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Assessment of Urban Flooding and Drainage Systems in Ebenezer Community, Egbeda Local Government Area, Oyo State, Nigeria

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Abstract

Urban flooding continues to threaten fast-growing communities where drainage systems are weak or poorly kept up. This study looked at flooding and drainage conditions in Ebenezer, a community within Egbeda Local Government Area of Oyo State, Nigeria. It set out to find how often flooding happens there, what drives it, how the drainage network is holding up, and how residents themselves view the causes and effects of the problem. Ebenezer was purposively chosen for the study, and 100 of its residents were reached through simple random sampling. A structured questionnaire supplied the primary data, supported by relevant literature and secondary records; the responses were then broken down using percentages, frequency counts, mean scores, and simple charts and tables. Flooding turned out to be an almost annual event for 84 percentage of respondents. Just over half (55%) described local drainage as poor, 30% called it fair, and only 15% rated it good. Residents pointed to careless waste dumping in drains, weak maintenance culture, badly designed channels, and unchecked urban growth as the chief reasons drainage keeps failing, while 70% named heavy rainfall as the immediate trigger of flood events. Disrupted movement was by far the most common consequence reported (80%), ahead of property damage, road deterioration, and health complaints. Taken together, the results point to a community where intense rainfall meets an under-maintained, poorly planned drainage system and inadequate waste management. Better-built and better-maintained drainage, stronger solid-waste practices, firmer enforcement of planning rules, public sensitisation, and active resident involvement are recommended as ways to bring the flood risk down.

Keywords: Urban flooding, drainage systems, flood risk, waste disposal, urbanisation, Ebenezer Community, Oyo State.

1 Introduction

Few environmental hazards touch as many city-dwellers as urban flooding does. Rapid urban growth, a changing climate, expanding populations, and drainage networks that have not kept pace all feed into flood events that are becoming both more frequent and more severe, a pattern especially visible in developing countries. Unlike flooding driven by overflowing rivers, urban flooding tends to happen simply because rain falls faster than the local drains can carry it away — and many of those drains are badly designed, choked with refuse, or simply never maintained. The fallout includes wrecked homes and businesses, transport gridlock, environmental damage, and public health risks.

Nigeria has not been spared this trend. Careless urban expansion, poor waste habits, buildings and structures encroaching on natural waterways, and drains left unmaintained have all pushed flood incidents higher across the country's towns and cities. Ibadan, within Oyo State, is a case in point: the metropolitan area has repeatedly suffered serious floods, some of which have cost lives, destroyed property, displaced households, and inflicted heavy economic losses. Episodes like these underline why it matters to examine local flood conditions closely and pin down exactly what is driving them.

Ebenezery Community, in Egbeda Local Government Area, is expanding quickly, and this growth has reshaped its natural landscape. As more buildings and hard surfaces cover the ground, and with drainage infrastructure struggling to keep up, the community has become increasingly exposed to flooding whenever rainfall is heavy. Residents commonly deal with flooded streets, waterlogged compounds, damaged property, and disrupted routines — all signs that the causes and characteristics of flooding here deserve closer study.

A fair amount has been written about urban flooding across Nigeria generally, but Ebenezery Community specifically has received little dedicated attention. Few studies, moreover, bring flood frequency, underlying causes, drainage conditions, and resident perceptions together within one study. Doing so — pairing what residents have experienced with an actual assessment of the drainage infrastructure — gives a fuller picture of how flooding unfolds locally and is more useful for shaping flood-management strategies that will actually hold up.

This study, then, sets out to investigate urban flooding in Ebenezery, Egbeda Local Government Area, Oyo State, by determining how often flooding occurs, identifying its main drivers, evaluating the state of the drainage system, and capturing residents' views on flood occurrence and management. The results are intended to be of practical use to urban planners, environmental managers, policymakers, and local government officials working to build more effective flood mitigation strategies and a community better able to withstand future flood events.

1.1 Objectives of the Study

The main objective of this study is to assess urban flooding in Ebenezery, Egbeda Local Government Area, Oyo State, Nigeria.

