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The Impact of ITA-Wogba Creek's Flooding on the Socio-Economic Activities of Port Harcourt, Rivers State, Nigeria.

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ABSTRACT

Flood is one of the recurrent environmental problems that has affected urban communities in Port Harcourt, Rivers State, Nigeria. This study focused on the effect of flood in the Ita-Wogba Creek area on the socio-economic activities of people living in selected flood-prone communities in Port Harcourt Metropolis. This study was done to identify the causes of floods, examine the socio-economic effects of floods, find out the coping measures employed by people, and investigate the relationship between the occurrence of floods and socio-economic losses. The research adopted a descriptive survey design in conducting this study. Data was collected from 400 respondents using a multi-stage sampling method from four communities around the Ita-Wogba Creek area. The findings revealed that improper disposal of solid waste, inadequate drainage systems, poor urban planning, and rapid urbanisation are the major causes of flooding in the study area. Flooding was found to negatively affect livelihoods, damage residential and commercial properties, increase health risks, disrupt educational activities, and impose financial burdens on households. Temporary evacuation, construction of makeshift barriers, and elevation of household belongings were identified as the most common coping strategies adopted by residents. The study further established that flooding contributes to the prevalence of waterborne and vector-borne diseases, including cholera, typhoid fever, and malaria. Correlation analysis revealed a strong positive and significant relationship between flooding frequency and socio-economic losses ($r = .881$, $p < .001$), indicating that increased flood occurrence leads to greater socio-economic damage. The study concludes that flooding around Ita-Wogba Creek is largely driven by human-induced factors and poses significant socio-economic and public health challenges. It recommends improved drainage infrastructure, effective waste management, sustainable urban planning, and strengthened community-based flood management strategies.

Keywords: Flooding, Community Resilience, Socio-Economic Impacts, Coping Strategies, Health Risks, Urban Planning, Disaster Management, Environmental Health

INTRODUCTION

The rise in natural disasters has resulted in many forms of consequences, which include the destruction of properties, loss of lives, and damage to the environment. Especially in underdeveloped countries, this situation has exacerbated poverty levels and made people vulnerable to health conditions (Coates et al., 2021; Adeyeye et al., 2021; Mazel-Cabasse, 2019; Living with Risk, 2016). Among these types of disasters, floods have proven to be among the costliest disasters in terms of finances, both in Nigeria and internationally. Urbanisation and changing climates have been among the factors that have raised the risk levels of flooding, especially in regions like Nigeria (Richard & Okeke, 2023). With the increasing incidence of flooding events caused by various factors such as coastal surges, flooding of rivers, and rainfall, people all across Nigeria have been adversely affected (Viero et al., 2019; Li-An et al., 2018). In particular, urban areas suffer immensely due to poor planning and waste disposal, and Port Harcourt is no exception. This city, located on the low-lying coast, represents one of many cities in Nigeria prone to flooding. With an inherent susceptibility to flooding and the presence of poor

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infrastructure, it becomes vital to appreciate the perceptions of residents regarding flood hazards (Emeka et al., 2021). It is important for an assessment of preparedness among the community about floods to have knowledge of the community's perception regarding floods. This knowledge is important in helping devise a strategy that will effectively manage the issue of floods and increase government intervention (Yin et al., 2021; Howarth, 2017). It is also possible for the incorporation of the knowledge to make it possible for the formulation of communication and mitigation measures.

As far as the repeated occurrences of climatic hazards are concerned, it is through social welfare programs that the vulnerability of individuals can be mitigated and immediate humanitarian help can be provided (Kundo et al., 2022). In addition to providing essential support services, these welfare initiatives serve as a means through which aid can be distributed during emergencies, thus complementing the ongoing efforts. Several studies have been carried out on the problem of urban flooding in Port Harcourt and other cities in Nigeria (Echendu, 2021; Richard & Okeke, 2023). However, most of the studies have only centred their attention on the general causes of floods, climate change, and urban planning issues. There is a lack of empirical evidence on the flooding of Ita-Wogba Creek and the impacts that come from the combined socio-economic and health consequences of Ita-Wogba Creek flooding. Besides, there are no available studies that have concurrently looked into residents' perceptions and adaptation to the same problem at the local level.

Aim and Objectives

The study aims to bring to the fore the impact of Itawogba Creek's flooding on the economic activities of Port Harcourt. The study objectives are to:

1. Examine the causes of flooding in the study area
2. Examine the socio-economic impact of flooding on the people
3. Identify the applied coping mechanisms of the people during flooding
4. Examine the people's health impact of flooding.

