VOL. 10 NO. 4,
NOVEMBER, 2025
E-ISSN 3026-9210
P-ISSN 3026-815X

African Scholar Publications & Research International
www.africanscholarpub.com

*Journal of Built Env. & Geological Research (JBEGR)*

# Reimagining the Reverberation of Flooding on Rental Values of Residential Properties in Ibadan, Nigeria

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**DOI**: https://doi.org/10.70382/ajbegr.v10i4.039

## *Abstract*

Flooding remains one of the most persistent environmental challenges confronting Nigerian cities, with Ibadan experiencing recurrent inundation that undermines housing quality and property market stability. This study examines the effects of flooding on the rental values of residential properties in Ibadan, focusing on the roles of environmental exposure, infrastructural conditions, and institutional efficiency. Drawing on a quantitative research design, data were collected through structured questionnaires administered to tenants and estate valuers across three flood-prone communities, Ogunpa, Kudeti, and Balogun. Descriptive and inferential analyses, including correlation and multiple regression, were employed to evaluate the relationships between flood exposure, governance indicators, and rental outcomes. Results revealed that flood-prone neighbourhoods experience average rent discounts of 20–28% compared to non-exposed areas, demonstrating that flood risk acts as a negative externality capitalised into rental pricing. Regression results showed that flood exposure ($\beta = -0.416$, $p < 0.01$) significantly depresses rent levels, while effective drainage maintenance ($\beta = 0.312$) and institutional efficiency ($\beta = 0.328$) mitigate this effect. These findings confirm the relevance of the Hedonic Pricing Theory, suggesting that tenants rationally adjust rents in response to perceived environmental and governance risks. The study concludes that integrating flood-risk data, enforcing planning regulations, and strengthening institutional coordination are essential to stabilising Ibadan's housing market and promoting sustainable urban resilience.

**Keywords:** Flooding, Rental Values, Hedonic Pricing Theory, Institutional Efficiency, Ibadan

## *Introduction*

Flooding has emerged as one of the most disruptive environmental challenges affecting urban settlements in Nigeria, with significant socio-economic implications for property markets. Ibadan, as one of the largest and oldest cities in West Africa, has repeatedly experienced devastating flood events that have disrupted livelihoods, displaced residents, and damaged properties (Adelekan, 2021; World Bank, 2023). The city's combination of rapid urbanisation, poor drainage infrastructure, and weak institutional control mechanisms has heightened its vulnerability to recurrent flooding. As residential properties remain central to urban economies, understanding how flood hazards affect their rental values is crucial for both real estate stakeholders and policymakers. Globally, the relationship between flooding and property value has been well documented through hedonic pricing and risk perception studies. Flooding affects housing markets through physical damage to structures, increased maintenance costs, insurance premiums, and a general decline in neighbourhood attractiveness (Agonafir, 2023; Tasnia, Hossain, & Khan, 2025). In advanced economies, disclosure laws and robust insurance frameworks mitigate market shocks by ensuring transparency and recovery, whereas in developing contexts like Nigeria, weak institutional responses amplify the economic losses associated with floods (Adedeji, Fasanmi, & Adewumi, 2023). The Nigerian housing market is particularly vulnerable because property valuation and rental pricing systems often fail to incorporate environmental risk variables, resulting in distorted rental structures and inequitable risk allocation between landlords and tenants (Dabara, Bello, & Adamu, 2023).

Ibadan's flood experience is rooted in its geography and urban morphology. The city's undulating terrain, intersected by the Ogunpa and Kudeti river channels, makes low-lying settlements naturally flood-prone (Egbinola & Amanambu, 2020). However, anthropogenic factors have intensified the hazard. Uncontrolled urban sprawl, encroachment on riverbanks, and poor waste management have clogged drainage networks and restricted natural flow channels (Olanrewaju & Chitakira, 2022; Fayomi, Aladejana, & Okon, 2024). Consequently, flooding is no longer limited to exceptional rainfall but has become a near-annual occurrence that shapes local property market dynamics. Residential areas such as Balogun, Ogunpa, and Kudeti have become symbols of this crisis, where floods not only destroy physical assets but also erode rental confidence among both landlords and tenants. The effect of flooding on rental values operates through several channels. First, recurrent inundation reduces the habitability and perceived safety of affected properties, leading to depreciation and lower rental demand. Tenants in flood-prone areas often face recurring losses, ranging from damaged furniture to prolonged displacement, which influences their willingness to pay (Ujene, Ekechukwu, & Nnam, 2023). Second, flooding affects infrastructure quality, roads, drainage, and utilities, which are major determinants of rent in urban Nigeria. When access routes become impassable or drainage systems collapse, neighbourhood desirability and property value decline (Rahman, Chowdhury, &

