities where many residents cannot afford to build or purchase houses. For students, young workers, civil servants and informal-sector households, renting remains the primary pathway to urban residence. When rents rise rapidly, tenants may reduce expenditure on food, education and health or relocate to cheaper locations. Such forced adjustments show that housing affordability is a determinant of wellbeing. Grewal et al. (2024), in a systematic review, connect housing prices with health outcomes, showing that housing cost pressure can affect stress, security and broader quality of life. In Calabar, rising rent therefore has consequences beyond the housing sector.

Residential displacement and peri-urban migration

Residential displacement occurs when households are compelled to leave a location because housing cost, redevelopment, eviction, environmental risk or social pressure makes continued residence difficult. It differs from voluntary mobility because the household may prefer to remain in the original neighbourhood but cannot do so under changing market conditions. Schnelzer (2025) describes displacement as a varied experience shaped by the global housing affordability crisis, while Shakespeare (2025) shows that middle-income renters also make location decisions based on what is both desirable and affordable. These arguments are relevant to Calabar because displacement is no longer limited to the poorest residents; middle-income households are also affected by rent escalation in high-demand neighbourhoods.

Peri-urban migration is one of the most visible responses to housing stress. Households move to fringe communities where rents are lower, plots are cheaper and tenancy arrangements may be more flexible. Adu-Gyamfi et al. (2022) identify the peri-urban interface as an alternative residential location for low-income migrants in Kumasi, Ghana. Similar patterns occur in Nigerian cities where surrounding communities absorb residents displaced by high urban rents. In Calabar, Akpabuyo and other fringe settlements increasingly function

as receiving zones for households that remain economically linked to the metropolis but can no longer afford accommodation within central neighbourhoods.

Peri-urban relocation is not automatically negative. It may provide access to cheaper housing, land ownership and new livelihood spaces. However, when it occurs rapidly and without planning, it can create settlement congestion, infrastructure deficits and environmental stress. Karakadzai et al. (2023) show that rapid urbanisation can produce development that does not conform to local spatial plans. Olaniran and Aule (2025) similarly argue that informal settlements and peri-urban growth in sub-Saharan Africa require systematic sustainable urban development approaches. The Calabar-Akpabuyo pattern therefore needs to be interpreted as part of a wider problem of uncontrolled metropolitan expansion.

House agents, rental inflation and weak market regulation

House agents operate as intermediaries between landlords and tenants. In a well-regulated rental market, they can reduce search costs, provide information, verify property availability and facilitate tenancy agreements. In weakly regulated markets, however, agents can also increase housing cost through multiple fees, inflated rent recommendations, speculative advertising, false scarcity and restrictions on direct landlord-tenant negotiation. The original concern in this study is that agents in Calabar have become more than facilitators; they have become important actors in the formation of rental prices and the distribution of housing opportunities.

The role of agents must be understood within the wider political economy of urban housing. Where housing supply is limited and demand is high, landlords and agents may have stronger bargaining power than tenants. Tenants under urgent need for accommodation may accept unfavourable terms, pay inspection fees without guarantee of access, and face repeated rent increases. The problem is worsened when rent regulation is weak or absent. Akande et al. (2024) show that public housing challenges in Nigeria affect low-income earners, while Okey (2025) identifies inflation, land scarcity and demand pressures as drivers of house prices. This study adds that rental intermediaries can intensify these pressures at the neighbourhood level.

Agent-driven rental inflation is also spatially uneven. It is most visible in neighbourhoods that have strong demand because of proximity to universities, offices, commercial corridors, transport routes or perceived prestige. In Calabar, the Etta Agbor, Marian and Goldie axes attract residential demand because of their accessibility, status and proximity to urban services. These neighbourhood advantages create opportunities for speculative rent escalation. As rents rise in these areas, lower-income residents are gradually excluded, leading to outward movement toward cheaper spaces. The rental market therefore becomes a mechanism for spatial restructuring.

GIS-based mapping of housing stress and migration flows

GIS-based spatial analysis has become central to urban studies because it allows researchers to locate, visualise and interpret patterns that may not be clear from tables alone. Housing affordability stress has a spatial form: some neighbourhoods become hotspots of high rent, some areas function as transition zones, and some peri-urban settlements become receiving points for displaced households. Spatial methods such as hotspot analysis, kernel density estimation and origin-destination flow mapping are useful because they show both concentration and movement. They also translate social problems into maps that can guide public intervention.

Kernel density estimation is useful for identifying clusters of settlement pressure and relocation concentration. Hotspot analysis helps detect areas where housing cost or migration intensity is higher than surrounding locations. Origin-destination flow mapping shows the direction and magnitude of movement from source neighbourhoods to receiving settlements. Mijani et al. (2022) used GIS-based multi-criteria decision analysis for spatial modelling of migration, while Ebrahim (2025) demonstrates the relevance of GIS-based spatial analysis for urban reconstruction and housing strategy. In the present study, these tools are used to connect high-rent Calabar neighbourhoods with peri-urban destinations.