Hypothesis

H_0: There is no statistically significant relationship between flooding frequency and socio-economic losses in the study area

CONCEPTUAL REVIEW

Causes of Flooding

Floods involve the inundation of areas normally above the water level, causing environmental, social, and economic challenges. Urban floods result from a variety of natural and human-caused reasons. Some of the leading reasons for flooding in Nigerian cities, according to Echendu (2023), include heavy rainfall, climate variability, poor drainage systems, blocked waterways, rapid urbanisation, and irresponsible waste disposal. Flooding in Port Harcourt occurs due to a variety of reasons, including the occupation of natural waterways, lack of proper stormwater management structures, and the blocking of Ita-Wogba Creek through the deposition of debris. The presence of these challenges makes it difficult for the waterway to store runoffs during times of heavy rainfall.

Socio-Economic Impact of Flooding

Socio-economic effects of floods can be described as the effects that occur as a result of floods on the livelihoods, assets, economic activity, incomes, and the overall welfare of the individuals affected by such floods. Flooding results in the demolition of residential property, cessation of economic activities, evacuation of the individuals affected by the floods, losses in income, and damage to infrastructure, among others. As De Brito et al. (2024) argue, the recurring flooding results in economic losses, decreased productivity, and poverty among the individuals residing in the affected areas. In the city of Port Harcourt, flooding of the Ita-Wogba Creek has led to economic activities being hindered.

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Coping Mechanisms Adopted During Flooding

The coping measures are the approaches taken by people in an effort to minimise the consequences of flooding and increase their resilience. The coping measures could either be structural or non-structural. Structural coping measures include embankments, construction of high-level foundations, creation of drainage paths, and creation of barriers, while non-structural coping measures include temporary evacuation, community-based early warning systems, environmental sanitation, and campaigns against flooding. As per John (2025), people living in flood-prone areas depend on adaptation approaches such as raising their belongings, creating pathways, and evacuating in times of heavy floods.

Health Impact of Flooding

Health effects of floods involve the health-related effects resulting from the flooding disaster on the affected populations. The floodwaters tend to pollute sources of water for drinking, cause transmission of diseases that thrive in such conditions, and provide breeding grounds for disease-causing vectors. As highlighted by Suhr & Steinert (2022), flooding has been known to result in incidences of cholera, typhoid fever, malaria, diarrhoea, and skin infections. Flooding disasters can also cause stress, anxiety, and trauma to the victims. Flooding in the Ita-Wogba Creek region has resulted in poor sanitation levels and increased susceptibility to infectious diseases.

Conceptual Model

The study is based on a conceptual framework that demonstrates the association among causes of floods, flooding itself and socio-economic outcomes in Port Harcourt. Causes of floods, such as heavy rains, inadequate drainage systems, blocked drainage pathways, dumping of waste, and urbanisation, form the independent variables. They lead to the occurrence of floods, which then affect socio-economic activities through destruction of properties, disruption of business operations, displacement of people, economic loss and negative health implications. How the locals cope with floods is considered a moderating variable, helping in minimising the negative impacts of floods.

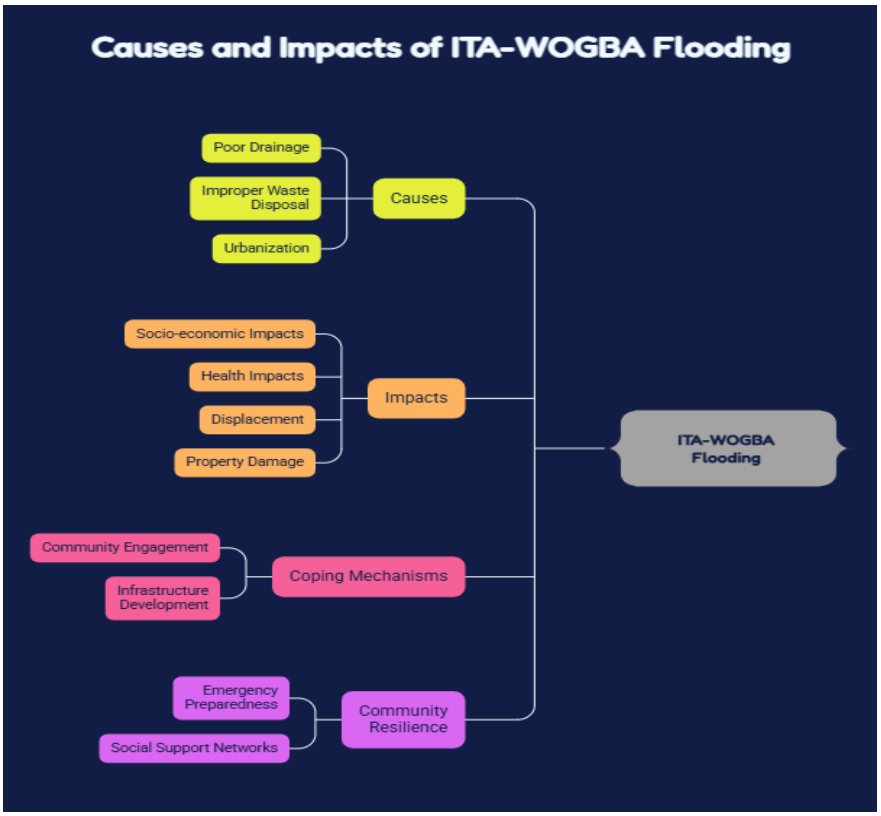

Figure 1: Causes and impacts of Ita Wogba Flooding.