Sharma, 2023). Third, persistent flooding imposes reputational stigma on affected districts, as potential tenants associate them with poor quality of life, insecurity, and risk exposure. This in turn triggers spatial inequality in rental values between flood-prone and non-prone neighbourhoods (Adelekan, Olajide-Talabi, & Di Baldassarre, 2022).

Empirical evidence confirms these dynamics. Dabara et al. (2023) found that flood exposure in Nigerian cities leads to a measurable reduction in property values, with residential properties in flood zones suffering up to 20–30 per cent lower rents than comparable units in safer zones. Similar findings in Ghana (Kabo-Bah, Aggrey, & Duku, 2023) and Kenya (Aliyu, Lawal, & Omisore, 2023) reveal that market responses to flood risk are not only physical but also psychological, as risk perception influences willingness to pay. In Ibadan, studies such as Adesina and Afolabi (2020) and Oyedepo, Ebohon, and Akinwale (2022) have noted that the recurrence of floods has increased vacancy rates and reduced rental stability in low-lying communities, especially where government intervention remains reactive rather than preventive. Beyond the direct physical and economic impacts, institutional capacity plays a decisive role in shaping how floods affect rental markets. Weak enforcement of building codes, poor drainage maintenance, and fragmented urban governance exacerbate exposure and sustain a cycle of depreciation (Oni & Adeniran, 2024; World Bank, 2023). Without consistent floodplain zoning or effective insurance coverage, landlords bear repair costs and pass them to tenants in the form of unpredictable rent adjustments. Consequently, households in flood-prone areas become trapped in a cycle of low rent, poor maintenance, and continued vulnerability.

This cycle not only perpetuates urban inequality but also undermines investment confidence in the housing sector. The economic significance of housing in Nigeria's urban system makes the study of flood-induced rental variation particularly relevant. The housing sector contributes significantly to employment, household wealth, and local government revenue through property taxation. When flood disasters distort rental markets, they also weaken municipal revenue bases and reduce the incentive for formal property registration. As noted by Odunsi (2022), understanding how environmental hazards interact with rental values can inform more resilient land-use planning, equitable housing policies, and sustainable valuation practices. This paper therefore examines the effects of flooding on the rental values of residential properties in Ibadan. It builds upon previous research on flood determinants but shifts focus to the economic consequences within the rental housing market. Using primary survey data from flood-prone and non-prone communities, the study employs descriptive and inferential analyses to estimate how flood exposure influences rents while accounting for institutional, infrastructural, and locational factors. The findings are expected to inform urban planners, valuers, and policymakers on how to integrate risk information into housing market assessments and flood mitigation strategies.

**Research Objectives**

i. To examine the relationship between flood exposure and rental values of residential properties in Ibadan.

ii. To evaluate the influence of institutional and infrastructural factors on the extent of flood-induced rental depreciation in Ibadan.

Research Questions

i. How does flood exposure affect the rental values of residential properties in Ibadan?
ii. To what extent do institutional inefficiencies and infrastructure conditions influence the relationship between flooding and rental value depreciation?

**Research Hypotheses**

**$H_{01}$:** There is no significant relationship between flood exposure and the rental values of residential properties in Ibadan.

**$H_{02}$:** Institutional and infrastructural factors do not significantly influence the effect of flooding on rental value depreciation in Ibadan.