The conceptual logic guiding this study is that housing affordability stress operates through three connected pathways. First, rental costs rise unevenly across the urban core. Second, house agents intensify this rise through fees, artificial inflation and restricted negotiation. Third, affected residents relocate to lower-cost peri-urban settlements, increasing pressure on receiving communities. This framework links market behaviour with spatial outcomes and demonstrates why housing policy, rent governance and peri-urban planning must be addressed together rather than separately.

Methodology

The study adopted an integrated research design combining descriptive survey methods with GIS-based spatial analysis. This design was appropriate because the research examined both social perceptions of housing affordability and the spatial pattern of residential displacement. The descriptive component generated quantitative evidence from residents, house agents, landlords and community stakeholders, while the GIS component mapped housing stress, relocation density and origin-destination migration flows. The combination of survey and spatial evidence strengthens the study because rent inflation and displacement are not only reported experiences but also locational processes. The study area comprised Calabar Metropolis and selected receiving peri-urban settlements in Akpabuyo Local Government Area and adjoining fringe communities. Calabar Metropolis lies within Cross River State, Nigeria, between approximately latitude 4 degrees 55 minutes N and 5 degrees 10 minutes N and longitude 8 degrees 15 minutes E and 8 degrees 25 minutes E. The metropolis serves as the administrative and commercial centre of Cross River State and has historically attracted residents because of employment, education, public administration, commerce and urban services. The urban form is low-lying, coastal and increasingly dense, with rising pressure on available residential land and rental accommodation. Akpabuyo Local Government Area lies to the eastern flank of Calabar Metropolis and has become a major receiving area for households and individuals relocating from high-rent neighbourhoods. Its attraction lies in comparatively lower rent, cheaper land and more flexible tenancy arrangements. Settlements such as Ikot Nakanda, Ikot Esu, Ikot Edem Odo, Ikot Akpaden and Atimbo Axis have become important destination points for displaced residents. Although these communities offer relatively cheaper housing, they also face increasing pressure on roads, water supply, drainage, schools, waste systems and other public services.

Primary data were obtained through structured questionnaires, direct field observation and GPS-based tracking of residential origin and destination points. Secondary data were obtained from housing records, rental price information, satellite imagery, population statistics and urban planning documents relevant to Calabar and Akpabuyo. The target population comprised household heads, tenants, house agents, landlords, community leaders and urban planning stakeholders. These respondent categories were selected because they either experience housing affordability stress directly, influence rental market practices or observe changes in peri-urban settlement growth. A total sample of 1,650 respondents was used for the study. The sample included 1,250 tenants, 200 house agents or landlords and 200 community stakeholders. The large sample size was considered suitable because the study covered multiple neighbourhoods, housing categories and relocation destinations. A multi-stage sampling procedure was adopted. First, Calabar Metropolis was stratified into housing pressure zones representing high-demand, medium-cost and lower-cost neighbourhoods. Second, Akpabuyo was purposively selected as a major receiving peri-urban area because of its growing role in absorbing displaced residents. Third, systematic random sampling was used to select households within selected origin and destination neighbourhoods. The research instrument captured information on housing type, annual rent, neighbourhood location, perception of house agent influence, relocation history and reasons for movement. Housing categories included single rooms, self-contained apartments, one-bedroom flats, two-bedroom flats and three-bedroom flats. House agent influence was measured using five indicators: agency fees increasing rental burden, artificial inflation of house rents, lack of rent regulation enforcement, frequent rent increment by

landlords through agents, and limited tenant negotiation power. Responses were rated on a five-point scale and summarised with means and standard deviations.

The GIS procedure involved three related outputs. The Housing Affordability Stress Intensity Map was developed from neighbourhood rental values and housing pressure categories. The Residential Density Map was generated to identify receiving settlement clusters and spatial concentration of destination points. The Residential Relocation Flow Map was generated through origin-destination flow modelling to show movement from Calabar neighbourhoods to peri-urban settlements. ArcGIS 10.8 was used to process spatial data, while hotspot analysis, kernel density estimation and origin-destination flow mapping were used to visualise the spatial patterns. Descriptive statistics, including frequencies, percentages, mean scores and interpretation categories, were used to summarise the survey data. GIS outputs were interpreted alongside the statistical results to ensure that maps were not treated as illustrations alone but as analytical evidence. The study observed ethical principles by explaining the purpose of the research to respondents, obtaining voluntary participation, protecting identities and reporting results in aggregate form. The study also recognises the limitation that relocation estimates are based on reported movements and field observations; however, the combination of survey data, GPS tracking and mapping provides a strong basis for identifying the direction and intensity of displacement.

