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Research Article

Impact of Floods on Property Rental Values in Asaba, Delta State, Nigeria

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Abstract

Property rental values are key indicators of investment performance and serve as a veritable source of income for property owners and accommodation for occupants. However, these property values are not static; they are sensitive to both economic and environmental conditions. Among the environmental factors, flooding has emerged as a major threat to the stability of property rental values, particularly in low-lying coastal regions such as Asaba, Delta State. Flooding has not only disrupted livelihoods and displaced residents but has also caused significant damage to property. The resultant effect is a decline in the desirability and marketability of affected properties. This study is aimed at analysing the impact of flooding on rental values of residential properties in flood-prone and non – prone areas of Asaba, Delta State. The study applied the distribution of questionnaire and survey design method for data collection as survey design enables the collection of numerical (quantitative) and descriptive (qualitative) data insights, while Persian parametric correlation, non-parametric correlation and weighted mean were used for data analysis. The study adopted Taro Yamani's formula for sample size technique with a population size of 490 comprising 398 Landlords, 72 Estate Surveyors and Valuers, and 20 Staff of Delta State Emergency Management Agency, Asaba. Results of analysis from Persian parametric correlation showed that flooding has high significant impact on rental values in Asaba with high significant value of 0.000 and high correlation coefficient of 98.9% while non parametric result shows that flooding has high significant impact on rental values in Asaba with high significant value of 0.000 and high correlation coefficient of 88.5%, while Spearman's rho correlation, showed that flooding in the city of Asaba has high significant value of 0.000 and high correlations coefficient of 96.4%. The results generally suggest that the city needs to seriously address the issue of flood risk in their areas, as the study shows that flooding is a very significant factor in the city of Asaba and hinders appreciable land development. The study recommends, among other things, that the government and key stakeholders should be engaged in floodplain management. In finding a solution to flooding using this approach, the first step is to construct a flood-frequency curve based on historical records, and an examination of the vegetation to determine how often, on average, floods of a certain degree occur in a particular area. This does not tell us exactly when a flood will occur, but it provides an idea of how often it might occur based on history.

Keywords: *Property, Rental value, Flooding, Flood risk, Analysis, Asaba.*

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1. Introduction

According to Okonjo (2020), the intensification of rainfall patterns across the southern region of Nigeria has pushed existing infrastructure to its limit, with repeated flooding damaging roads, homes, schools, and private businesses. This has led to a noticeable shift in tenant behavior in flood-prone towns like Asaba, where households now prioritize elevation, drainage access, and seasonal flood history when choosing rental properties. These studies collectively affirm that flooding is not merely an environmental problem, but also a key disruptor of urban land use, housing stability, and real estate investment patterns in Nigeria.

Rental values of properties play a vital role in the economic stability and urban development of any nation. Rental value of a property means the fair market price to rent a property, which is influenced by current market conditions such as supply and demand (Wasson, 2022). In urban centers like Asaba, property rental values serve as a veritable source of income for property owners and accommodation for the teeming population.

Property rental values are key indicators of investment performance and are used to assess real estate markets, determine tax obligations, and guide urban planning policies. However, these property values are not static; they are sensitive to both economic and environmental conditions. Among the environmental factors, flooding has emerged as a major threat to the stability of property rental values, particularly in low-lying coastal regions. Flooding, which refers to the overflow of water onto land that is usually dry, according to the National Severe Storms Laboratory (2015), has become a recurrent environmental hazard in Nigeria and more intensely in the Niger Delta region, including Asaba. Flooding occurs during excessive rainfall, overflow of riverbanks, blocked drains, and rising sea levels in Delta State due to its geographical location and climate pattern.

Asaba is the capital of Delta State and one of the key cities in the Niger Delta region. Geographically located at 6°12’15’N, 6°39’55’E. The city lies within the deltaic floodplain of the River Niger and its numerous tributaries. The topography is generally flat and marshy, with elevations rarely exceeding 15 meters above sea level. The climate is tropical and humid, with an annual rainfall of about 2,500–4,000 mm, most of which falls between May and October. This seasonal rainfall, coupled with poor drainage infrastructure and unchecked urban development, makes the city particularly prone to flash flooding. According to a 2023 report by the Nigerian Hydrological Services Agency (NIHSA, 2023), Asaba is classified as a high-risk flood zone with recurring displacement of over 100,000 residents annually during peak flood periods.

In Asaba, flooding has not only disrupted livelihoods and displaced residents but has also caused significant damage to buildings, roads, and infrastructure. The resultant effect is a decline in the desirability and marketability of affected properties, especially marketable housing. Tenants often vacate flood-prone environments during the rainy season, leading to reduced demand, lower occupancy rates, and downward pressure on rent. Landlords, on the other hand, are faced with reduced income, increased maintenance costs, and depreciation on property value. Over the years, several communities in Asaba have experienced recurring floods, which have altered the dynamics of the local market rental values. The impact of flooding is not just limited to physical damage, but it also extends to investors’ confidence and long-term property use. While various studies have examined the effects of environmental degradation on property, this study is specifically focused on the determination of property market trends in Asaba with respect to flooding, Delta State.