**Conceptualising Flood Risk and Urban Vulnerability**

Flooding represents one of the most prevalent environmental hazards affecting urban systems globally, yet its impacts vary according to exposure, sensitivity, and adaptive capacity. The concept of flood risk integrates the probability of a flood event with the potential consequences for people, property, and infrastructure (UNDRR, 2022). In urban contexts, risk is determined not solely by hydrological or climatic triggers but also by socio-economic and governance conditions that heighten vulnerability (World Bank, 2023). The hazard–exposure–vulnerability framework explains that the magnitude of flood losses depends on the intersection between physical hazard, the exposure of assets and populations, and the capacity to anticipate and recover from impacts (Agonafir, 2023). Urban vulnerability emerges from structural deficiencies such as poor drainage, informal settlements in floodplains, and limited institutional coordination (Adelekan, Olajide-Talabi, & Di Baldassarre, 2022). In many African cities, population growth has outpaced infrastructural investment, creating a mismatch between land use and natural hydrology (Rahman, Chowdhury, & Sharma, 2023). The expansion of impervious surfaces, roads, pavements, and buildings, reduces natural infiltration, resulting in surface runoff and flash floods. Ibadan's historical development mirrors this pattern: urban sprawl into river valleys and the absence of functional storm-water systems have amplified the city's flood risk profile (Egbinola & Amanambu, 2020).

Vulnerability also has a social dimension. Low-income households often occupy high-risk areas because of affordability constraints, inadequate enforcement of zoning regulations, and lack of affordable alternatives (Aliyu, Lawal, & Omisore, 2023). This spatial inequality embeds environmental injustice, as the poorest residents bear the greatest risk burden. Additionally, inadequate access to risk information and insurance deepens vulnerability by preventing households from adopting preventive measures (Ujene, Ekechukwu, & Nnam, 2023). Scholars increasingly argue for a systems-based understanding of urban flood risk that recognises interdependencies between the built environment, governance, and market dynamics (Agyeman & Evans, 2021). In Ibadan, flood impacts extend beyond physical

damage to influence economic productivity, property markets, and social stability. Consequently, vulnerability is best conceived as an evolving process driven by both environmental stress and institutional fragility. As Oni and Adeniran (2024) observed, resilient urban governance requires a shift from reactive crisis management to anticipatory risk reduction through spatial planning, enforcement, and continuous data integration. The conceptual link between flood risk and property value thus lies in how vulnerability is perceived and priced by urban residents and investors. Where exposure is high and mitigation capacity weak, markets respond through rent depreciation, lower property turnover, and disinvestment.

**Flooding and Property Market Dynamics in Developing Economies**

Flooding exerts complex influences on housing markets, particularly in developing economies where urban planning and insurance mechanisms are weak. The hedonic pricing model has been widely applied to estimate how environmental risks affect property prices by decomposing housing value into structural, locational, and environmental attributes (Dabara, Bello, & Adamu, 2023). Within this framework, flood exposure functions as a disamenity that tenants and buyers internalise as reduced willingness to pay. Empirical evidence from across Sub-Saharan Africa shows that properties in flood-prone areas command significant rent discounts relative to comparable safe locations (Kabo-Bah, Aggrey, & Duku, 2023; Umar, 2023). In Nigeria, studies have documented recurring flood events leading to physical deterioration of housing stock and depreciation in market rents (Adelekan, 2021; Oyedepo, Ebohon, & Akinwale, 2022). These effects are often mediated by infrastructure failure, as poor drainage and inaccessible roads reduce neighbourhood attractiveness. Fayomi, Aladejana, and Okon (2024) linked flood-induced road damage to rising maintenance costs and declining property occupancy in Lagos, suggesting that risk externalities spill over into broader urban systems. Similarly, Dabara et al. (2023) observed that rental reductions in Ibadan's low-lying districts averaged 25–30 per cent during high-risk seasons, reflecting the market's rational discounting of exposure.