Results and discussion

Spatial variation in housing types and annual rental cost

Table 1 presents the categories of housing and average annual rental costs across selected neighbourhoods in Calabar Metropolis. The results show clear spatial variation in rental burden. Etta Agbor recorded the highest annual rental cost across all housing categories, with a single room costing NGN180,000, a self-contained apartment costing NGN320,000, a one-bedroom flat costing NGN450,000, a two-bedroom flat costing NGN700,000 and a three-bedroom flat costing NGN1,050,000. Marian also recorded very high rental values, with a single room costing NGN160,000 and a three-bedroom flat costing NGN980,000. These values indicate that the Etta Agbor and Marian axes are the strongest housing pressure zones in the study area. Goldie and Calabar South recorded high pressure, especially for one-bedroom, two-bedroom and three-bedroom flats. Goldie recorded annual rents of NGN400,000 for a one-bedroom flat, NGN620,000 for a two-bedroom flat and NGN950,000 for a three-bedroom flat. Calabar South recorded NGN380,000, NGN600,000 and NGN900,000 respectively for the same categories. Satellite Town recorded moderate pressure, while Ikot Ansa recorded the lowest values among the selected neighbourhoods. The gradient from very high to low rental pressure suggests that affordability stress is spatially structured by neighbourhood desirability, access, perceived status, service availability and market demand.

Table 1. Categories of housing and average annual rental cost across selected neighbourhoods in Calabar Metropolis.

S/N	Neighbourhood	Single room (NGN/yr)	Self-contained (NGN/yr)	1-bedroom flat (NGN/yr)	2-bedroom flat (NGN/yr)	3-bedroom flat (NGN/yr)	Dominant housing pressure level
1	Etta Agbor	180,000	320,000	450,000	700,000	1,050,000	Very high
2	Marian	160,000	300,000	420,000	650,000	980,000	Very high
3	Goldie	140,000	280,000	400,000	620,000	950,000	High
4	Calabar South	130,000	250,000	380,000	600,000	900,000	High
5	Satellite Town	100,000	200,000	320,000	500,000	780,000	Moderate
6	Ikot Ansa	80,000	180,000	280,000	420,000	650,000	Low

Source: Authors' fieldwork, 2026.

The pattern in Table 1 demonstrates that rental cost increases consistently with housing size across all neighbourhoods. This is expected, but the rate of increase is not uniform. The difference between a three-bedroom flat in Etta Agbor and a three-bedroom flat in Ikot Ansa is NGN400,000 annually, a gap that can determine whether a household remains in the urban core or relocates. This difference is especially significant for civil servants and informal-sector workers whose incomes are relatively fixed. The spatial distribution of rental cost therefore produces a hierarchy of access, where central and high-demand neighbourhoods become increasingly exclusionary. Figure 1 visualises the rental pressure pattern across Calabar Metropolis. The map confirms that the highest affordability stress is concentrated around the Etta Agbor and Marian axes, with Goldie and Calabar South also displaying high pressure. The visual evidence is important because it shows that housing stress is not randomly distributed across the metropolis. Instead, it follows the geography of high-demand neighbourhoods, accessibility corridors and agent-mediated rental markets. This aligns with St-Hilaire et al. (2024), who show that housing stress can be spatially concentrated and therefore requires spatially targeted intervention.