Source: Author's conceptualisation (2026).

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Theoretical Framework

Vulnerability Theory

According to Vulnerability Theory, which was proposed by Blaikie et al. (1994), it can be said that social, economic, and environmental conditions determine how vulnerable an individual and a community are towards natural hazards like floods. According to the theory, disasters happen not only due to physical hazards but also because people do not have resilience against them. This theory is useful for our current discussion in the sense that it can help us understand why people and businesses surrounding the Ita-Wogba Creek face different impacts of floods according to their level of exposure.

The Study Area

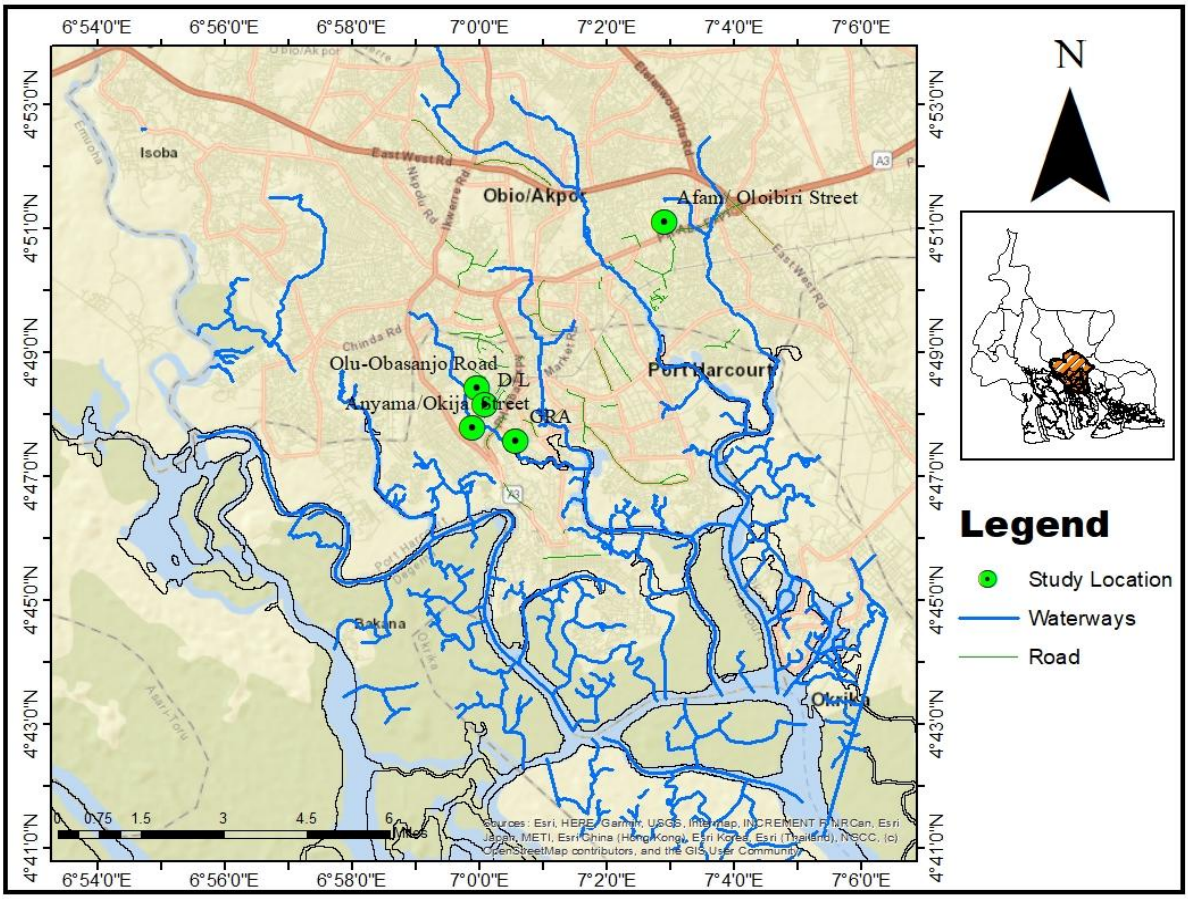

Figure 2. Port Harcourt Metropolis the study area

Port Harcourt Metropolis is located in the Niger Delta region of southern Nigeria, approximately between latitude 4.71°N and longitude 7.06°E (see Figure 2). The city serves as the administrative capital of Rivers State and is bounded by neighbouring Local Government Areas, including Obio/Akpor, Eleme, and Oyigbo. Situated along the Bonny River, which provides access to the Gulf of Guinea and the Atlantic Ocean, Port Harcourt occupies a strategic geographical position that supports extensive economic and maritime activities within the region. The metropolis was selected for this study due to its economic significance and its role as one of Nigeria's leading commercial and industrial centres. Port Harcourt is widely recognised as the hub of the country's oil and gas industry, hosting numerous activities related to petroleum exploration, production, refining, and distribution. The city also serves as an important centre for trade and commerce, with vibrant markets, business districts, and financial institutions that contribute significantly to regional and national economic development. In addition, manufacturing activities such as food processing, beverage production, pharmaceutical manufacturing, and construction material production further strengthen the city's industrial base. The transportation network of Port Harcourt enhances its strategic importance. As a major port city, it is connected to other parts of Nigeria through an extensive road network, railway facilities, and maritime transport infrastructure. These transportation linkages

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facilitate the movement of goods, services, and people, thereby promoting economic growth and regional integration. The city also hosts several higher educational institutions, research centres, and professional training facilities, which contribute to human capital development and innovation.

The physical environment of Port Harcourt is characterised by low-lying coastal plains, creeks, mangrove swamps, and river channels typical of the Niger Delta region. The area experiences a humid tropical climate with high annual rainfall and temperatures throughout the year. These environmental conditions support economic activities but also expose the city to challenges such as flooding, environmental degradation, and infrastructure stress. Furthermore, the hospitality and tourism sectors, including hotels, restaurants, recreational parks, and cultural attractions, contribute to the socio-economic importance of the metropolis. Collectively, these features make Port Harcourt a prominent urban centre and an ideal location for studies relating to economic development, environmental management, and urban sustainability.