Beyond physical risk, risk perception plays an important role in shaping property market outcomes. Even after infrastructural repair, flood stigma persists, affecting tenant and investor confidence (Adesina & Afolabi, 2020). Studies in Ghana and Kenya revealed that residents continue to devalue flood-prone areas years after mitigation, as past events influence expectations of future losses (Kabo-Bah et al., 2023). The absence of standard disclosure laws in Nigeria exacerbates this issue; landlords rarely inform prospective tenants about flood histories, and tenants lack the means to verify exposure (Ujene et al., 2023). Consequently, rental contracts often underprice or misprice risk, generating instability in rental yields. Economic models also highlight feedback loops between flooding, income loss, and housing affordability. Flooding disrupts livelihoods, reduces tenants' capacity to pay, and increases vacancy durations. Over time, this weakens landlords' revenue streams and diminishes reinvestment incentives, leading to a deterioration in housing quality (World Bank, 2023). Therefore, flooding's effects on the rental market are both direct, through structural damage,

and indirect, through reduced purchasing power and urban disamenities. Collectively, the literature underscores that property markets in developing countries are highly sensitive to environmental shocks due to institutional weaknesses and informal market practices. In Ibadan, where rental housing dominates the residential landscape, flood events impose sustained socio-economic penalties. Understanding these dynamics is essential for creating risk-sensitive valuation systems and equitable housing policies that internalise environmental costs.

**Institutional and Infrastructural Dimensions of Flood-Induced Value Change**

Institutional capacity and infrastructure quality critically shape how flooding translates into property market outcomes. Weak governance, poor coordination, and inadequate maintenance regimes increase both the frequency and impact of floods (Adedeji, Fasanmi, & Adewumi, 2023). In Nigeria, fragmented responsibilities among ministries and local councils result in overlapping functions and uncoordinated responses (Oni & Adeniran, 2024). The failure to enforce building codes and drainage easements allows uncontrolled development on floodplains, thereby increasing exposure. Infrastructure deficits amplify these institutional gaps. Poorly designed or undersized drains, clogged by waste and sedimentation, create recurrent flash floods even after moderate rainfall (Fayomi et al., 2024). The World Bank (2023) observed that Ibadan's drainage system functions at less than 60% efficiency due to neglect and illegal dumping. This not only exacerbates physical risk but also discourages private investment and undermines housing market stability. Adedeji et al. (2023) argued that hydrological data deficiency impedes scientific decision-making, resulting in poorly targeted interventions.

Institutional inefficiency also extends to urban land administration. In many Nigerian cities, property registration and planning approval processes remain weak, with little integration of geospatial flood data into zoning. As a result, flood-prone parcels continue to attract development because risk is not priced into land value (Olanrewaju & Chitakira, 2022). The institutional failure to disclose or penalise such practices undermines risk transparency and distorts market signals. Comparative evidence from Accra and Nairobi suggests that when governance improves, through decentralised maintenance budgets, digital mapping, and inter-agency coordination, market confidence and property values stabilise (Kabo-Bah et al., 2023). Conversely, when governance fails, even small floods cause disproportionate economic disruption. In Ibadan, the lack of consistent drain desilting schedules, low community participation, and insufficient floodplain monitoring perpetuate risk. Therefore, the literature suggests that flood-induced rental depreciation in Ibadan is not simply a reflection of natural hazard exposure but a manifestation of governance and infrastructural fragility. Strengthening institutional frameworks, through policy coherence, public accountability, and participatory flood management, can moderate market volatility and promote housing resilience.

**Empirical Evidence on Flooding and Rental Value Depreciation**

Empirical investigations globally reveal consistent evidence that flooding depresses property and rental values. In the United Kingdom, Rahman et al. (2023) found post-flood rent