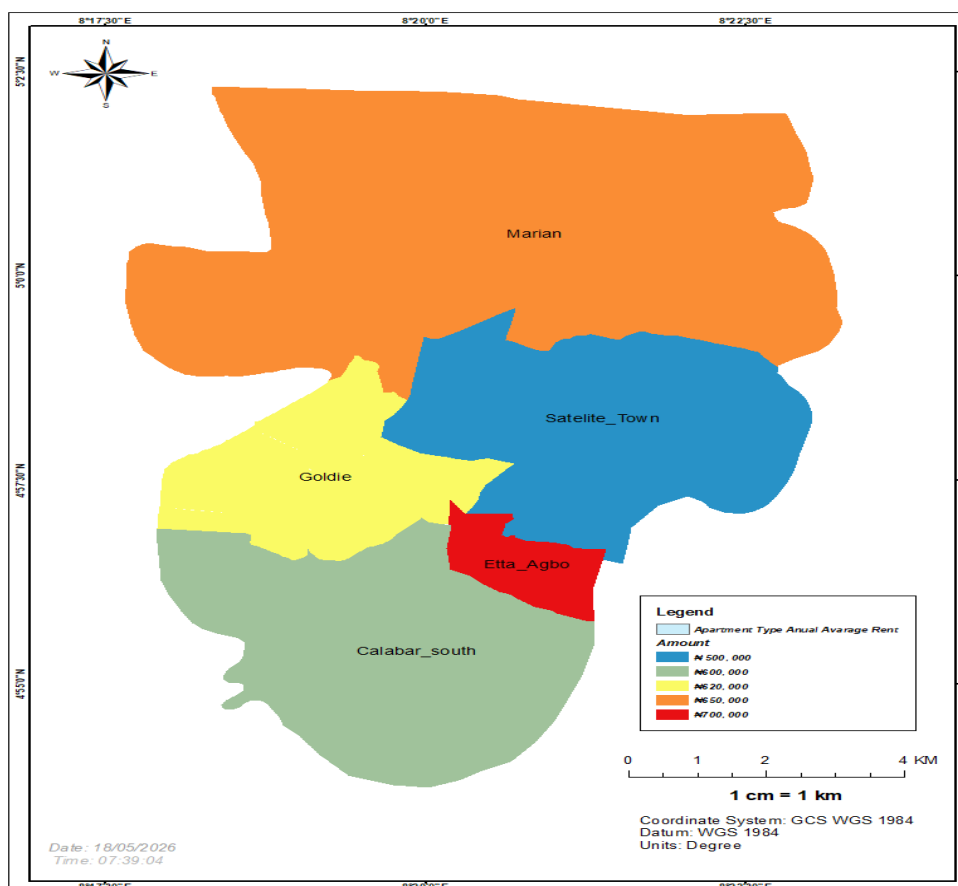


Figure 1. Housing affordability stress intensity map showing annual rental cost variation in Calabar Metropolis.

Source: Department of Geography and Environmental Science, University of Calabar.

The implication of Figure 1 is that affordability policy in Calabar should be neighbourhood-sensitive. A general statement that rents are rising is not sufficient for planning. The map shows where pressure is most severe and where tenant protection, rent monitoring and affordable housing interventions should be prioritised. Etta Agbor and Marian require urgent attention because they function as high-pressure rental zones, while Goldie and Calabar South require monitoring to prevent further exclusion of middle-income residents. Lower-cost areas such as Ikot Ansa may also require protection from speculative spillover as residents move away from high-cost zones.

Influence of house agents on rental inflation

Table 2 presents the influence of house agents on rental inflation in Calabar Metropolis. The results show strong agreement across all indicators, with mean scores ranging from 4.4 to 4.7 on a five-point scale. Artificial inflation of house rents recorded the highest mean score of 4.7 and a standard deviation of 0.48, indicating strong consensus among respondents that agents contribute directly to rent escalation beyond normal market value. Agency fees increasing rental burden and limited tenant negotiation power both recorded mean scores of 4.6, showing that agents influence affordability not only through rent but also through transaction costs and bargaining restrictions. The lack of rent regulation enforcement recorded a mean score of 4.5, while frequent rent increment by landlords through agents recorded a mean score of 4.4. These findings suggest that the rental market is weakly regulated and that tenants face limited institutional protection. The relatively low standard deviations indicate that respondents did not differ widely in their assessment. In practical terms, residents generally agree that house agents have become a strong force in the Calabar rental market. Their influence appears to operate through direct fees, price advice to landlords, control of information and reduction of tenant access to direct negotiation.

Table 2. Influence of house agents on rental inflation in Calabar Metropolis.

S/N	Indicator	Mean score (1-5)	Standard deviation	Interpretation
1	Agency fees increase rental burden	4.6	0.52	Strong influence
2	Artificial inflation of house rents	4.7	0.48	Strong influence
3	Lack of rent regulation enforcement	4.5	0.60	Strong influence
4	Frequent rent increment by landlords via agents	4.4	0.55	Strong influence
5	Limited tenant negotiation power	4.6	0.50	Strong influence

Source: Authors' fieldwork, 2026.

The results in Table 2 are central to the study because they identify the institutional mechanism behind affordability stress. Rent increases may be partly explained by population growth, demand and land values, but the findings suggest that house agents also play an active role in intensifying rental burden. This supports the argument that affordability stress is not only produced by supply and demand but also by the practices of intermediaries in the housing market. Where agents collect high fees, discourage direct landlord access and influence landlords to increase rent, the tenant faces a higher entry cost into the rental market. Agent influence is especially problematic when public regulation is weak. In such conditions, agents can create artificial scarcity, charge repeated inspection fees and inflate perceived market prices. This produces a market environment in which tenants have little control over the terms of access. The finding aligns with Okey (2025), who emphasises the role of demand-side and inflationary pressures in Nigeria housing prices, but it adds a more localised dimension by showing how rental intermediation can transmit those pressures to neighbourhood-level affordability stress. The results also support Akande et al. (2024), who argue that low-income earners are particularly affected by weak housing provision and market inequalities. The social consequence of this pattern is displacement. When the total cost of renting includes agent fees, rent increases, inspection charges and reduced bargaining power, households are pushed to seek cheaper accommodation elsewhere. In this way, house agents do not merely influence prices; they influence the spatial distribution of residents. The rental market becomes a driver of metropolitan restructuring, as people move away from high-cost areas to locations where the total housing cost is lower.