Flooding is one of the most recurrent and destructive environmental hazards affecting urban centers globally, with severe consequences on human settlements, infrastructure, and economic stability. Flooding occurs when excess water overflows normally dry land due to heavy rainfall, river overflow, storm surges, or inadequate drainage systems (United Nations Office for Disaster Risk Reduction, 2022). While flooding is a natural hydrological event, its impact is propelled by anthropogenic factors such as rapid urbanization, poor land use planning, deforestation, and the blockage of water channels. Nigeria is no exception to this trend. In the recent past, the country has witnessed a surge in flood-related incidents, particularly in low-lying and deltaic regions of the country. Delta State, located in the Niger Delta, is one of the most affected areas due to its geographical characteristics and exposure to prolonged rainfall and rising water levels. Asaba, the state capital, sits within a floodplain. This, combined with increasing population density and inadequate infrastructural development, makes the city extremely susceptible to seasonal floods. Between 2015 and 2024, Asaba experienced multiple flood disasters culminating in the major 2022 disaster, which displaced thousands of residents and led to widespread property damage. The implication of flooding extends beyond immediate displacement and infrastructural loss. Flooding also disrupts the real estate market, particularly the property market trend. In neighbourhoods like Infant Jesus, Cable Point, Okpanam Road, and Anwai, recurring floods have reduced the attractiveness of residential properties. Resulting in prolonged voids, reduced rent, and rising maintenance costs for landlords. Flood water hastens the physical deterioration of buildings, compromises tenant safety, and decreases the overall livability of affected communities.

In contrast, relatively elevated areas such as Bonsac, Oduke, and the core area are experiencing growing demand, as tenants and property seekers migrate away from flood-prone zones in search of safer and more stable housing options. Spatial shift in housing preference and value has begun to redefine the dynamics of the Asaba rental market. However, while anecdotal evidence suggests a strong link between flooding and declining property rental values, there is a noticeable lack of empirical data to support those observations. Investors in real estate, Estate Surveyors, and property developers are left without critical information to guide location-based investment decisions. Additionally, the absence of structured studies on the subject limits the capacity of government agencies and urban planners to craft evidence-based policies aimed at disaster resilience and sustainable housing development.

Furthermore, the lack of localized studies on how recurrent flooding affects the financial performance of property rental values limits our understanding of the long-term economic implications for property owners and tenants alike. Given that the real estate sector plays a crucial role in housing delivery, income generation, and urban development, this knowledge gap poses significant risks to market sustainability and urban resilience. This study, therefore, sought to determine property market trends in flood-prone and non-flood-prone areas of Asaba between 2025 and 2024 by analyzing changes in rent levels, tenant preferences, property vacancy rates, and location-based investment patterns. The research aims to provide data-driven insight into how flooding influences real estate markets in flood-prone cities, drawing from the objectives of the study, which were: to ascertain trends in rental values of residential properties within flood-prone and non-flood-prone areas of Asaba from 2015 to 2024, and the impact of flood risks on property values in Asaba. The findings are expected to inform planning strategies, property investment decisions, and disaster risk reduction efforts in Asaba and similar urban contexts across Nigeria.

2. Literature Review

2.1 Concept of flooding

Flooding has increasingly become a global challenge affecting both developed and developing countries. In the context of Nigeria, especially in the Niger Delta region, recurring flooding continues to have serious implications for housing delivery, infrastructure provisions, livelihoods, and most critically, property values. Flooding is generally described as an overflow of water that submerges land that is usually dry (National Severe Storms Laboratory, 2015).

In Nigeria, Adelekan (2016) identifies types of flooding such as urban flooding, dam bursts and levee failures, dam spills, and flash floods. These categories are often experienced concurrently during heavy rainfall, especially in low-lying and poorly planned urban areas like Asaba. The Niger Delta region is particularly vulnerable to flooding due to its topography, high annual rainfall, and proximity to rivers and creeks. Delta State, where Asaba is located, is among the worst-affected states. Annual flooding events between 2015 and 2024 have significantly disrupted socio-economic activities and created volatility in the property market. Izah (2018) emphasized that the flooding situation in the Niger Delta region is intensified by river siltation, continuous sand filling, and wetland degradation, all of which contribute to water accumulation during the rainy season. Adebayo and Nwachukwu (2021) supported this, noting that in the case of Bayelsa and Delta states, residents often rebuild in the same high-risk zones due to attachment to ancestral lands or lack of alternatives. This has led to a noticeable shift in tenant behavior in flood-prone towns like Asaba, where households now prioritize elevation, drainage access, and seasonal flood history when choosing rental properties. These studies collectively affirm that flooding is not merely an environmental problem, but also a key disruptor of urban land use, housing stability, and real estate investment patterns in Nigeria.