The specific objectives are to:

1. Determine the frequency of flood occurrences in Ebenezery Community, Egbeda Local Government Area.
2. Identify the major causes of urban flooding in the study area.
3. Assess the condition and effectiveness of the drainage systems in the study area.

4. Examine residents' perceptions of the causes, occurrence, and impacts of urban flooding in the study area.
5. Recommend appropriate measures for mitigating urban flooding in the study area based on the findings.

1.2 Research Questions

This study seeks to answer the following research questions:

1. What is the frequency of urban flooding in Ebenezero Community, Egbeda Local Government Area, Oyo State, Nigeria?
2. What are the major causes of urban flooding in the study area?
3. What is the condition and effectiveness of the drainage systems in the study area?
4. What are residents' perceptions of the causes, occurrence, and impacts of urban flooding in the study area?
5. What measures can be adopted to mitigate urban flooding in Ebenezero Community, Egbeda Local Government Area?

2 Literature Review

2.1 Concept of Urban Flooding

Urban flooding has drawn growing attention because of how often it now occurs and how much damage it leaves behind in cities. Alves et al. (2024) frame it as more than a purely physical event — it is a phenomenon with real social and environmental fallout for the communities it hits, not just standing water in built-up areas. They make the case that grasping urban flooding fully requires looking at both its physical and social dimensions together, since drainage infrastructure, hard surfaces, and how vulnerable a community is all combine to shape the level of risk.

Nkwunonwo, Whitworth, and Baily (2020) similarly rank urban flooding among the most serious environmental hazards facing cities worldwide, stressing that managing it well hinges on understanding how often it happens, what causes it, and what damage it does in rapidly urbanising settings.

Lucas (2024) makes a related point, noting that unchecked urban growth, poorly kept drainage systems, weak solid-waste management, and limited institutional capacity rank among the leading drivers of urban flooding in Nigerian cities.

2.2 Flood Frequency

Flood frequency describes how many times flooding occurs over a given period. Nkwunonwo et al. (2020) argue that tracking this figure matters because it reveals the scale and recurrence of flood events, which in turn feeds into sound flood-risk assessment and disaster-management planning.

2.3 Causes of Urban Flooding

Researchers generally point to a mix of natural and human-driven factors behind urban flooding. Lucas (2024) names rapid urbanisation, blocked drains, poor waste handling, and weak urban planning as the chief culprits in Nigerian cities. Alves et al. (2024) add that as roads, rooftops, and paved surfaces multiply, the ground absorbs less rainwater and runoff increases sharply, raising the odds of flooding whenever there is heavy rain.

2.4 Drainage Conditions and Urban Flooding

How well a drainage network functions matters enormously for managing urban floods. According to Alves et al. (2024), drains that are poorly designed, obstructed, or rarely maintained rank among the biggest physical contributors to urban flooding, and improving both capacity and upkeep can meaningfully cut flood risk.

2.5 Residents' Perceptions of Urban Flooding

There is growing recognition that residents themselves hold valuable knowledge about flood hazards. Odunuga, Oyebande, and Omojola (2012) found that residents understand which areas flood, why, and what socio-economic toll it takes, concluding that folding local perceptions into flood management makes mitigation efforts more effective.

Jakpor and Akpovwovwo (2026) reach a similar conclusion more recently, reporting that resident perceptions shed light on local flood characteristics, help shape mitigation practices, and encourage community involvement — all components of flood risk reduction that hold up over time.

2.6 Theoretical Framework

This study is built on the Pressure and Release (PAR) Model, first put forward by Blaikie and colleagues (1994). At its core, the model holds that a disaster is what happens when a natural hazard meets human vulnerability; the hazard on its own is not enough. Applied to urban flooding, this means heavy rainfall only becomes a disaster once it combines with conditions such as failing drainage, unplanned urban growth, careless waste disposal, and weak land-use control.