Residential displacement flow from Calabar metropolis to Akpabuyo LGA

Table 3 presents the major residential displacement flows from Calabar Metropolis to Akpabuyo settlements. The strongest reported flow was from Marian to Ikot Nakanda, with an estimated 320 migrants in 2025. The main reason identified for this movement was high rent cost. Etta Agbor recorded an estimated 280 migrants

relocating to Ikot Esu because of housing affordability, while Calabar South recorded 250 migrants relocating to Ikot Edem Odo as a result of rent inflation. Goldie recorded 210 migrants moving to Ikot Akpaden due to agent-driven rent increases, and Satellite Town recorded 190 migrants moving to the Atimbo Axis because of low-cost housing availability. These flows show that residential displacement is not restricted to one neighbourhood. It cuts across very high-pressure and high-pressure zones and extends into moderate-pressure neighbourhoods. The movement from Marian and Etta Agbor is particularly important because these areas are not simply low-income locations; they include residents who may have previously been able to afford urban accommodation but are now experiencing stronger pressure. This confirms the argument that housing affordability stress is affecting both low-income and middle-income households in Calabar.

Table 3. Residential displacement flow from Calabar Metropolis to Akpabuyo LGA.

S/N	Origin area (Calabar)	Destination (Akpabuyo settlements)	Estimated migrants in 2025	Main reason for relocation
1	Marian	Ikot Nakanda	320	High rent cost
2	Etta Agbor	Ikot Esu	280	Housing affordability
3	Calabar South	Ikot Edem Odo	250	Rent inflation
4	Goldie	Ikot Akpaden	210	Agent-driven rent increase
5	Satellite Town	Atimbo Axis	190	Low-cost housing availability

Source: Authors' fieldwork, 2026.

The evidence in Table 3 indicates that peri-urban settlements around Akpabuyo are becoming residential alternatives for households displaced by affordability stress. This pattern is consistent with Adu-Gyamfi et al. (2022), who describe peri-urban areas as alternative residential locations for low-income migrants. However, the Calabar evidence suggests that the movement includes a wider range of residents who are priced out of urban neighbourhoods by rent escalation and agent-related costs. The result is a growing daily and permanent connection between Calabar and its peri-urban fringe. Figure 2 presents the residential density pattern in the receiving areas. The map shows concentration around settlements such as Ikot Nakanda, Ikot Esu, Ikot Edem Odo, Atimbo, Nyanhasang and Edim Otop. These density clusters are important because they represent the spatial accumulation of relocation decisions. As more households move into these areas, settlement expansion increases and previously rural or semi-urban communities begin to transform into dense residential corridors. Without planning control, this process can produce road congestion, poor drainage, pressure on water supply, informal land subdivision and uncontrolled building patterns.