reductions of 8–10% in affected localities, recovering slowly over three years. However, in African contexts, depreciation tends to persist due to weak reconstruction capacity. Dabara et al. (2023) documented that in Ibadan and Kaduna, rental values in flood-prone areas were between 20% and 35% lower than non-prone areas. These effects were accentuated where drainage infrastructure was poor and government compensation delayed. Adelekan (2021) and Oyedepo et al. (2022) observed that property values decline most sharply in districts repeatedly hit by floods, such as Ogunpa and Kudeti, where cumulative structural damage and health risks deter new tenants. Similarly, Ujene et al. (2023) demonstrated that perceived institutional failure, especially in enforcement and drainage maintenance, reinforces long-term market pessimism. The economic effects extend beyond rents to insurance premiums, collateral values, and housing investment rates. Cross-country studies provide comparative insight. Kabo-Bah et al. (2023) found in Accra that properties with improved flood defences or situated within planned estates exhibited rent premiums of up to 12%, indicating that mitigation investments are capitalised positively into market value. In contrast, unregulated informal settlements suffered chronic underpricing, perpetuating poverty traps. Likewise, Tasnia et al. (2025) emphasised the role of water-sensitive urban design in reducing market losses, arguing that integrating green infrastructure increases both resilience and aesthetic value.

For Ibadan, recent evidence indicates that flooding's effects on rent values operate through both direct physical losses and indirect socio-psychological channels. Persistent flooding erodes tenant confidence and limits landlords' ability to charge economic rents. Furthermore, structural inequality ensures that low-income tenants bear disproportionate risk exposure while lacking relocation options (Aliyu et al., 2023). The literature thus confirms that rental markets internalise environmental risk, but the magnitude of adjustment depends on the strength of institutional safeguards and public awareness. Overall, empirical evidence converges on the conclusion that flooding significantly affects rental values across contexts, with the effect magnitude mediated by infrastructure quality, governance efficiency, and market transparency. Ibadan's experience illustrates how unregulated urban growth and weak institutional response transform a natural hazard into an enduring economic liability for households, investors, and the wider urban economy.

**Theoretical Framework**

This study adopts the Hedonic Pricing Theory to explain how flooding affects the rental values of residential properties in Ibadan. The hedonic model argues that a dwelling's observed rent is the sum of implicit prices for its attributes: structural characteristics (for example, number of rooms, building condition), locational features (for example, access to paved roads, distance to the CBD), neighbourhood services (for example, water supply, waste collection), and environmental risks. Flood exposure enters this framework as a measurable disamenity. Tenants, anticipating repair costs, disruption, health risks and future inundation, discount their willingness to pay for homes in flood-prone streets relative to comparable homes in safer areas. The size of this discount is the implicit price of flood risk. Applied to Ibadan, the model

predicts three patterns. First, all else equal, rents are lower on streets with recent or frequent flooding than on non-exposed streets. Second, infrastructure and governance conditions mediate the discount: where drainage is regularly desilted and planning rules are enforced, the implicit price penalty is smaller because perceived risk is lower. Third, market stigma persists over time, so even after a dry season or minor upgrades, tenants may continue to price in risk if they believe future floods remain likely. Empirical studies in Nigeria and West Africa support these propositions. Hedonic analyses report significant negative coefficients for flood exposure after controlling for structure and location, with larger penalties where drainage maintenance and enforcement are weak (Dabara, Bello, & Adamu, 2023; Kabo-Bah, Aggrey, & Duku, 2023). Cross-city evidence further shows that integrating risk information, building setbacks and routine drain clearance narrows rent discounts by improving expected habitability and access (Rahman, Chowdhury, & Sharma, 2023; World Bank, 2023). Thus, the hedonic pricing lens offers a coherent microeconomic rationale for the study's design: by estimating the implicit rent penalty of flood exposure while controlling for other attributes, we identify how environmental risk and institutional performance are capitalised into Ibadan's rental market.

**Research Methodology**

This study employed a quantitative research design anchored on the hedonic pricing framework to examine the effects of flooding on the rental values of residential properties in Ibadan, Nigeria. The design allowed for systematic data collection and analysis of measurable variables, such as rental values, flood exposure, and infrastructural conditions, across selected communities historically affected by flooding. Three flood-prone communities, namely Ogunpa, Kudeti, and Balogun, were purposively chosen due to their recurrent flood histories and spatial variation in exposure. The study population consisted of residential tenants and practising estate surveyors and valuers within the selected areas. Using the Taro Yamane formula at a 95% confidence level, a representative sample of 278 respondents was determined. A structured questionnaire served as the primary instrument for data collection, capturing information on respondents' socio-demographic characteristics, flood experiences, rental prices, and perceptions of environmental and institutional conditions. The questionnaire was pre-tested for validity and reliability, while ethical considerations, including informed consent and confidentiality, were strictly observed.

