



THE EFFECT OF FLOOD ON THE SOCIO-ECONOMIC ACTIVITIES ON RESIDENT OF ASABA, DELTA STATE

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ABSTRACT

Flooding has become a recurrent environmental and urban planning challenge in Asaba, Delta State, Nigeria, with significant implications for socio-economic activities and urban sustainability. This study examined the effects of flooding on socio-economic activities in Asaba with particular emphasis on drainage deficiencies, blocked waterways, weak planning enforcement, and floodplain encroachment. A mixed-method research design was adopted using questionnaires, interviews, and field observations. A total of 400 questionnaires were distributed across flood-prone communities, while 372 valid responses were retrieved and analyzed using descriptive statistics and thematic analysis. Findings revealed that 84.1% of respondents experienced flooding annually, while 85.5% identified inadequate drainage infrastructure as the major cause of flooding. Other significant drivers included blocked drainage channels (80.9%), uncontrolled urban development (72.3%), and floodplain encroachment (68.3%). The study further showed that flooding severely disrupts transportation (88.2%), damages residential properties (84.4%), reduces business income (79.6%), affects agricultural production (69.3%), and contributes to temporary displacement and school disruption. Spatial evidence indicated that riverbank and low-lying communities were the most vulnerable due to poor drainage connectivity and weak development control. The study concludes that flooding in Asaba is not only a climatic issue but also a consequence of inadequate urban planning and infrastructure management. The study recommends prioritizing drainage rehabilitation, strengthening waste management systems, enforcing floodplain-sensitive development regulations, improving early warning compliance, and enhancing institutional coordination for effective urban flood risk management and sustainable urban resilience in Asaba.

Keywords: Flooding, Urban Planning, Socio-Economic Activities, Drainage Infrastructure, Flood Risk Management, Urban Resilience, Disaster Risk Reduction, Asaba, Floodplain Encroachment, Nigeria.

INTRODUCTION

Flooding has become one of the most devastating environmental challenges associated with climate variability and rapid urbanization across the globe. Although floods are natural hydrological events, their frequency, intensity, and destructive impacts have increased significantly in many developing countries due to poor urban planning, uncontrolled land-use changes, inadequate drainage infrastructure, and weak environmental governance (Acheampong, 2019; World Bank, 2021). In many flood-prone urban centres, human settlements and economic activities continue to expand into vulnerable flood plains because of population growth, housing pressure, and economic opportunities associated with riverine environments.

In Nigeria, flooding represents the most recurrent and widespread natural disaster, affecting lives, infrastructure, agriculture, transportation, housing, and urban livelihoods. Several studies have linked the increasing severity of flooding in Nigerian cities to rapid urban expansion, poor drainage systems, blocked waterways, weak development control, and ineffective implementation of physical planning regulations (Cirella & Iyalomhe, 2018; Okoye, 2019; Nkwunonwo, Whitworth, & Baily, 2016). Researchers have argued that urban flooding in Nigeria is no longer driven solely by heavy rainfall and climate change, but increasingly by anthropogenic factors including indiscriminate waste disposal, unregulated construction, and settlement encroachment on natural drainage channels (Oriola, 2013; Olanrewaju et al., 2019).

Despite extensive studies on flooding in Nigeria, much of the existing literature focuses broadly on environmental impacts and disaster occurrence at national or regional scales, with

limited attention to how recurring urban floods specifically disrupt socio-economic activities within rapidly growing medium-sized cities such as Asaba. Furthermore, previous studies have often treated socio-economic impacts in general terms without adequately examining how flooding affects livelihood systems, transportation networks, commercial activities, residential stability, education, and informal economic survival within local urban contexts. This creates an important research gap, particularly in Asaba where annual flooding has become both an environmental and urban planning concern.

Asaba, the capital of Delta State, Nigeria, has experienced rapid physical expansion over the past two decades due to increasing population growth, urban migration, and commercial development. However, this urban growth has not been matched with adequate physical planning and drainage infrastructure. Many residential neighbourhoods and commercial areas have emerged without proper storm-water management systems, while natural drainage channels and wetlands have increasingly been encroached upon by buildings and road construction. The absence of an effective and comprehensive urban master plan, combined with poor enforcement of planning regulations, has intensified the city's vulnerability to annual flooding.

The flooding events recorded between 2012 and 2025 demonstrate the growing severity of flood disasters in Asaba and other parts of Nigeria. The 2012 flood marked a major turning point in the country's flood history, while the 2022 flood was regarded as one of the most destructive in recent decades due to its extensive damage to lives, property, and livelihoods (Reuters, 2012; Eleke, 2022). In Asaba, particularly within Oshimili South Local Government Area, recurrent floods have displaced residents, destroyed homes

and businesses, disrupted transportation systems, damaged roads and drainage facilities, and affected agricultural production and food supply. Communities located close to the River Niger have remained especially vulnerable because of their proximity to flood plains and poorly managed urban expansion.