2.2 Causes of Flooding

In developing countries such as Nigeria, Ojo and Adejugbagbe. (2017) identifies causes of flooding to include unregulated development, inadequate municipal capacity, poor enforcement of planning laws, encroachment into flood-prone areas, and substandard drainage systems. Adelekan (2016) agrees and classifies the causes into two: natural causes (such as torrential rains and tidal waves) and human causes (such as indiscriminate waste disposal, poor forecasting, and illegal constructions). The studies further highlighted the interplay between natural and human factors, emphasizing the need for holistic flood management strategies. Given the recurrence of these problems over the years, Asaba has experienced multiple severe floods that have not only displaced residents but also discouraged tenancy and investments in flood-prone neighborhoods.

The human- nature interactions that cause flooding form the focus of this study, and they include, but are not limited to:

1. **Poor drainage systems**: This is a major human-induced cause of flooding experienced in Nigeria, Ogundele and Jegede (2011). Most residential neighbourhood in Nigeria has no drainage system. They rely on a natural water course for runoff. It is commonplace that buildings are constructed

along water courses, and this in turn obstructs channels, which results in flooding during the rainy season (Nabegu, 2014).

2. **Poor waste management system**: Poor waste management is one of the major factors that are contributing to the already worsening flooding problem in Nigeria (Ojo and Adejugbagbe, 2017). Poor attitude of Nigerians to waste disposal has been widely discussed in various studies as one of the causes of flood (Ojo and Adejugbagbe, 2017; Olukanni, Adebayo, and Tenebe, 2014).

3. **Unregulated development**: Farrell (2018) recommended that Flooding and urbanization are intricately related in both developing and developed countries. Dan-Jumbo, Metzger, and Clark (2018) explained that Agricultural lands are being increasingly converted to residential purposes without proper regulation, thus worsening the flooding problem in the country.

4. **Weak implementation of planning laws and corruption**: Nigeria's current planning laws are standard, but their implementations are poorly managed (Nnaemeka-Okeke, 2016). Political interference on planning regulations, understaffing, and lack of functional equipment are factors that mitigate effective planning and implementation (Nnaemeka-Okeke, 2016; Oluwaseyi, 2019). Generally, floods are caused by two major factors: human and natural factors. These factors are obviously responsible for the generation and continuous occurrence of floods in the environment, and at any point negatively affect the environment at large.

2.3 Effects of Flooding

Flooding effects, according to Bariweni, Tawari, and Abowei (2012), could be classified into primary and secondary effects. The primary effects, according to them, include physical damage that happens to any type of structure, including bridges, cars, buildings, sewerage systems, roadways, and canals. The secondary effects include water supplies that result in contamination of water (water pollution). Bariweni, Tawari, and Abowei (2012) discussed some factors that affect flooding; These include,

(a) **The level of predictability:** This affects the timing, accuracy, and communication of warnings given before a flood.

(b) **The rate of onset of the flood**: How quickly the water arrives and the speed at which it rises will govern the opportunity for people to prepare and respond effectively for a flood.

(c) **The speed and depth of water**: This dictates the level of exposure of people and property to a flood. It is difficult to stand or wade through even relatively shallow water that is moving.

(d) **The duration of flood:** This is another important factor in determining the extent of its impact, particularly on individuals and affected communities.

Flooding affected three basic dimensions of sustainable development: social, economic, and environmental dimensions. Flooding has a disproportionate impact all over the world. The different impacts are attributed to levels of development in different countries of the world (Mata-Lima, 2013) and are discussed hereunder:

i. Creation of a void and loss of income to the property developer

Flooding will create a void and loss of income to property owners in the floodplain. The risks of destruction of properties threaten prospective tenants, thus causing an inadequate supply of tenantable accommodation. Flooding creates a void and seasonal occupation, thereby leading to a loss if income to property developers. Available properties in the upland cannot meet the housing needs of the people because more prospective tenants will be chasing them. The result will be increased rent due to forces of demand and supply. Flood-affected properties do not command the same rent as flood-free properties within the same neighbourhood. The rent of properties with similar characteristics within the same neighbourhood differs. There is no market value of properties in the market, which causes conflict.

ii. Decrease in the standard of living

There is a symbiotic relationship between flooding and the standard of living. They feed off each other. Flooding worsens the poverty situation, and poverty makes the impact of flooding more severe by increasing vulnerability. Flooding and poverty decrease the living standards of the people affected. Flooding and poverty impede developmental progress, especially among the poor in society (Dube, Mtapuri, and Matunhu, 2018).