Data were analysed using descriptive statistics (mean scores, frequencies, and percentages) to summarise rental variations and respondents' characteristics. Inferential statistics, including Analysis of Variance (ANOVA) and Multiple Regression Analysis, were employed to test the hypotheses and determine the extent to which flood exposure, infrastructural quality, and institutional efficiency influenced rental values. Results were presented in tabular and graphical forms to ensure clarity. This methodological approach ensured internal validity, replicability, and analytical precision in assessing the link between flooding and housing market behaviour in Ibadan's urban context.

## Results

**Table 1: Comparative Mean Rental Values by Flood Exposure Category (₦/Month)**

| Community | Flood-Prone Areas (Mean Rent) | Non-Flood Areas (Mean Rent) | % Rent Difference | Interpretation |
|---|---|---|---|---|
| **Ogunpa** | ₦68,000 | ₦95,000 | -28.4% | Significant rent discount in flood-prone streets. |
| **Kudeti** | ₦71,500 | ₦92,000 | -22.3% | Flood exposure reduces rent value moderately. |
| **Balogun** | ₦79,000 | ₦98,500 | -19.8% | Slight discount due to partial flood exposure. |
| **Average** | ₦72,833 | ₦95,167 | **-23.5%** | Flood exposure reduces rents by about one-quarter. |

Across all three communities, flood-prone areas exhibited an average 23.5% reduction in rent values compared to non-flooded zones. The result confirms that flood exposure acts as a negative externality that tenants internalise through lower willingness to pay. Ogunpa recorded the sharpest depreciation, consistent with its high flood frequency and poor drainage condition.

**Table 2: Mean Scores of Institutional and Infrastructural Factors Affecting Rental Value**

| Factor | Mean Score (MS) | Rank | Interpretation |
|---|---|---|---|
| **Weak enforcement of building regulations** | 4.63 | 1st | Poor planning control intensifies flood risk and rent depreciation. |
| **Poor drainage maintenance** | 4.51 | 2nd | Irregular desilting increases exposure and tenant turnover. |
| **Inadequate waste management** | 4.42 | 3rd | Blocked drains sustain flood recurrence. |
| **Low government intervention in risk management** | 4.27 | 4th | Minimal state response undermines confidence. |
| **Limited community participation** | 4.12 | 5th | Weak engagement limits mitigation. |

The highest mean score (4.63) was attributed to *weak enforcement of building regulations*, followed by *poor drainage maintenance (4.51)*. Both factors indicate institutional weaknesses that amplify flood effects and erode market confidence.

**Hypothesis 1: There is no significant relationship between flood exposure and the rental values of residential properties in Ibadan.**

**Table 3: Correlation between Flood Exposure Index and Rental Values**

| Variable Pair | Pearson's r | Sig. (p-value) | Decision |
|---|---|---|---|
| **Flood Exposure Index × Rental Value** | -0.678 | 0.001 | Significant |

There exists a strong, negative, and statistically significant correlation ($r = -0.678$, $p < 0.01$) between flood exposure and rental value, indicating that as flood frequency and severity increase, rent levels decrease correspondingly. Since $p < 0.05$, the null hypothesis that there is

no significant relationship between flood exposure and rental values is rejected. Therefore, flooding significantly reduces the rental values of residential properties in Ibadan.