METHODOLOGY

Research Design

The study employed a descriptive survey method to evaluate the effect of Ita-Wogba Creek floods on the socio-economic activities of the people living in some selected flood-prone areas within Port Harcourt City, Rivers State, Nigeria. This type of methodology was deemed suitable since it allowed the researchers to gather information directly from the people concerning the effect of floods on their socio-economic activities.

Population

This study population was chosen from among the communities around Ita-Wogba Creek in Port Harcourt, Rivers State. The total population of Port Harcourt is 2,188,930, which was projected from the 2006 National Population Census with a growth rate of 2.6% per annum from 2006 to 2025 (National Population Commission, 2006). This population included the adult members of households in four flood-vulnerable communities, namely Afam/Oloibiri Street, GRA Phase II, Anyama/Okija Street, and Olu-Obasanjo Road. According to local government records, the total population was 159,627 (Port Harcourt Local Government Area Records, 2025).

Sample / Sampling Technique

A sample size of 400 respondents was determined using the Taro Yamane formula at a 5% margin of error:

$$n = \frac{N}{\left(1 + N\left(e^2\right)\right)}$$

Where:

n-signifies the sample size

N-signifies the population under study

e-signifies the margin error = 0.05

$$\mathrm{n} = \frac{159{,}627}{\left(1 + 159{,}627\ \ (0.0025)\right)}$$

$$\mathrm{n} = \frac{159{,}627}{399.07} \approx 399.89 = 400$$

For the purpose of enhancing representation and ensuring equal allocation among the chosen study locations, the sample size was increased to 400 individuals. This implies that 100 respondents each were randomly selected from the four locations, which are Afam/Oloibiri Street, GRA Phase II, Anyama/Okija Street, and Olu-Obasanjo

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Road. A multi-stage sampling method was adopted. The first stage involved the selection of the four communities due to their proximity to the Ita-Wogba Creek and experience of frequent floods in the past. The second stage entailed the enumeration of residences. The third stage entailed the selection of households using a systematic random sampling method.

Instruments

Primary data collection involved the use of an instrument that comprised a structured questionnaire. It was constructed on a scale of four points, where participants chose between Strongly Agree (4) and Strongly Disagree (1). It helped in measuring the extent to which flooding takes place and the socio-economic effects of such occurrences. Field observation was also performed to help in the interpretation of the answers provided. Secondary data, on the other hand, was gathered from textbooks, journals, government publications, and documents dealing with the issue of flooding and environmental management. Data regarding rainfalls, floods, drainage systems and health were obtained from the Nigerian Meteorological Agency (NiMet), Rivers State Emergency Management Agency (RSEMA) and some health facilities in Port Harcourt. Instrument reliability was determined through a face and content validity test performed by three experts in Geography and Environmental Management from the University of Port Harcourt. Cronbach's Alpha gave an alpha value of 0.83.