The socio-economic consequences of flooding in Asaba extend beyond physical destruction. Flood incidents frequently interrupt commercial transactions, reduce household income, damage residential and commercial properties, increase transportation costs, and disrupt educational, religious, and social activities. Farmers experience severe losses through the destruction of crops such as yam and cassava, while traders and small business owners often suffer income reduction due to restricted movement and declining customer access during flood periods. Educational activities are also affected when schools become inaccessible or are temporarily converted into emergency shelters. These disruptions collectively weaken urban productivity and increase the vulnerability of already economically fragile households.

Although flooding is partly associated with climatic factors such as intense rainfall and river overflow, evidence from Nigerian urban studies suggests that poor urban planning and inadequate infrastructure significantly worsen flood impacts. Impermeable urban surfaces, blocked drainage systems, indiscriminate refuse disposal, and uncontrolled development patterns increase surface runoff and reduce the city's natural capacity to absorb excess water (Aderogba, 2012; Adelekan, 2016). In Asaba, these planning deficiencies have transformed seasonal rainfall events into recurring urban disasters with serious socio-economic implications.

Against this background, this study examines the effects of flooding on socio-economic activities in Asaba with particular attention to how inadequate urban planning, drainage deficiencies, and uncontrolled settlement expansion contribute to the recurring flood problem. The study specifically focuses on the ways flooding affects livelihoods, transportation, commerce, housing, education, and other socio-economic activities within Oshimili South Local Government Area. By providing localized evidence from Asaba, the study contributes to the growing discourse on urban flood vulnerability, disaster risk reduction, and sustainable urban planning in Nigerian cities.

MATERIALS AND METHODS

Research Design

This study adopted a mixed-method research design combining quantitative and qualitative approaches to examine the effects of flooding on socio-economic activities in Asaba, Delta State. The mixed-method approach was considered appropriate because it enabled the collection of both numerical and explanatory data regarding the extent, nature, and socio-economic implications of flooding within the study area. The quantitative component relied on structured questionnaires administered to residents, while the qualitative component involved key informant interviews with community leaders, urban planning officials, and affected residents.

Study Area

The study was conducted in Asaba, located in Oshimili South Local Government Area of Delta State, Nigeria. Asaba lies along the western bank of the River Niger and has experienced recurrent flooding due to its low-lying topography, rapid urban expansion, inadequate drainage systems, and increasing encroachment into flood-prone areas.

Communities situated close to the River Niger and poorly drained neighbourhoods were particularly vulnerable to seasonal flooding events.

Population of the Study

The target population comprised households, traders, transport operators, farmers, property owners, and other residents living within flood-prone communities in Asaba. Particular attention was given to neighbourhoods with a history of recurrent flooding between 2012 and 2025.

Sampling Technique and Sample Size

A stratified sampling technique was adopted to ensure adequate representation of residents across different flood-risk zones. The study area was stratified based on proximity to the River Niger, elevation characteristics, and severity of previous flood exposure. Communities were categorized into high-risk, moderate-risk, and low-risk flood zones.

Thereafter, purposive sampling was used to select flood-prone communities that had experienced repeated flood incidents. Within the selected communities, systematic random sampling was used to administer questionnaires to household heads and business operators.

A total of 400 questionnaires were distributed across the selected communities, while 372 valid questionnaires were retrieved and used for analysis, representing a response rate of 93%. In addition, 15 key informant interviews were conducted with officials from the town planning authority, environmental agencies, community leaders, and affected residents.

Sources of Data

Both primary and secondary data were used for the study. Primary data were obtained through questionnaire administration, field observations, and interviews. Secondary data were sourced from journal articles, government reports, flood disaster reports, planning documents, textbooks, and previous studies relating to flooding and urban planning in Nigeria.

Research Instrument

The principal instrument for data collection was a structured questionnaire divided into five sections:

- i. Section A: Socio-demographic characteristics of respondents
- ii. Section B: Nature and frequency of flood occurrence
- iii. Section C: Effects of flooding on socio-economic activities
- iv. Section D: Urban planning and drainage conditions
- v. Section E: Residents' coping and adaptation strategies

The questionnaire consisted of both closed-ended and Likert-scale questions designed to measure residents' experiences and perceptions regarding flood impacts.

The qualitative interview guide focused on planning failures, drainage infrastructure, flood management practices, and recurring socio-economic disruptions caused by flooding.