The PAR Model fits this study because it offers a lens for connecting Ebenezery Community's physical conditions — its drainage infrastructure and rate of urban growth — with the human choices and vulnerabilities that turn ordinary rainfall into flooding. It therefore usefully frames the study's assessment of flood frequency, causes, drainage conditions, and resident perceptions in Egbeda Local Government Area.

2.7 Empirical Review

Earlier studies converge on rapid urbanisation, weak drainage, poor waste management, and heavy rainfall as the leading causes of urban flooding. Nkwunonwo, Whitworth, and Baily (2020) found that ineffective drainage infrastructure and poor urban planning substantially raise flood risk in Nigerian cities, while Lucas (2024) reported that blocked drainage channels and unregulated development contribute to frequent flooding. Odunuga, Oyebande, and Omojola (2012) likewise stressed how much resident perceptions matter for understanding why floods occur and for designing mitigation strategies that work.

Even with this body of work, little empirical evidence exists specifically on Ebenezer Community in Egbeda Local Government Area. This study addresses that gap by examining flood frequency, causes, drainage conditions, and resident perceptions within the community.

2.8 Research Gap

While various parts of Nigeria have been studied for urban flooding, Ebenezer Community in Egbeda Local Government Area has received comparatively little dedicated research. Most existing work has centred on major cities and tends to focus narrowly on flood causes and impacts. Few studies bring flood frequency, drainage conditions, and resident perceptions together at the community scale, and this study fills that gap by offering a rounded assessment of urban flooding in Ebenezer Community that can inform more effective flood management and urban planning.

3 Methodology

3.1 Study Area

This study took place in Egbeda Local Government Area of Oyo State, Nigeria, one of the state's 33 local government areas, with its headquarters at Egbeda, Ibadan. The area was carved out of the former Lagelu Local Government Area in 1989, sits within Nigeria's rain-forest and derived savanna belts, and has a tropical sub-equatorial climate marked by clear wet and dry seasons. It covers roughly 191 km², carries a population density of about 1,470 persons per square kilometre, and is split into 11 political wards.

Ebenezer Community was purposively chosen for the study because it is among the areas most regularly hit by urban flooding. From there, 100 residents — 50 men and 50 women — were reached using simple random sampling.

Both primary and secondary sources fed into the data. A structured questionnaire administered to the selected respondents supplied the primary data, while relevant books, journal articles, government publications, and other scholarly materials supplied the secondary data. Descriptive statistics were then used to analyse everything collected, with frequency counts, percentages, mean scores, tables, and charts used to summarise and present findings against the study's objectives.

3.2 Data Collection

Primary data came from a structured questionnaire administered to the 100 selected residents of Ebenezer Community, covering flood frequency, causes of flooding, drainage conditions, and resident perceptions of urban flooding. Secondary data was drawn from relevant textbooks, journal articles, government publications, and other scholarly sources on urban flooding.

3.3 Data Analysis

Responses from participants were coded, entered, and examined using descriptive statistical methods, with frequency distributions and percentages used to summarise and interpret the data. Findings are presented in tables and charts to make the results easier to relate back to the research questions.

4 Results and Discussion

4.1 Socio-Demographic Characteristics of Respondents

Table 1 sets out the socio-demographic profile of respondents in Ebenezer Community. Men made up 54% of the sample and women 46%, a fairly even split that means both groups contributed views on flooding and drainage conditions in the study area.

On age, the 31–45 bracket was the largest at 42%, followed by those 46 and above (33%), with 18–30-year-olds making up the remaining 25%. This spread suggests a good share of respondents were adults likely to have built up real experience and knowledge of flooding and drainage conditions over time.

Occupationally, traders formed the largest group at 49%, followed by civil servants (20%) and other occupations (31%). With traders so dominant, flooding likely carries real consequences for commerce and household income, particularly where businesses and markets sit in flood-prone parts of the community.

On length of residence, half of respondents (50%) had lived in Ebenezer Community for more than 10 years, 30% for under 5 years, and 20% for 5–10 years. That so many are long-term residents means many respondents likely bring a solid, lived understanding of the area's flooding patterns and drainage conditions, which strengthens the value of their perceptions for this study.