Method of Data Analysis

Data were analysed by using descriptive analysis such as mean, standard deviation, frequency, and percentage in order to provide answers to the research questions and to present the respondents' opinions. The hypothesis suggesting that there is no statistically significant association between frequency of flooding and socio-economic impact was tested through the use of Pearson Product-Moment Correlation (PPMC) at the significance level of 0.05. The null hypothesis was rejected whenever the p-value < 0.05 and was accepted whenever the p-value > 0.05. All data were coded and analysed through SPSS.

RESULTS

Socio-economic characteristics of the respondents

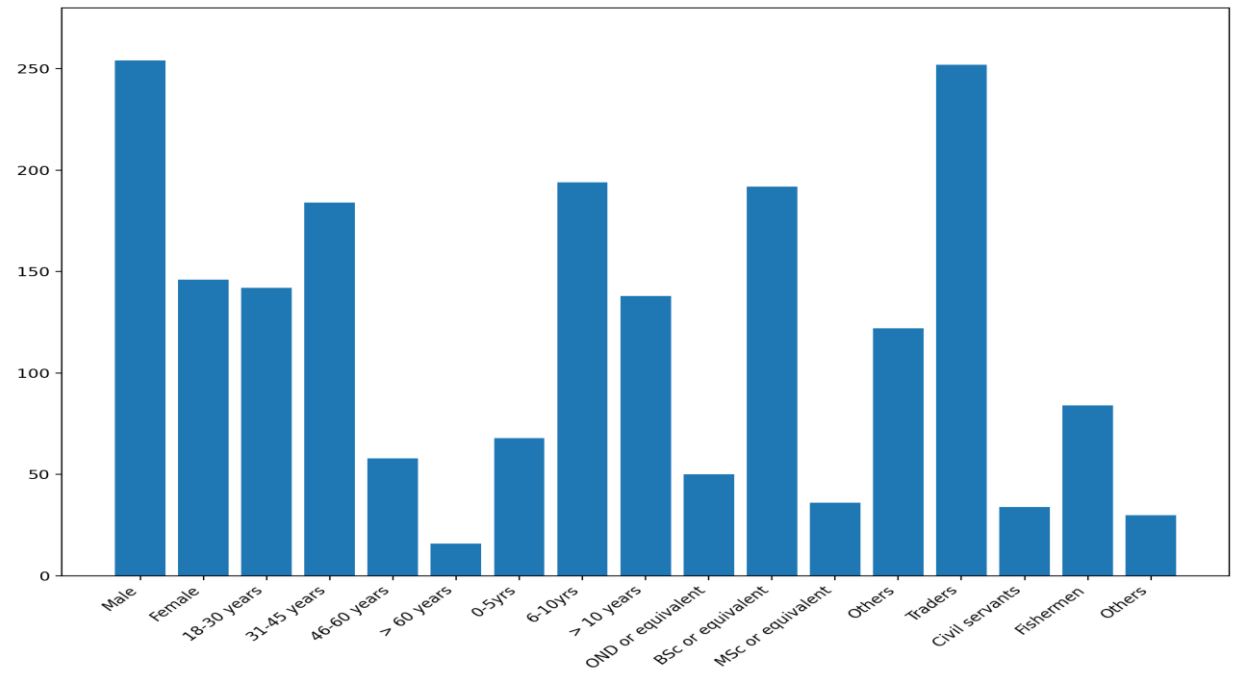

Figure 3: Demographic characteristics of the respondents

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As can be seen in Figure 3 below, a total of 400 people took part in the study, where 254 (63.5%) were males, and 146 (36.5%) were females. From this, it is clear that males formed the majority of the respondents in the area under study. As far as age is concerned, 184 (46.0%) of the respondents belonged to the age range of 31-45 years, while 142 (35.5%) fell into the age range of 18-30 years. 58 (14.5%) respondents were in the age range of 46-60 years, while 16 (4.0%) were above 60 years. As for occupation, 252 (63.0%) respondents were traders, constituting the largest occupational group. The second largest occupational group comprised 84 (21.0%) fishermen, followed by 34 (8.5%) civil servants and 30 (7.5%) respondents who were involved in other occupations. On the other hand, in terms of educational qualification, 192 (48.0%) respondents were holders of BSc or equivalent qualifications, whereas 122 (30.5%) respondents belonged to the other category. There were 50 (12.5%) respondents who had OND or equivalent qualifications, while 36 (9.0%) respondents had MSc or equivalent qualifications. As far as the length of stay is concerned, 194 (48.5%) respondents had stayed in the area for 6-10 years, 138 (34.5%) respondents had stayed in the area for more than 10 years, and 68 (17.0%) respondents had stayed in the area for less than 5 years.