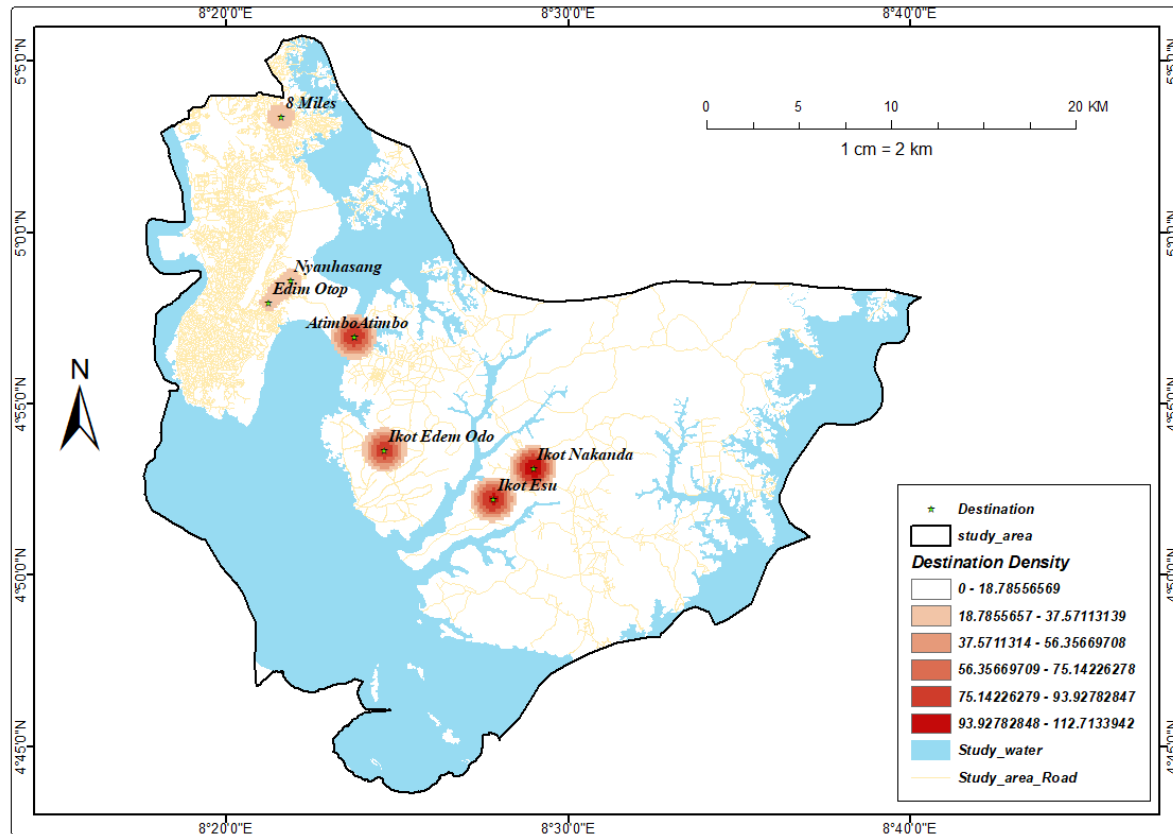


Figure 2. Residential density map of peri-urban receiving settlements.

Source: Department of Geography and Environmental Sciences, University of Calabar, Nigeria.

The density pattern shown in Figure 2 is a warning signal for urban planners. Receiving settlements are no longer peripheral in social terms because they are increasingly tied to the housing market of Calabar Metropolis. The concentration of displaced residents in these locations means that public infrastructure must be planned at a metropolitan scale. Water supply, waste management, schools, health posts, feeder roads and drainage systems in Akpabuyo and adjoining settlements should be treated as part of the Calabar urban system rather than as separate rural concerns. If planning does not respond early, affordability-driven migration may reproduce the same infrastructure stress that residents are trying to escape. Figure 3 presents the origin-destination relocation map from the Calabar urban core to peri-urban centres. The map visually confirms the strongest flows from Marian and Etta Agbor toward Ikot Nakanda and Ikot Esu, as well as movements from Calabar South, Goldie and Satellite Town toward other receiving areas. The thickness and direction of the flows demonstrate that displacement is not random. It follows a structured path from higher-cost urban neighbourhoods to lower-cost peri-urban settlements. This spatial evidence strengthens the argument that affordability stress in Calabar is actively reshaping the residential geography of the wider metropolitan area.

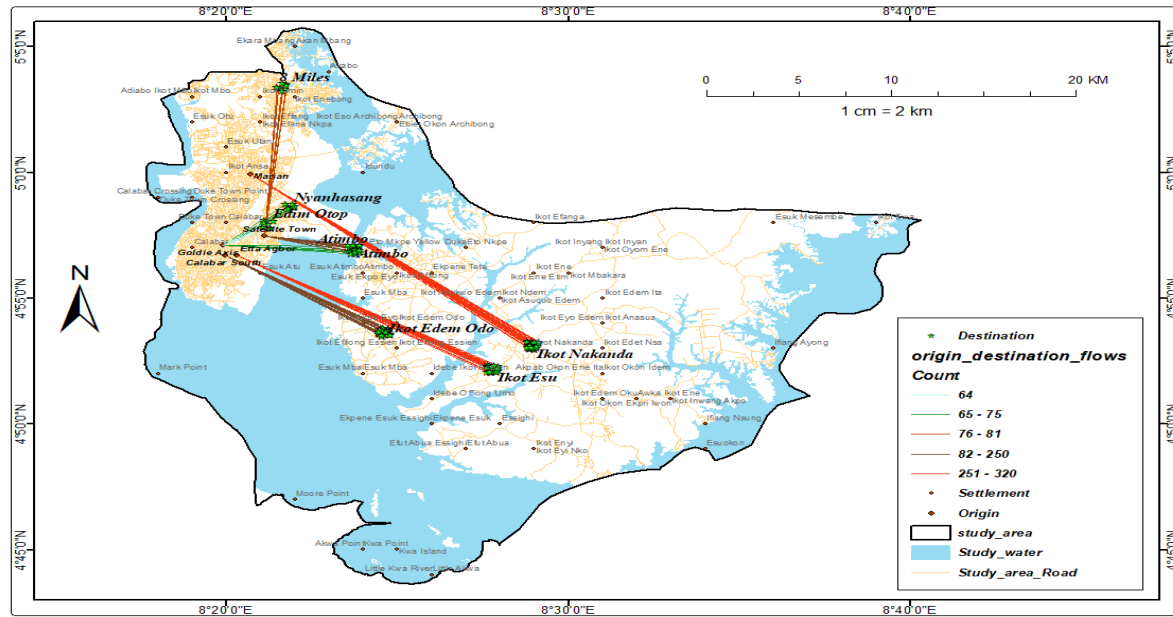


Figure 3. Residents' relocation flow map from Calabar urban core to peri-urban centres.