Nigeria is a poor country, yet it has overtaken India as a nation with the largest number of poor people. 87 million Nigerians live in extreme poverty (Homi Kharas and Hofer, 2018). As flooding has become a recurrent event, poverty is further entrenched.

iii. Food insecurity

Food and agriculture are essential to eradicating hunger, but that sector is heavily impacted by flooding in Nigeria (Osabohien, Osabuohien, and Urhie, 2018). Food security is the sure way of eradicating hunger, and it involves making food available and accessible, but Nigeria is far from achieving food security. Despite the vast arable land in Nigeria, it remains the biggest importer of food in Africa (Matemilola and Elegbede, 2017; Osabohien, Osabuohien, and Urhie, 2018).

iv. Inadequacy of clean water and sanitation

Everyone should have access to adequate and clean water for domestic and personal use. In Nigeria, it is estimated that about 63 million people lack access to potable water, while 100 million do not have access to basic sanitation amenities. On a global scale, up to 80% of diseases are linked to poor hygiene and unsafe water (Raimi et al., 2018). Flooding leads to contamination of water bodies and reduces access to potable water (Olanrewaju, 2019).

v. Loss of lives and properties

Nigeria's ecosystem is suffering degradation because of interacting factors, including flooding (Izah, 2018). Flooding destroys human lives, animals, and the natural flora and fauna of the ecosystem. Flood waters destroy land by stripping soil and eroding shorelines, taking out the natural vegetative cover in its path (Smith, 2017). The hazard it causes poses a threat to plants and animals. Preventing invasive alien species is one of the targets of the Sustainable Development Goals, but flooding promotes the invasion of alien species when seeds of plants are carried by flooding to non-native areas. Wildlife is not spared either during flood disasters, as they are killed in numbers and are also displaced as a result of the loss of their natural habitats (Tawari-Fufeyin, Paul, and Godleads, 2015).

2.4 Impact of Flood on Property Rental Values

Flooding has been shown to have a significant impact on property values, especially in flood-prone areas. Akinpelu and Ogunba (2014) reported that rental values in flooded parts of Ibadan dropped significantly after the 2011 floods, and landlords had to offer incentives to retain tenants. Udo and Udofia (2018) examined the impact of seasonal flooding in Uyo, noting that areas like Nwaniba Road experienced sharp reductions in rental demand immediately after major flood events. Similarly, Nkwunonwo, Whitworth, and Baily (2016) concluded that in Lagos, flooded properties are usually appraised lower than their counterparts in flood-free areas even when they are located close to each other. These Nigerian studies reinforce the argument that flooding not only reduces property prices temporarily it may also permanently alter the desirability of entire neighbourhood. There is increasing evidence from the literature suggesting that flooding has a significant negative effect on residential property values. According to Adelekan (2010), properties exposed to recurring flood risks depreciate faster than their counterparts in non-flood-prone zones.

2.5 Flooding and Rental Values of Properties

While much of the literature focuses on the sale value of properties, fewer studies have directly addressed the impact of flooding on rental values. However, the same principles apply. When an area is known for frequent flooding, demand for housing will drop. Tenants avoid high-risk areas, leading to reduced rental income for landlords. Properties in such areas may remain vacant or require significant discounts to attract tenants. In flood-prone cities in Nigeria, landlords often report difficulty in retaining tenants after a major flood event. Anecdotal evidence from cities like Lagos and Port Harcourt shows a trend where tenants vacate flooded houses, forcing landlords to either reduce rent or invest in expensive repairs and floodproofing (Omisore, 2011). Given the frequency and severity of floods in Delta State, especially in Asaba, landlords in those areas have faced declining rental income. Properties in low-lying neighbourhoods or near riverbanks are severely affected. Chukwu and Umeh (2020) emphasized that repeated exposure to flood damage discourages landlords from investing in property maintenance, which further accelerates property decline and reduces rental competitiveness. In a study on the Niger Delta, Adebayo and Lawanson (2017) observed that tenants are increasingly avoiding areas like Patani and Sagbama due to poor drainage and frequent flood disruptions. According to Oluku, Idehen, and Mission (2021), many tenants in flood-prone communities such as Etegwe in Yenagoa now demand shorter leases or insist on living on upper floors, limiting landlord income opportunities. These findings highlight the real economic burden that flooding places on property owners and the critical need for government intervention.

This reality creates a downward spiral where property maintenance is delayed, rental values decrease, and neighborhood quality deteriorates. It also explains why some property investors are hesitant to build or maintain houses in high-risk zones. Yet, despite the above trend, empirical data on how floods affect the rental values of properties in Asaba remains sparse. Most available literature either generalizes the effect on property value or omits the market rental values entirely, pointing to a significant gap that this study aims to address.