Measurement of Variables

The dependent variable of the study was the effect of flooding on socio-economic activities. Socio-economic activities were operationalized to include livelihood activities, transportation, housing, commerce, education, agriculture, and social interactions.

Flood effects were measured using the following indicators:

- i. Income loss measured as estimated percentage reduction in monthly household earnings during flood periods.
- ii. Property damage measured by estimated financial loss incurred on residential and commercial buildings.
- iii. Transportation disruption measured by increased travel time and road inaccessibility during flooding.
- iv. Educational disruption measured by number of school closure days and student absenteeism.
- v. Agricultural loss measured through estimated crop destruction and reduction in farm output.
- vi. Residential displacement measured by frequency and duration of temporary relocation during flood events.
- vii. Rental value effects measured through changes in housing demand and rental prices in flood-prone areas.

Responses were measured using frequency scales, percentages, and Likert-scale ratings ranging from "Very Low Effect" to "Very High Effect."

Validity and Reliability of Instrument

To ensure content validity, the questionnaire was reviewed by experts in urban and regional planning, environmental management, and research methodology. Their observations and corrections were incorporated into the final version of the instrument.

A pilot study was conducted using 30 respondents from a nearby flood-prone community outside the main study area. The reliability of the instrument was tested using Cronbach's Alpha reliability coefficient. The overall reliability coefficient obtained was 0.81, indicating that the instrument was reliable for data collection.

Method of Data Collection

Questionnaires were administered directly to respondents with the assistance of trained research assistants familiar with the local communities. Interviews were conducted face-to-face and audio-recorded with participants' consent. Field observations were also carried out to document drainage conditions, blocked waterways, flood channels, and vulnerable settlement patterns.

Ethical Considerations

Ethical approval for the study was obtained from the relevant departmental research committee. Respondents were informed about the purpose of the study, and participation was entirely voluntary. Verbal informed consent was obtained before questionnaire administration and interviews. Respondents were assured of confidentiality and anonymity, and all information provided was used strictly for academic purposes.

Method of Data Analysis

Quantitative data obtained from questionnaires were coded and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics such as frequencies, percentages, mean scores, and standard deviations were used to analyze respondents' socio-economic characteristics and perceived flood impacts.

Inferential statistical techniques, including regression analysis, were employed to examine the relationship between flooding and socio-economic activities in the study area. The regression analysis helped determine the extent to which

variables such as drainage condition, settlement location, and flood frequency influenced socio-economic disruptions.

Qualitative interview data were analyzed using thematic content analysis. Responses from participants were transcribed, coded into thematic categories, and interpreted to complement the quantitative findings.

RESULTS AND DISCUSSION

Overview of Respondents and Flood Exposure

Out of the 400 questionnaires distributed across flood-prone communities in Asaba, 372 valid responses were retrieved and analyzed, representing a response rate of 93%. The socio-economic profile of respondents indicates that flooding affects multiple livelihood groups within the city. Traders constituted 31.2% of respondents, civil servants 18.5%, transport operators 14.8%, farmers 12.4%, artisans 10.5%, while other informal sector workers accounted for 12.6%. Findings further revealed that 84.1% of respondents had experienced flooding at least once annually between 2012 and 2025, while 63.7% reported repeated property damage during major flood events. The recurrent nature of flooding suggests that flood risk has become a normalized urban challenge in Asaba rather than an occasional environmental event.

Spatial Distribution of Flood Vulnerability in Asaba

The spatial pattern of flooding revealed that vulnerability is unevenly distributed across neighbourhoods. Communities located close to the River Niger, low-lying areas, and densely built neighbourhoods with inadequate drainage infrastructure recorded the highest levels of exposure.

Major Drivers of Flooding in Asaba

Respondents were asked to rank the major causes of flooding within the study area. Results showed that infrastructural and planning-related factors were perceived as more significant than purely climatic causes.

Effects of Flooding on Socio-Economic Activities

The study examined the effects of flooding on major socio-economic activities including transportation, housing, business activities, education, agriculture, and household income.

The findings demonstrate that transportation systems experienced the highest level of disruption during flood events. Roads became inaccessible, public transport costs increased, and movement of goods and services was restricted.

Housing Vulnerability and Residential Displacement

Housing vulnerability emerged as a major flood impact within the study area. About 71.5% of respondents indicated that floodwater entered their homes during major rainfall events, while 39.3% reported structural damage to residential buildings.

Urban Planning, Resilience, and Disaster Risk Reduction

The study found that weak urban planning practices significantly increase flood vulnerability in Asaba. Approximately 76.1% of respondents believed that poor development control and weak enforcement of planning regulations contributed to recurring flood problems.