Source: Department of Geography and Environmental Sciences, University of Calabar, Nigeria.

The relocation map in Figure 3 also shows why housing affordability should be integrated into transportation and land-use planning. Many displaced residents continue to work, study, trade or access services in Calabar after moving to the fringe. This creates daily commuting flows that can increase transport cost, travel time and road pressure. The immediate saving on rent may therefore be partly offset by higher mobility costs. For households with low income, the combined burden of rent and transport may still reduce welfare. Sustainable planning should therefore evaluate affordability not only by rent level but also by total location cost. The results further indicate that agent-driven rent increases can contribute to social segregation. As high-demand areas become expensive, lower-income residents are gradually excluded and replaced by those who can afford higher rents or absorb agency costs. This process may not occur through formal eviction, but it still functions as economic displacement. The displacement is gradual and market-led, which makes it less visible than sudden demolition or eviction. GIS mapping helps to reveal this hidden process by showing where people are moving from and where they are going. The findings are consistent with broader research on urban expansion in Africa. Ayeni et al. (2025) note that peri-urban expansion in sub-Saharan Africa has implications for sustainable development, while Olaniran and Aule (2025) emphasise the need to address informal settlements and peri-urban growth systematically. In Calabar, the sustainability issue is twofold. First, the urban core is becoming less affordable for many residents. Second, receiving settlements are growing faster than their infrastructure base. The study therefore shows that housing affordability stress and peri-urban expansion should be treated as connected urban governance problems.

A major contribution of the study is the integration of descriptive rental data with GIS-based spatial outputs. Table 1 identifies the rental hierarchy, Table 2 identifies the intermediary mechanism of rent inflation, Table 3 identifies the displacement flow, and Figures 1 to 3 spatialise the relationship among these patterns. Together, the results show that housing affordability stress in Calabar is not an abstract complaint. It is measurable, mappable and linked to specific neighbourhoods, market actors and destination settlements. This evidence can support more targeted policy responses than general housing statements. The findings also raise questions about justice in the rental market. Housing is a basic need, yet access is increasingly mediated by fees and informal negotiation structures that disadvantage tenants. Where tenants cannot negotiate directly, cannot verify genuine rent values or cannot challenge arbitrary charges, the market becomes unequal. Weak rental governance therefore allows private actors to determine access to urban space. This undermines inclusive urban

development and may conflict with broader sustainability goals that require socially equitable and spatially balanced cities. The peri-urban implications are equally important. The movement to Akpabuyo and other fringe settlements may appear to solve affordability in the short term, but it creates new planning responsibilities. If local authorities fail to guide land subdivision, road alignment, drainage, waste disposal and community facilities, the receiving areas may evolve into poorly serviced settlements. The pressure already visible in density clusters should therefore be addressed through proactive planning, not delayed response. Planning agencies need updated spatial data, development control, serviced plots and infrastructure investment in receiving communities.

The GIS evidence provides a practical basis for policy prioritisation. Instead of treating Calabar Metropolis as a single housing market, planners can identify specific pressure corridors and receiving settlements. The areas of strongest rent pressure should be prioritised for affordability monitoring, while the receiving settlements should be prioritised for infrastructure and land-use planning. This dual approach would reduce pressure in the origin areas and prepare the destination communities for growth. It also demonstrates the value of spatial research for urban sustainability planning in medium-sized Nigerian cities. Another important finding is that house agents function as informal regulators of access to rental housing. In the absence of effective public oversight, their practices shape who sees available properties, who negotiates with landlords, how much tenants pay before entry and how quickly rents change. This role may be informal, but its effects are formal in the lives of residents because it determines location, expenditure and displacement risk. The findings therefore call for rental market transparency, including written fee schedules, clear tenancy documentation and channels through which tenants can report exploitative practices. The study also reveals a planning contradiction. The urban core concentrates employment, education, commerce and services, yet rising rent reduces the ability of ordinary residents to live near those opportunities. Peri-urban settlements provide cheaper accommodation, yet they often lack the infrastructure needed to support rapid population growth. This produces a double burden for affected households: they leave the urban core because of rent pressure but may face higher commuting costs, longer travel time and reduced access to public services. Housing affordability should therefore be evaluated in relation to total urban accessibility rather than rent alone. Taken together, the findings show that affordability stress in Calabar is produced at the intersection of neighbourhood desirability, rent intermediation and limited housing governance. The rental table identifies where the highest costs occur, while the agent-influence table explains why market prices are not experienced by residents as neutral. The spatial maps then show the outcome of these pressures: residents move towards cheaper peri-urban settlements where housing is more accessible but infrastructure is weaker. This sequence is important because it demonstrates that displacement is not accidental. It is the cumulative result of market pressure, weak regulation and uneven urban service distribution.