Table 1: Socio-demographic characteristics of respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	54	54.0
	Female	46	46.0
Age Group	18–30	25	25.0
	31–45	42	42.0
	46 and above	33	33.0
Occupation	Civil servant	20	20.0
	Trader	49	49.0
	Others	31	31.0
Length of Residence	<5 years	30	30.0
	5–10 years	20	20.0
	>10 years	50	50.0

Source: Field Survey, 2026

4.2 Frequency of Flood Occurrence in Ebenezer

Table 2 sets out how often respondents say flooding occurs in the study area. A clear majority — 84% — reported flooding almost every year, while 8% said it happens occasionally and another 8% called it rare. Flooding is clearly a persistent problem here, and the dominance of annual flood reports points to a community highly prone to seasonal flooding, likely tied to weak drainage, fast urban growth, and heavier rainfall.

Source: Field Survey, 2026

Table 2: Frequency of flood occurrence

Response Category	Frequency (n)	Percentage (%)
Very frequent (yearly)	84	84.0
Occasional	8	8.0
Rare	8	8.0
Total	100	100

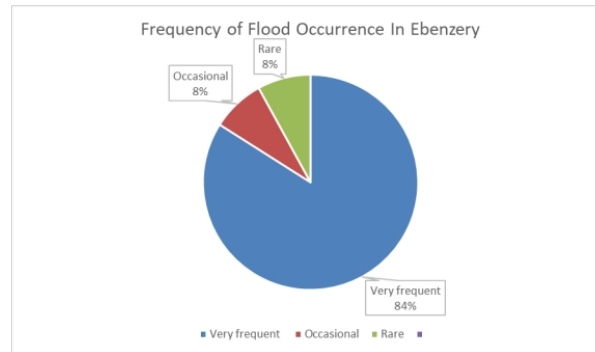


Figure 1: Pie Chart Showing Frequency of Flood Occurrence in Ebenezery

4.3 Condition of Drainage Systems in Ebenezery

Table 3 records how respondents rate the state of local drainage. Over half (55%) called it poor, 30% fair, and only 15% good — findings that point to widespread dissatisfaction with drainage infrastructure. Drains in this condition likely struggle to move stormwater efficiently, leading to water building up during heavy rain and pushing up flood risk.

Table 3: Condition of drainage systems

Drainage Condition	Frequency (n)	Percentage (%)
Good	15	15.0
Fair	30	30.0
Poor	55	55.0
Total	100	100

Source: Field Survey, 2026

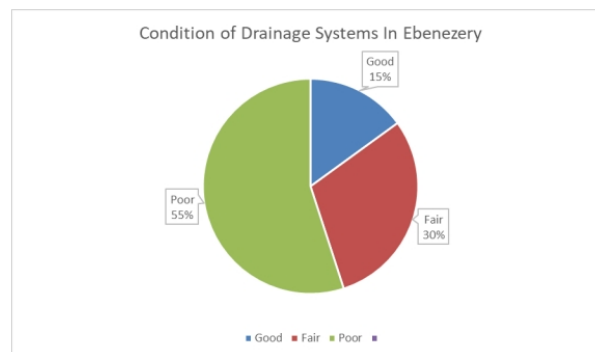


Figure 2: Pie Chart Showing Condition of Drainage Systems in Ebenezery

4.4 Causes of Drainage Failures in Ebenezer

Table 4 shows what respondents blame for drainage failure. Waste dumped into drains topped the list at 44%, followed by inadequate maintenance (33%), poor design or construction (26%), and rapid urbanisation (5%). Human behaviour, in other words, outweighs natural factors as a driver of drainage failure — improperly discarded solid waste blocks channels, cutting stormwater flow and raising flood risk whenever rain is heavy.