3. Research Methods

In this research, the population consists of various stakeholders actively involved in the rental housing market chain within Asaba. They are property owners who lease their properties, Estate Surveyors and Valuers who professionally assess property values and Delta State Emergency Management Agency, Asaba, who are saddled with disaster management.

The target population of this study included property owners in Asaba community, practicing Estate Surveyors and Valuers in Asaba and staff of Delta State Emergency Management Agency. These personnel served as key informants since they had in-depth understanding of flood incidents in Asaba in Delta State.

Respondents in this study were sampled from the target population of 490 respondents which include 398 property owners in Asaba, 72 Registered Estate Surveyors and Valuers in Asaba (NIESV Delta State, 2024) and 20 Delta State Emergency Management Agency in Asaba (SEMA 2024) The above figure constitutes total number of personnel in both institutions in Asaba, from which a sample was drawn using simple random sampling. Simple random sampling was adopted to enable each element of the population to have an equal and independent chance of being included in the sample. The main tool for data collection was the structured questionnaire, which was meticulously designed to capture key variables such as flood frequency, severity, and resultant effects on rental income and occupancy rates. Data analysis was conducted using a combination of descriptive and inferential statistical methods to thoroughly interpret the data collected. Descriptive statistics such as frequencies and percentages were used to summarize respondents' characteristics and their perceptions regarding flooding and rental values, while inferential statistics, including Persian correlation coefficients and simple regression analysis, were applied to examine the strength and nature of the relationship between flooding variables (frequency and severity) and changes in rental property values. The Statistical Package for the Social Sciences (SPSS) software was used for all quantitative analysis, ensuring accurate computation and presentation of results. Qualitative data from interviews were analyzed thematically to identify recurring patterns, insights, and policy implications. The integration of qualitative and quantitative findings (triangulation) enhanced the validity and depth of the research conclusions.

4. Results and Discussions

4.1. Presentation of Results

The table below shows the rental value trend of flood-prone properties in Asaba from 2015 to 2024. Rondi Street, Obiora Street, and Ike Street were used for analysis because they are always affected by floods.

Property rental value trend in Asaba from 2015 to 2024 for flood-prone properties

Location	Type of property	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Affected Area		Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000	Amt p.a. N'000
Rondi St.	1-bedroom flat	220	220	220	220	220	220	220	230	230	230

Obiora St.	1-bedroom flat	220	220	220	220	220	220	220	230	230	230
Ike St.	1-bedroom flat	220	220	220	220	220	220	220	220	220	220
Rondi St.	2-bedroom flat	250	250	250	250	250	280	280	280	280	280
Obiora St.	2-bedroom flat	250	250	250	250	250	260	280	280	280	280
Ike St.	2-bedroom flat	250	250	250	250	250	250	260	260	260	280
Rondi St.	3-bedroom flat	280	280	280	280	280	280	280	300	300	300
Obiora St.	3-bedroom flat	280	280	280	280	280	280	300	300	300	300
Ike St.	3-bedroom flat	280	280	280	280	280	280	280	300	300	300
Rondi St.	Duplex	500	500	500	500	700	800	800	800	1,000	1,000
Obiora St.	Duplex	500	500	500	500	650	650	650	700	700	900
Ike St.	Duplex	500	500	500	500	600	600	600	700	700	900

SOURCE: Researcher's field survey

From the above table, it was discovered that there was no rent review for 1-bedroom flats of N220,000 at Rondi Street and Obiora Street for 7 years, while Ike Street was extended to 8 years due to fear that tenants who retained their tenancies may vacate the premises at the slightest provocation. Even while a review was made, it did not follow the 25% standard of review. The same thing affected rent review for two-bedroom flats, three-bedroom flats, and duplexes in the various neighbourhoods. There is a loss of income as rent is stagnated.

Property rental value trend in Asaba from 2015 to 2024 for flood-free properties

Location	Type of property	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Okobi St.	1-bedroom flat	220	220	230	230	240	240	250	250	260	260
Okparaku St.	1-bedroom flat	230	230	230	250	250	250	250	280	280	280
Chukwuma St.	1-bedroom flat	230	230	230	250	250	250	250	280	280	280
Okobi St.	2-bedroom flat	250	250	280	280	280	280	280	300	300	300
Okparaku St.	2-bedroom flat	250	250	280	280	280	280	280	300	300	300
Chukwuma St.	2-bedroom flat	250	250	280	280	280	280	280	300	300	300

Okobi St.	3-bedroom flat	300	300	300	340	340	340	350	350	350	380
Okparaku St.	3-bedroom flat	300	300	300	340	340	340	350	350	350	380
Chukwuma St.	3-bedroom flat	300	300	300	340	340	340	350	350	350	380
Okobi St.	Duplex	800	800	800	1,500	1,500	1,500	1,500	1,800	1,800	1,800
Okparaku St.	Duplex	800	800	800	1,500	1,500	1,500	1,500	1,800	1,800	1,800
Chukwuma St.	Duplex	800	800	800	1,500	1,500	1,500	1,500	1,800	1,800	1,800

SOURCE: Researcher's field survey

The table above shows the rental value trend of non-flood-prone properties in Asaba from 2015 to 2024. The following streets, Okobi, Okparaku, and Chukwuma, were adopted because they are in the upland of Asaba. From the table, it was discovered that rent review followed the normal process after three years due to the bargaining power of the properties. According to the table, there was no loss of income, unlike in the flood-prone area where rent review becomes a problem.