Objective One: Causes of flooding in the study area

Table 1 Perception of Respondents on causes of flooding in the study area

	Causes of flooding	**SA**	**A**	**D**	**SD**	**Mean**	**SD**	**Remarks**	**Rank**
		4	**3**	**2**	**1**				
1	The lack of proper drainage systems contributes significantly to flooding in Port Harcourt.	293	107			3.73	.443	Accepted	2
2	Rapid urbanisation and unchecked expansion lead to increased surface runoff and flooding.	232	154	14		3.55	.565	Accepted	4
3	Improper disposal of solid waste blocks drainage systems and contributes to flooding.	313	87			3.78	.413	Accepted	1
4	Changing weather patterns, including increased rainfall intensity and frequency, worsen flooding in Port Harcourt.	178	155	43	24	3.22	.864	Accepted	6
5	Inadequate urban planning and enforcement of building regulations contribute to flooding.	291	109			3.73	.446	Accepted	3
6	Lack of awareness and community involvement in flood risk reduction efforts exacerbate the problem.	146	227	27		3.30	.587	Accepted	5
	Total					**3.55**	**.553**		

Source: Researcher's Fieldwork, 2026

Table 1 presents respondents' perceptions of the causes of flooding in the study area. The results show that all the identified factors were accepted as causes of flooding since their mean ratings were above the criterion mean of 2.50. Improper disposal of solid waste that blocks drainage systems was perceived as the most significant cause of flooding, ranking first with a mean score of 3.78 (SD = 0.413). This was followed by the lack of proper drainage systems, which ranked second with a mean score of 3.73 (SD = 0.443). Inadequate urban planning and poor enforcement of building regulations also emerged as major contributors, ranking third with a mean score

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of 3.73 (SD = 0.446). Rapid urbanisation and unchecked expansion were identified as another important cause of flooding, ranking fourth with a mean score of 3.55 (SD = 0.565). The lack of awareness and community involvement in flood risk reduction efforts ranked fifth with a mean score of 3.30 (SD = 0.587). Changing weather patterns, including increased rainfall intensity and frequency, ranked sixth with a mean score of 3.22 (SD = 0.864). The overall mean score of 3.55 (SD = 0.553) indicates that respondents generally agreed that flooding in Port Harcourt is caused by a combination of infrastructural, environmental, and human-related factors. These findings emphasise the need for improved waste management, effective drainage systems, proper urban planning, and greater public participation in flood control efforts.

Trends in Climate Variables, Flood Occurrence, and Socio-Economic Impacts of Ita-Wogba Creek Flooding in Port Harcourt (2019–2025)

The analysis of rainfall reveals that rainfall increased by 4.895 mm per annum. As seen in Figure 4, the least square trend line shows that rainfall exhibited a slight increasing trend during the period studied. However, the very low coefficient of determination ($R^2 = 0.0061$) suggests that rainfall varied considerably from year to year. In contrast, temperature increased by 0.027°C per annum (Figure 5), with a relatively strong coefficient of determination ($R^2 = 0.6333$), indicating a consistent warming trend that may contribute to increased flood vulnerability in Port Harcourt.

Figure 6 shows that flooding remained a recurrent environmental challenge within the Ita-Wogba Creek area between 2019 and 2025. Flood incidents ranged from 8 to 17 annually, while affected communities varied between 5 and 17. Flood duration peaked at 37 days in 2022, demonstrating the persistent nature of flood events and their potential to disrupt socio-economic activities. The socio-economic impacts of flooding are evident in Figure 7. Houses damaged increased from 93 in 2019 to 229 in 2022, while businesses affected rose from 48 to 146 during the same period. Persons displaced reached 1,520 in 2022, accompanied by an estimated economic loss of ₦491.4 million. These findings indicate that Ita-Wogba Creek flooding has negatively affected residential properties, commercial activities, livelihoods, and economic productivity within Port Harcourt. The health implications of flooding are presented in Figure 8. Cholera, typhoid, and malaria cases fluctuated throughout the study period, with total disease cases peaking at 3,379 in 2022. This suggests that flooding contributed to poor environmental sanitation, contaminated water sources, and increased exposure to disease vectors. Figure 9 highlights efforts to mitigate flooding through drainage maintenance and waste management. Although drainage channels cleared and waste removed increased over time, flood complaints remained high, peaking at 306 in 2024. Overall, the findings demonstrate that flooding along Ita-Wogba Creek has significantly affected the socio-economic well-being, public health, and environmental sustainability of Port Harcourt.