**Hypothesis 2: Institutional and infrastructural factors do not significantly influence the effect of flooding on rental value depreciation in Ibadan.**

**Table 4: Multiple Regression Analysis of Determinants of Rental Value**

| Predictor Variable | Unstandardised β | Standardised β | t-value | p-value | Decision |
|---|---|---|---|---|---|
| **Flood Exposure ($X_1$)** | -0.371 | -0.416 | -5.22 | 0.000 | Significant |
| **Drainage Quality ($X_2$)** | 0.284 | 0.312 | 3.98 | 0.002 | Significant |
| **Institutional Efficiency ($X_3$)** | 0.295 | 0.328 | 4.21 | 0.001 | Significant |
| **Constant** | 8.91 | — | 2.87 | 0.006 | — |

**Model Summary:** $R = 0.812$

$R^2 = 0.659$ Adjusted $R^2 = 0.642$ $F(3, 66) = 42.51$, $p < 0.001$

The model explains 65.9% of the variation ($R^2 = 0.659$) in rental values. Flood exposure ($\beta = -0.416$) exerts a strong negative effect, confirming its depressive influence. Conversely, drainage quality ($\beta = 0.312$) and institutional efficiency ($\beta = 0.328$) have positive and significant effects, indicating that better governance and infrastructure can mitigate rental losses. Since $p < 0.05$ for institutional and infrastructural variables, the null hypothesis that institutional and infrastructural factors do not significantly influence the effect of flooding on rental depreciation) is rejected. Therefore, institutional and infrastructural conditions significantly shape the relationship between flooding and rental value in Ibadan.

**Discussion of Findings**

The findings of this study provide significant empirical insight into how flooding influences the rental values of residential properties in Ibadan, Nigeria. The analysis revealed that flood exposure exerts a strong, negative, and statistically significant effect on rent levels, with tenants in high-risk areas paying substantially lower rents compared to those in flood-free zones. This pattern aligns with the hedonic pricing theory, which posits that housing markets capitalise both positive and negative externalities into property prices and rents. Flood risk, as a measurable disamenity, leads tenants to discount their willingness to pay for affected dwellings due to perceived inconvenience, damage potential, and uncertainty about future inundation. The comparative rent analysis showed that flood-prone neighbourhoods such as Ogunpa and Kudeti experience rent reductions of between 20% and 28%, confirming that market forces internalise environmental risk into pricing structures. This outcome is consistent with the findings of Dabara, Bello, and Adamu (2023), who reported similar rent discounts in flood-exposed corridors in Southwestern Nigeria. The strength of this relationship ($r = -0.678$) further indicates that as the frequency and intensity of flooding increase, rental values decline proportionately. It demonstrates that flood risk perception and actual experience influence market behaviour in a predictable manner.

Beyond environmental exposure, the study found that institutional and infrastructural factors play a decisive role in mediating the extent of rental value depreciation. Weak enforcement of building regulations (MS = 4.63) and poor drainage maintenance (MS = 4.51) emerged as the leading institutional causes of flood recurrence and sustained market decline. This reinforces earlier assertions by Adelekan, Olajide-Talabi, and Di Baldassarre (2022) that ineffective urban governance magnifies natural hazards into socio-economic crises. In Ibadan, the failure to control development within floodplains, combined with irregular drainage desilting and poor waste management, has entrenched a cycle of flooding, damage, and property devaluation. The regression analysis substantiates this governance dimension. Flood exposure recorded a negative standardised coefficient ($\beta = -0.416$), signifying its strong depressive influence on rent, while drainage quality ($\beta = 0.312$) and institutional efficiency ($\beta = 0.328$) both exhibited positive and statistically significant effects. Together, these variables explained 65.9% of the variation in rental values across the study area. This finding underscores that urban flooding in Ibadan is not solely an environmental problem but a symptom of institutional fragility. Where planning enforcement and infrastructure maintenance are effective, flood risk, and by extension, rental depreciation, is substantially reduced. Similar observations were made by Kabo-Bah, Aggrey, and Duku (2023) in Ghana and Oni and Adeniran (2024) in Nigeria, who found that cities with stronger coordination among agencies and consistent budgeting for drainage maintenance recorded lower market losses following floods.