Table 1: Pearson Correlation of the impact on rental values

		Affected Areas	Unaffected Areas
AffectedAreas	Pearson Correlation	1	.989**
	Sig. (2-tailed)		.000
	N	12	12
UnaffectedAreas	Pearson Correlation	.989**	1
	Sig. (2-tailed)	.000	
	N	12	12

Table 1 shows the correlation of the average affected flood-prone areas and average unaffected flood-prone areas in Asaba. The correlation method used is the Pearson parametric correlation method. The correlation result showed that there is a significant impact of the flood in Asaba. This means that flood is a significant factor that can affect both flood-prone areas and non-flood-prone areas in Asaba. This shows that the city needs to seriously address the issue of flood risk in its areas, as the study shows that flooding has a highly significant impact on rental values in Asaba, with a highly significant value of 0.000 and a high correlation coefficient of 98.9%.

Table 2: Non-Parametric Correlations of the impact on rental values

			AffectedAreas	UnaffectedAreas
Kendall's tau_b	AffectedAreas	Correlation Coefficient	1.000	.885**
		Sig. (2-tailed)	.	.000
		N	12	12
	UnaffectedAreas	Correlation Coefficient	.885**	1.000
		Sig. (2-tailed)	.000	.
		N	12	12
Spearman's rho	AffectedAreas	Correlation Coefficient	1.000	.964**
		Sig. (2-tailed)	.	.000
		N	12	12
	UnaffectedAreas	Correlation Coefficient	.964**	1.000
		Sig. (2-tailed)	.000	.
		N	12	12

Table 2 shows a similar result to Table 1. However, Table 2 presents a non-parametric correlation method using Kendall's Tau B and Spearman's rho correlation method. The correlation result showed that there is a significant impact of flood on rental values in Asaba. This means that flood is a significant factor that can affect both flood-prone areas and non-flood-prone areas in Asaba. Kandall's correlation showed that flooding has a highly significant impact on rental values in Asaba, with a highly significant value of 0.000 and a high correlation coefficient of 88.5%, while Spearman's rho correlation showed that flooding in the city of Asaba has a highly significant value of 0.000 and a high correlation coefficient of 96.4%. The results generally suggest that the city needs to seriously address the issue of flood risk in its areas, as the study shows that flooding is a very significant factor in the city of Asaba.

Table 3: The rating scale for flood-risk contribution factors in Asaba, Delta State

Response Category	Scale Value	Interpretation
Strongly affected risk	5	Very high contribution
Affected risk	4	High contribution
Not affected risk	3	Moderate contribution
Strongly not affected risk	2	Low contribution
Unknown / Undecided affected risk	1	No contribution

Table 3 is a **representative response distribution pattern** based on 470 respondents, typically on flood risk contributing factors in Asaba.

Table 4: Respondent Analysis for the Distribution pattern of factors affecting flood risks

Flood Risk Factor	Strongly affected (5)	Affected (4)	Not affected (3)	Strongly not affected (2)	Unknown/Undecided (1)	Weighted Mean	Rank	Risk Level
Excessive rainfall	210	160	60	25	15	**4.13**	1	Very High
Overflow of river bank	180	175	60	30	25	**4.00**	2	Very High
Lack of water channels	170	160	80	35	25	**3.90**	3	High
Blockade of canals	165	155	85	40	25	**3.84**	4	High
Lack of awareness	100	160	110	60	40	**3.43**	7	Moderate
Weak dams	120	150	110	55	35	**3.55**	6	Moderate
Lack of enforcement of building codes	140	165	95	45	25	**3.75**	5	High
Silting of water bodies	130	160	105	50	25	**3.63**	6	Moderate
Indiscriminate dumping of refuse	180	145	80	40	25	**3.88**	4	High
Hard landscaping	100	140	120	70	40	**3.34**	8	Moderate

Table 4 above represents the mean rate scale analysis of the flood risk contributing factors that affect flooding in Asaba, Delta State.