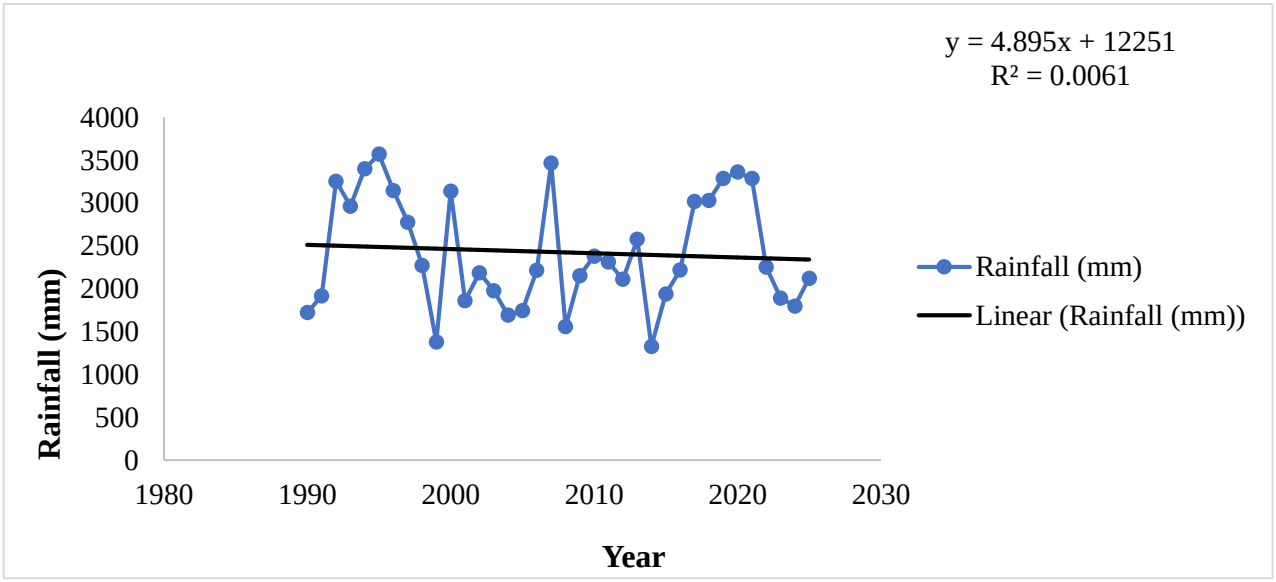

Figure 4: Total Annual Rainfall for Port Harcourt

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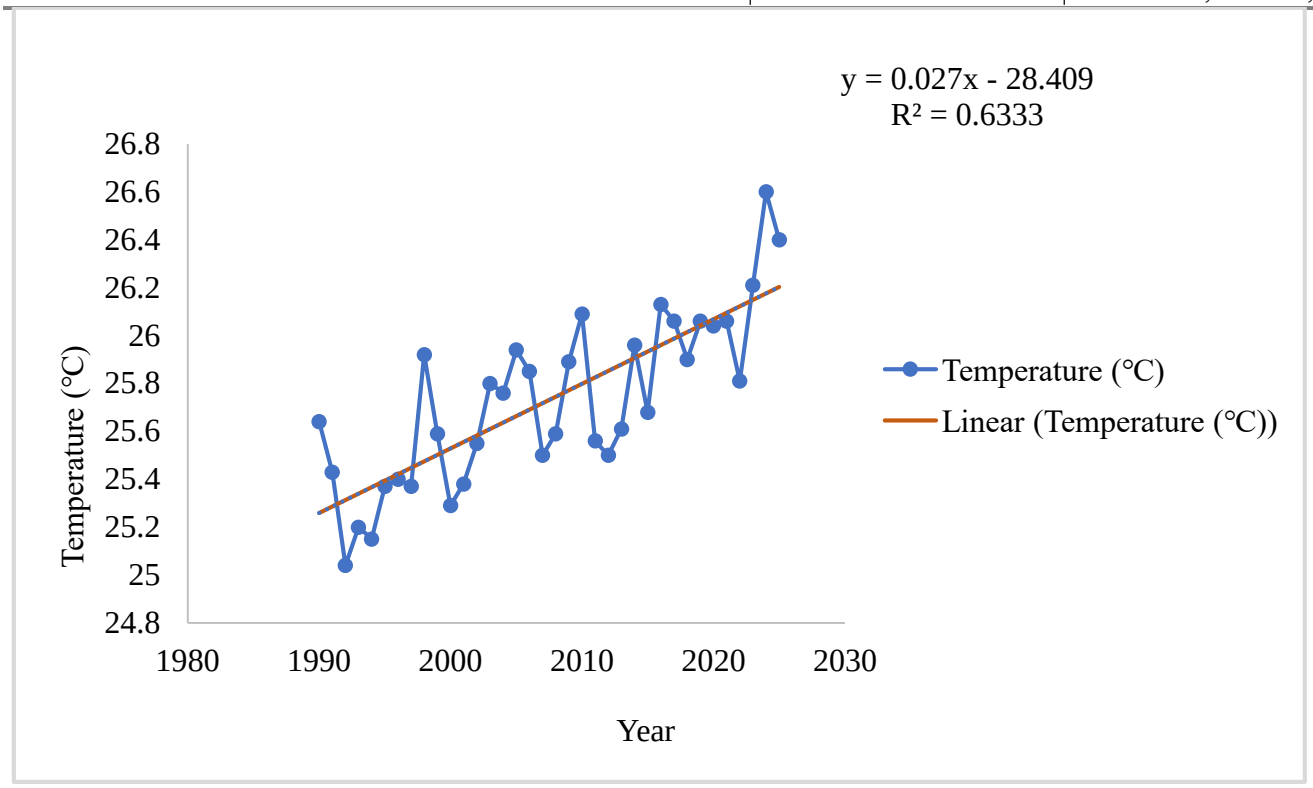