Table 4: Causes of drainage failures

Cause	Frequency (n)	Percentage (%)
Waste disposal in drains	44	44.0
Poor construction/design	26	26.0
Lack of maintenance	33	33.0
Urbanization	5	5.0
Total	100	100

Source: Field Survey, 2026

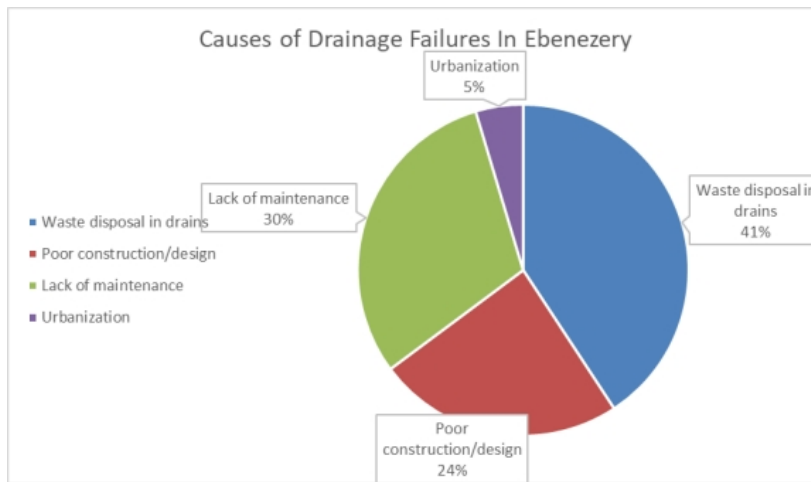


Figure 3: Pie Chart Showing Causes of Drainage Failures in Ebenezer

4.5 Impacts of Flooding on Residents

Table 5 lists how residents say flooding affects them. Disrupted movement was the dominant impact, cited by 80% of respondents, followed by house damage (11%), road damage (6%), and health problems (3%). Flooding, then, carries wide-ranging social, economic, and physical costs — hampering daily activity, transport, and access to services, straining household finances through property damage, and exposing residents to contaminated floodwater that can bring on health issues.

Table 5: Impacts of flooding on residents

Impact	Frequency (n)	Percentage (%)
Damage to houses	11	11.0
Road damage	6	6.0
Health issues	3	3.0
Disruption of movement	80	80.0
Total	100	100

Source: Field Survey, 2026

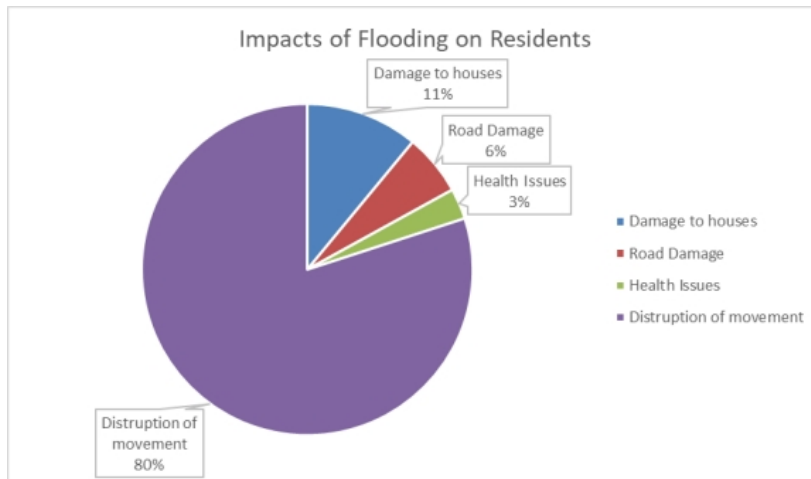


Figure 4: Pie Chart Showing Impacts of Flooding on Residents in Ebenezer

4.6 Residents' Perception of Main Cause of Flooding

Table 6 captures what residents see as the main driver of flooding. Heavy rainfall led by a wide margin at 70%, with waste disposal in drainage channels (11%), poor drainage systems (19%), and poor urban planning (10%) trailing behind. Residents clearly see rainfall as the immediate trigger, though weak drainage, careless waste disposal, and inadequate planning are also seen as real contributing factors underlining the need for better drainage infrastructure, regular channel maintenance, effective waste management, and sound urban planning to bring down both how often flooding happens and how severe it is.