Table 4.1 Interpretation of Weighted Mean

Weighted Mean Range	Flood Risk Interpretation
4.50 – 5.00	Extremely high flood risk
3.50 – 4.49	High flood risk
2.50 – 3.49	Moderate flood risk
1.50 – 2.49	Low flood risk
1.00 – 1.49	No significant contribution

Table 4.1 represents the mean range and scale rating of the values for flood risk analysis and evaluation.

Table 4.2 rating for flood risk factors

Rank	Flood Risk Factor	Weighted Mean	Flood Risk Level
1	Excessive rainfall	**4.13**	Very High
2	Overflow of the riverbank	**4.00**	Very High
3	Lack of water channels	**3.90**	High
4	Indiscriminate dumping of refuse	**3.88**	High
5	Blockade of canals	**3.84**	High
6	Lack of enforcement of building codes	**3.75**	High
7	Silting of water bodies	**3.63**	Moderate–High
8	Weak dams	**3.55**	Moderate–High
9	Lack of awareness	**3.43**	Moderate
10	Hard landscaping	**3.34**	Moderate

The **overall mean flood risk score** across all factors =

$$\frac{\{4.13 + 4.00 + 3.90 + 3.88 + 3.84 + 3.75 + 3.63 + 3.55 + 3.43 + 3.34\}}{10} = 3.75$$

Overall Flood Risk Level in Asaba, Delta State = "High."

The study observed that dominant flood risk distributors are excessive rainfall and overflow of riverbanks are the dominant contributors due to high rainfall intensity and poor river management. **The research also showed that human-related risks that result from a** lack of drainage maintenance, indiscriminate waste dumping, and weak enforcement of urban planning codes significantly aggravate flooding. Other m**oderate contributors to flood risks are w**eak dams, silting of channels, and poor awareness, which reflect systemic and educational gaps. While the l**owest contributors of flood risk are h**ard landscaping and lack of awareness, though still relevant, they indicate urban planning and behavioral issues, not primary hydrological drivers.

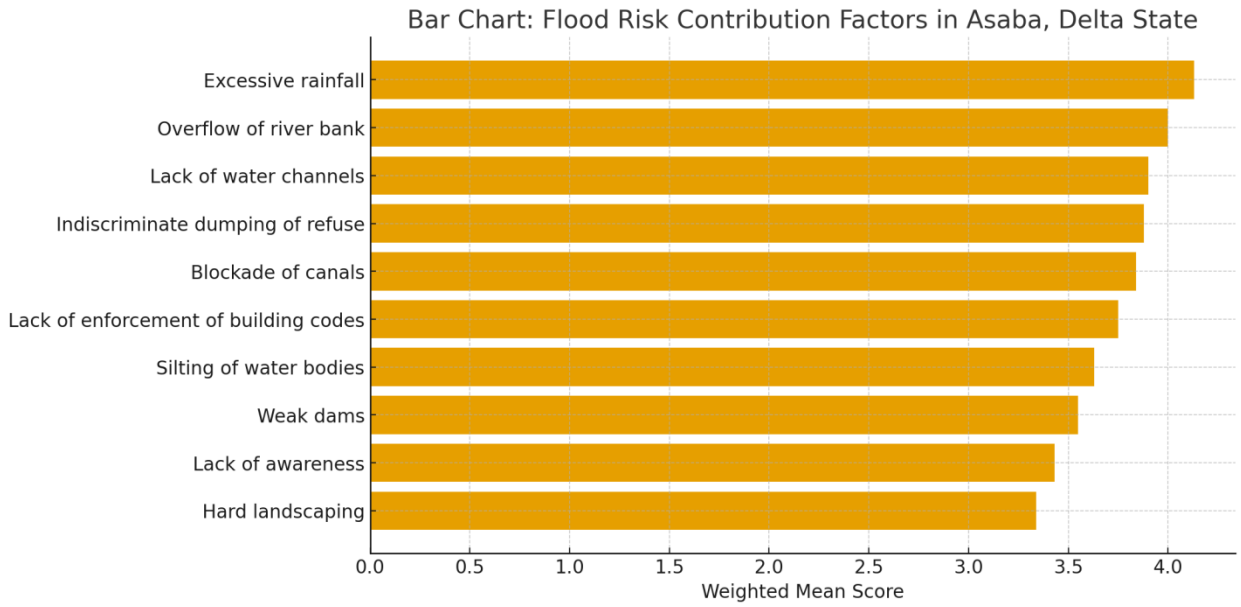


Figure 1: Bar Chart for Flood Risk Contribution Factors in Asaba

This chart confirms that **Excessive Rainfall**, **Overflow of Riverbanks**, and **Lack of Water Channels** are the **dominant flood risk contributors** in Asaba, with overall flood risk categorized as **High** (mean = 3.75).