Another important implication is the role of perception and market confidence. Persistent flooding creates a stigma effect whereby tenants associate affected communities with poor living standards, unhealthy environments, and recurring inconvenience. Even when flood levels recede or repairs are made, the psychological imprint of risk endures, resulting in longer vacancy periods and suppressed rents. This finding mirrors the conclusions of Aliyu, Lawal, and Omisore (2023) and Rahman, Chowdhury, and Sharma (2023), who observed that flood history influences property desirability more than actual proximity to hazard zones. Furthermore, the study highlights social inequities in flood exposure. Most low- and middle-income tenants reside in flood-prone areas because rents are cheaper, yet they bear the greatest physical and economic risks. This replicates the findings of Ujene, Ekechukwu, and Nnam (2023), who argued that socio-economic vulnerability and weak institutions reinforce one another, perpetuating a cycle of risk and marginalisation. The Ibadan case thus exemplifies how urban inequality interacts with environmental stress to create spatial clusters of vulnerability and economic decline.

The findings also affirm the arguments advanced by the World Bank (2023) and UNDRR (2022) that building resilience in African cities requires integrating flood-risk data into land-use planning and property valuation systems. Without such integration, rental markets will continue to misprice risk, discouraging investment and reducing overall urban productivity. The evidence from Ibadan suggests that policy responses should extend beyond physical mitigation to include institutional strengthening, improved risk communication, and legal frameworks that enforce disclosure of flood history in tenancy agreements. In summary, the study demonstrates that flooding in Ibadan has both direct and indirect economic

consequences. Directly, it damages housing stock and increases maintenance costs; indirectly, it erodes tenant confidence, weakens demand, and generates structural rent discounts. Institutional inefficiency magnifies these effects by failing to prevent illegal developments and maintain drainage networks. The empirical results thus confirm that Ibadan's flood-related rental depreciation is as much a governance failure as it is an environmental hazard. The implications for policymakers and real estate professionals are profound: flood risk must be treated as a core component of property valuation, urban planning, and housing policy. By addressing the underlying institutional and infrastructural deficiencies, Ibadan can transform from a reactive city vulnerable to annual floods into a resilient urban environment capable of sustaining stable housing markets and improved living conditions.

**Conclusion**

This study investigated the effects of flooding on the rental values of residential properties in Ibadan, focusing on how environmental, institutional, and infrastructural factors shape the housing market. The results reveal that flooding exerts a substantial and statistically significant negative effect on rental values across flood-prone communities, confirming that tenants internalise environmental risk when determining willingness to pay. The observed rent discounts of 20–28% in high-risk areas demonstrate that flood exposure is a critical determinant of housing affordability and market segmentation in Ibadan. Beyond environmental risk, institutional and infrastructural weaknesses amplify these effects. Weak enforcement of building regulations, poor drainage maintenance, and irregular waste management perpetuate recurrent flooding and sustain negative market perceptions. The regression results further establish that flood exposure, drainage quality, and institutional efficiency collectively explain over 65% of rental variation in the study area. This underscores that Ibadan's flood-induced property depreciation is not solely a natural outcome but also a function of governance failure and infrastructural neglect. The findings therefore confirm the theoretical proposition of the Hedonic Pricing Model, which asserts that flood risk, as an environmental disamenity, reduces property values when unmitigated by effective institutional or infrastructural interventions. Building resilience into Ibadan's housing market thus requires holistic policy reforms that integrate urban planning, environmental management, and market transparency.

**Recommendations**

1. Enforce Urban Planning and Building Regulations: Strengthen institutional capacity for monitoring and enforcing development control, particularly in floodplains and riparian corridors.
2. Upgrade and Maintain Drainage Infrastructure: Introduce routine desilting schedules, expand drainage capacity, and incorporate climate-resilient engineering standards into urban infrastructure projects.
3. Institutional Coordination: Establish a unified urban flood management agency to harmonise functions among state, local, and environmental bodies.

4. Flood Risk Information Disclosure: Mandate that landlords and estate agents disclose flood histories in rental agreements to improve market transparency and tenant decision-making.
5. Public Awareness and Community Participation: Promote community-led waste management and early-warning systems through resident associations and local media campaigns.
6. Integrate Flood Data into Valuation Practice: The Nigerian Institution of Estate Surveyors and Valuers (NIESV) should incorporate flood-risk indicators into rental valuation guidelines to enhance evidence-based property pricing.
7. Long-Term Resilience Planning: Embed flood-risk mapping and geospatial data in urban master plans, ensuring that new developments align with hydrological realities.

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