Discussion of Findings

The study demonstrates that flooding in Asaba is both a physical environmental hazard and a governance challenge linked to rapid urbanization and weak planning systems.

Table 1: Neighbourhood-Level Flood Vulnerability in Asaba

Neighbourhood Category	Flood Frequency	Drainage Condition	Vulnerability Level
Riverbank communities	Very High	Poor	Very High
Low-lying residential areas	High	Poor	High
Densely built informal settlements	High	Moderate/Poor	High
Planned residential layouts	Moderate	Good	Low

Table 2: Ranking of Major Flood Drivers

Flood Driver	Frequency	Percentage(%)	Mean Score	Rank
Inadequate drainage infrastructure	318	85.5	4.62	1st
Blocked drainage channels	301	80.9	4.48	2nd
Heavy rainfall	287	77.2	4.31	3rd
Uncontrolled urban development	269	72.3	4.19	4th
Encroachment on flood plains	254	68.3	4.10	5th
River Niger overflow	221	59.4	3.74	6th

Table 3: Severity of Flood Impacts on Socio-Economic Activities

Impact Category	Percentage Affected (%)	Mean Severity Score	Rank
Transportation disruption	88.2	4.71	1st
Residential property damage	84.4	4.58	2nd
Business income loss	79.6	4.39	3rd
Food price increase	73.5	4.21	4th
Agricultural losses	69.3	4.05	5th
School disruption	62.7	3.88	6th
Residential displacement	58.4	3.75	7 th

CONCLUSION

The study revealed that flooding in Asaba is no longer an isolated environmental occurrence but a recurring urban management challenge closely associated with poor drainage infrastructure, blocked waterways, weak planning enforcement, and uncontrolled development within flood-prone areas. Findings from the study showed that inadequate drainage systems and indiscriminate waste disposal were the most significant drivers of flooding, while floodplain encroachment and weak urban planning regulations further intensified residents' vulnerability.

The results further demonstrated that flooding has severe socio-economic consequences for residents of Asaba. Major impacts identified include disruption of transportation and mobility, destruction of residential and commercial properties, loss of business income, agricultural damage, rising food prices, temporary displacement of households, and interruptions to educational and health-related activities. The study also revealed that low-income households and residents of riverbank and low-lying communities experience the greatest level of vulnerability because of limited adaptive capacity and poor infrastructural conditions.

The findings therefore suggest that flooding in Asaba is not only a climate-related issue but also a product of inadequate urban governance, poor environmental management, and weak institutional coordination. Unless integrated flood risk management strategies are implemented, the frequency and severity of socio-economic disruptions associated with flooding may continue to increase with ongoing urban expansion.

RECOMMENDATIONS

Based on the findings of the study, the following recommendations are prioritized:

Rehabilitation and Expansion of Urban Drainage Infrastructure

The Delta State Government and relevant urban development agencies should prioritize the rehabilitation, expansion, and regular maintenance of drainage systems across flood-prone areas in Asaba. Existing drainage channels should be widened and properly connected to natural waterways to improve storm-water discharge during heavy rainfall events.

Strengthening Waste Management and Drainage Protection

Indiscriminate disposal of solid waste into drainage channels should be strictly controlled through improved waste collection systems, environmental sanitation enforcement, and public awareness campaigns. Drainage channels and natural waterways should be routinely cleared to prevent blockage and overflow during the rainy season.

Enforcement of Floodplain-Sensitive Development Regulations

Physical planning authorities should strengthen development control measures to prevent further encroachment into wetlands, flood plains, and natural drainage corridors. Construction approvals should strictly comply with environmental impact and flood-risk assessments before building permits are issued.

Integrated Urban Flood Risk Planning

Flood risk management should be fully integrated into urban planning and land-use policies in Asaba. This includes the

preparation and implementation of a comprehensive urban master plan that incorporates flood vulnerability mapping, drainage planning, and climate-resilient infrastructure development.

Improvement of Early Warning Systems and Community Preparedness

Government agencies and emergency management institutions should improve flood early warning dissemination and encourage compliance with evacuation directives during severe flood events. Community-based awareness programmes should also be strengthened to improve residents' preparedness and adaptive capacity.

Institutional Coordination and Flood Governance

There is a need for stronger institutional coordination among urban planning authorities, environmental agencies, emergency management bodies, and local government institutions. Effective collaboration among these agencies will improve flood monitoring, infrastructure maintenance, disaster response, and long-term resilience planning.

Promotion of Climate-Resilient Urban Development

Future urban development projects in Asaba should incorporate climate-resilient infrastructure such as sustainable drainage systems, retention basins, permeable surfaces, and green buffer zones to reduce runoff and improve urban flood adaptation capacity.

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