4.1 Discussion of Key Findings

The study has dealt with the determination of the property trend in Asaba. The analysis has shown that floods have a significant impact on the rental values of properties in Asaba. Tenants threatened by flood occurrences, which eventually led to destruction to properties and, in the worst-case scenario, loss of lives, are not protected. This has left many flood-affected properties vacant/void, while properties free from flood risk are in high demand but cannot meet market demand.

Virtually all the households in Asaba (over 99%) know that Asaba is vulnerable to annual flooding, which shows the problem. Huang and Fan (2020) criticized flood-risk managers for not ensuring the existence of resilience-based post-disaster recovery plans or guidelines, as well as for not focusing on financial costs in choosing a recovery path. Nkwunonwo et al. (2016) and Adelekan (2016) also faulted the city managers in Nigeria for not combining the usual structural measures to flood-risk management with non-structural measures, such as insurance, advocacy, education, stakeholders' participation, and consultation. The implication of this low flood-risk culture in Asaba is that if the trend is not checked, for economic recovery, flood victims in the area will continue to rely heavily on individual resources, family, friends and community members, as well as on relief from government and donor agencies support which most times, has proved to be inadequate, unsustainable and does not reach victims at the right time.

The correlation result showed that there is a significant impact of the flood in Asaba. This means that flood is a significant factor that can affect both flood-prone areas and non-flood-prone areas in Asaba. This shows that the city needs to seriously address the issue of flood risk in its areas, as the study shows that flooding has a highly significant impact on rental values in Asaba, with a highly significant value of 0.000 and a high correlation coefficient of 98.9%. Non-parametric correlation method using Kendall's Tau B and Spearman's rho, the correlation result showed that there is a significant impact of flood on rental values in Asaba. This means that flood is a significant factor that can affect both flood-prone areas and non-flood-prone areas in Asaba. Kandall's correlation showed that flooding has a highly significant impact on rental values in Asaba, with a highly significant value of 0.000 and a high correlation coefficient of 88.5%, while Spearman's rho correlation showed that flooding in the city of Asaba has a highly significant value of 0.000 and a high correlation coefficient of 96.4%. The results generally suggest that the city needs to seriously address the issue of flood risk in its areas, as the study shows that flooding is a very significant factor in the city of Asaba.

In light of the foregoing, it would be necessary to suggest a few solutions.

1. Nigerians should work on the perception of residents because of their hesitancy about moving to the upland during flooding incidents.
2. There should be intensive awareness of the menace of flooding to Asaba residents.
3. Governments/philanthropists and residents may split the burden of relocation.
4. Awareness campaigns should be launched on the importance of flood-resistant material to developers of flood-prone areas.

The suggestions on intensive awareness of the menace of flooding to Asaba residents and the launching of awareness campaigns on the importance of flood-resistant materials in building are in line with Bueno et al. (2021), and This Day (2021), who called for the citizens to seize the new opportunities presented by flooding.

Furthermore, Sasson et al. (2021) suggested developing an effective city resilience plan in collaboration with a non-governmental organization, while ICLEI (2020) suggested engaging the insurance sector on urban needs, capacities, and data. Further studies in this area are Adelekan (2016) and Kaushalyaa et al. (2014), which suggest that property owners should be sensitized on how to ensure their assets, even as the government is expected to make flood insurance policies compulsory for residents. As for dealing with the image problem of insurance companies, this aligns with Ogunwusi et al. (2017), who suggest highlighting the high payment of claims, as in the 2017 Lekki flooding case. This study agrees with Kleffner (2022) and Schanz (2021) on the need for public-private partnership on risk sharing and development of micro insurance programmes such as Afat Vimo and the Scaled-up Proshika scheme shown in Mechler et al. (2006).

5. Conclusions

From this study, we can see that flooding has a negative mitigating impact on the rental values of properties in Asaba. A comparison of rental values of flood-prone and non-flood-prone areas of Asaba

shows a great disparity in rental values of properties in both areas, with a highly significant impact of 0.0000 and a high correlation coefficient of 98.9%. The coefficient analysis conducted also shows statistical differences in the rental values of properties from both locations.

Widening of drains within the study area and subsequent drainage construction should be taken into consideration, having considered the peculiarity of the low-lying nature of the soil strata of the area. Again, developers should be encouraged to build houses using durable materials, and sand filling the building area above sea level.

This study also addresses the role of government and spirited individuals in ensuring that victims of flood disasters recover economically in a timely, dignified, and sustainable manner. Asaba is located in the capital territory of Delta State, and residents of flood-prone areas are grossly underinvested in flood risks. Given the severe threat from climate change, concerted efforts must be made towards improving resilience in African cities. As city managers, governments should drive the needed change by increasing their capacity for handling issues of city resilience and taking full advantage of external flood-risk financing, such as that provided by the African Development Bank's ARC. The Nigerian government needs to shore up its image as a veritable source of solutions on flood risk. Residents of Asaba also need to show more interest in flood-risk matters.

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