Synthesis of spatial and social findings

Implications/conclusion

The study has important implications for urban housing policy, spatial planning and metropolitan governance in Calabar. First, rent governance should be strengthened. The strong influence of house agents on rental inflation shows the need for a clearer regulatory framework for agency practice. Such a framework should address inspection fees, agency commissions, disclosure of landlord-approved rent, tenant access to negotiation and penalties for false advertisement or artificial inflation. Regulation should not eliminate house agents, but it should ensure that intermediation does not become exploitation. Second, Calabar requires a neighbourhood-based housing affordability monitoring system. The Housing Affordability Stress Intensity Map demonstrates that pressure is spatially concentrated. Urban authorities should therefore maintain a rental database for major neighbourhoods, update average rent values annually and identify emerging hotspots before displacement becomes severe. This system could be managed jointly by planning authorities, housing agencies, university

researchers and local government units. Evidence-based monitoring would make it easier to detect abnormal rent escalation and support targeted housing interventions. Third, affordable housing supply should be expanded in strategic locations within and near the urban core. If only peripheral settlements remain affordable, displacement will continue and commuting burdens will increase. Public-private partnerships, cooperative housing schemes, serviced plots, rental housing programmes and student or worker housing initiatives can help reduce pressure on the private rental market. These interventions should focus on low- and middle-income residents, who are most vulnerable to rent shocks and agent-driven entry costs. Fourth, peri-urban planning must be integrated into metropolitan development strategy. Akpabuyo and adjoining settlements are increasingly functioning as part of the Calabar residential system. They require improved roads, drainage, water supply, waste management, schools, health facilities and land-use control. Without early intervention, affordability-driven settlement expansion may produce informal growth, infrastructure overload and environmental stress. Planning should therefore follow the flow of residents rather than stop at administrative boundaries.

Fifth, GIS should become a routine tool for housing and urban management in Cross River State. The maps generated in this study show how spatial evidence can support decision-making. Housing affordability, residential density and migration flows can be monitored through periodic mapping. Such evidence would help agencies prioritise infrastructure, regulate development, identify displacement risks and plan transport linkages. Universities can support this process by providing technical GIS capacity, research collaboration and periodic urban observatory reports. The study concludes that housing affordability stress in Calabar Metropolis is spatially uneven, market-mediated and displacement-producing. Etta Agbor, Marian, Goldie and Calabar South recorded stronger rental pressure than Satellite Town and Ikot Ansa. House agents were found to exert strong influence on rental inflation through agency fees, artificial rent increases, weak regulation, landlord-agent rent adjustments and limited tenant negotiation power. The displacement evidence shows consistent movement from high-rent neighbourhoods to low-cost peri-urban settlements in Akpabuyo and adjoining areas. The GIS outputs confirm that housing pressure and relocation are spatially organised. Figure 1 identifies the areas of strongest rent pressure, Figure 2 shows the density of receiving settlements and Figure 3 demonstrates the direction and magnitude of relocation flows. These findings show that the housing market is reshaping the settlement structure of Calabar and its peri-urban fringe. The study therefore contributes empirical evidence that links rental inflation, intermediary behaviour and residential displacement in a Nigerian metropolitan context. Future research should extend this study by analysing household income, transport cost, tenancy duration, gender differences, landlord perspectives and longitudinal changes in rent over several years. Further studies should also examine the environmental consequences of peri-urban expansion, including wetland conversion, drainage obstruction, road congestion and public service deficits. For policy, the major lesson is clear: housing affordability is not only a private rental issue but a sustainability and spatial justice issue. Unless rent governance, affordable housing delivery and peri-urban planning are strengthened together, Calabar may continue to experience displacement from the urban core and unplanned expansion at the fringe.

Declarations

Ethics approval and consent to participate: The study was conducted in accordance with accepted ethical principles for social and spatial research. Respondents were informed of the purpose of the study, and participation was voluntary.

Consent for publication: All authors approved the manuscript for journal submission and publication.

Availability of data and materials: The datasets used for the analysis are available from the corresponding author on reasonable request.

Competing interests: The authors declare that they have no competing interests.

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Authors' contributions: The authors contributed to the conception of the study, data collection, spatial analysis, interpretation of results, manuscript drafting and final approval of the article.

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