Table 6: Residents' perception of the main cause of flooding

Perceived Cause	Frequency (n)	Percentage (%)
Poor drainage	19	19.0
Heavy rainfall	70	70.0
Waste disposal	11	11.0
Poor planning	10	10.0
Total	100	100

Source: Field Survey, 2026

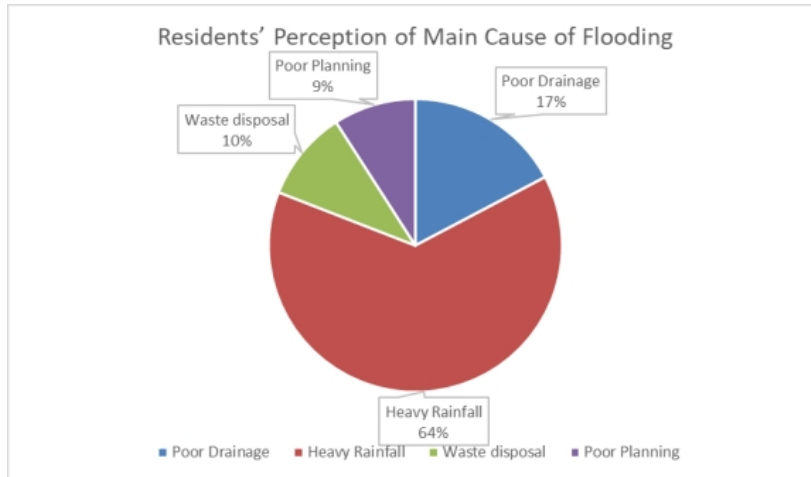


Figure 5: Pie Chart Showing Residents' Perception of the Main Cause of Flooding in Ebenezer

5 Conclusion

This study set out to examine urban flooding in Ebenezer Community, Egbeda Local Government Area, Oyo State, Nigeria, focusing on how often it happens, the state of local drainage, what causes drainage to fail, the impact on residents, and how residents themselves perceive the main causes of flooding. Flooding proved to be a near-annual occurrence for most respondents, and the drainage system was found to be largely in poor shape, limiting its ability to handle stormwater during heavy rain.

Waste dumped into drainage channels, weak maintenance, poor drainage design, and rapid urbanisation emerged as the leading causes of drainage failure. Residents pointed to heavy rainfall as the main trigger of flooding, while also recognising poor drainage, improper waste disposal, and weak planning as significant contributing factors. Flooding was also found to carry real social, economic, and physical costs for residents chiefly through disrupted movement, but also property and road damage and health-related problems.

Taken together, the findings suggest that flooding in Ebenezer Community stems from intense rainfall meeting a drainage system and urban environment that are not equipped to handle it. Tackling these issues will require better-built and better-maintained drainage, stronger solid-waste management, and more sustainable urban planning — all of which can help lower flood risk and make the community more resilient to future flood events.

6 Recommendations

Based on the findings of this study, the following recommendations are proposed:

- Government and relevant agencies should construct, rehabilitate, and expand drainage systems in flood-prone parts of Ebenezer Community to improve stormwater discharge during periods of heavy rainfall.
- Drainage channels should be regularly inspected, desilted, and maintained to prevent blockages and keep stormwater flowing efficiently.
- Public awareness campaigns should be stepped up to discourage indiscriminate waste disposal into drains, and residents should be educated on proper waste management practices to reduce drainage obstruction.

- Local authorities should strengthen environmental sanitation programmes and more firmly enforce existing regulations against illegal waste disposal, backed by regular monitoring and appropriate sanctions.
- Urban planning and building regulations should be strictly enforced to stop construction on natural drainage channels and in flood-prone areas, reducing flood vulnerability.
- Flood-control infrastructure — retention ponds, improved road drainage, and similar measures — should be built into future community development projects.
- Community participation should be encouraged through environmental sanitation committees that work alongside local authorities to maintain drainage systems and promote flood risk reduction.
- Further research should apply geospatial tools such as GIS and remote sensing to map flood-prone areas and support evidence-based flood management and planning decisions.

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