Figure 5: Mean Annual Temperature for Port Harcourt

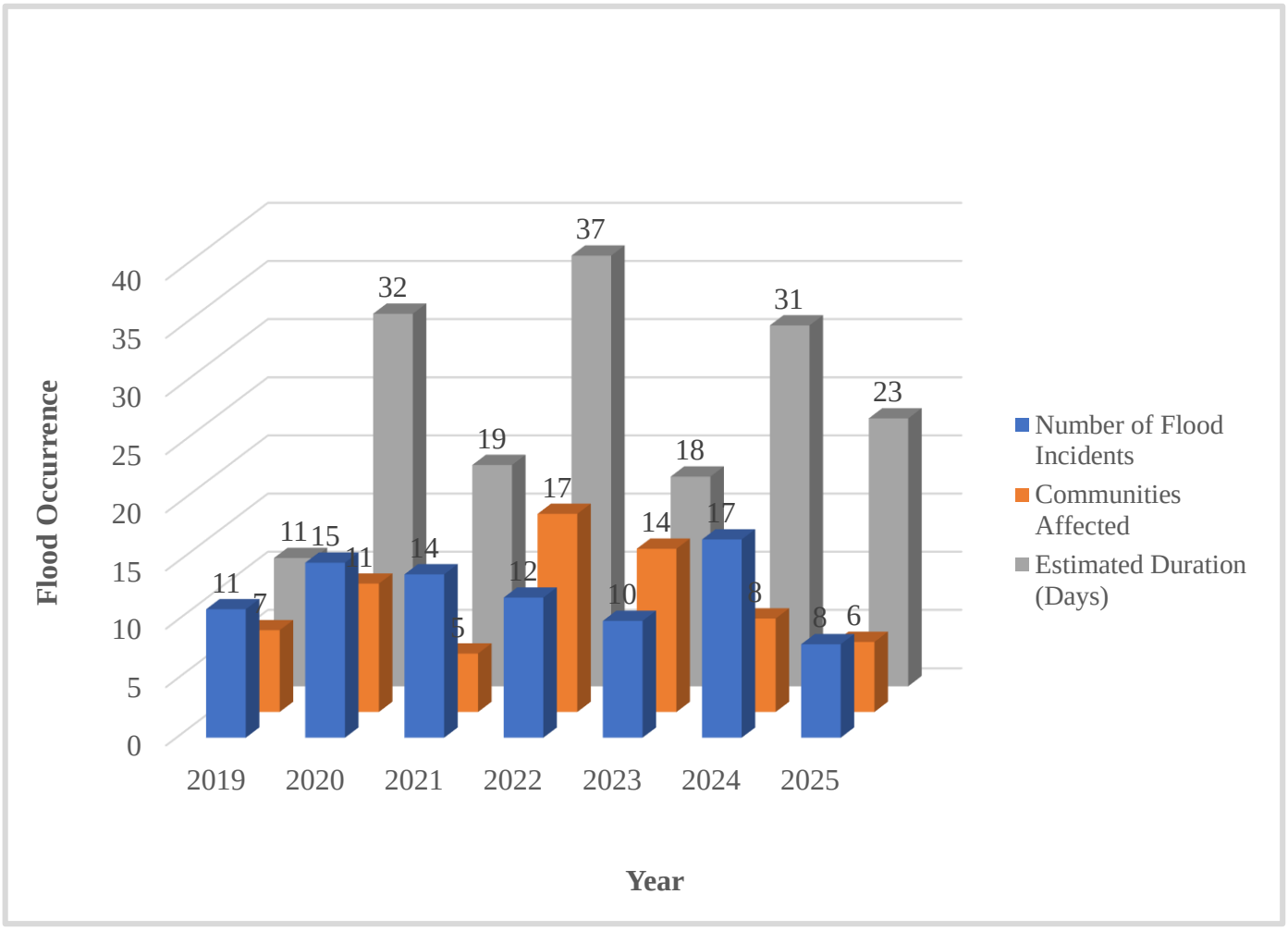

Figure 6 Flood Occurrence Records from RSEMA (2019–2025)

Source: Rivers State Emergency Management Agency (RSEMA).

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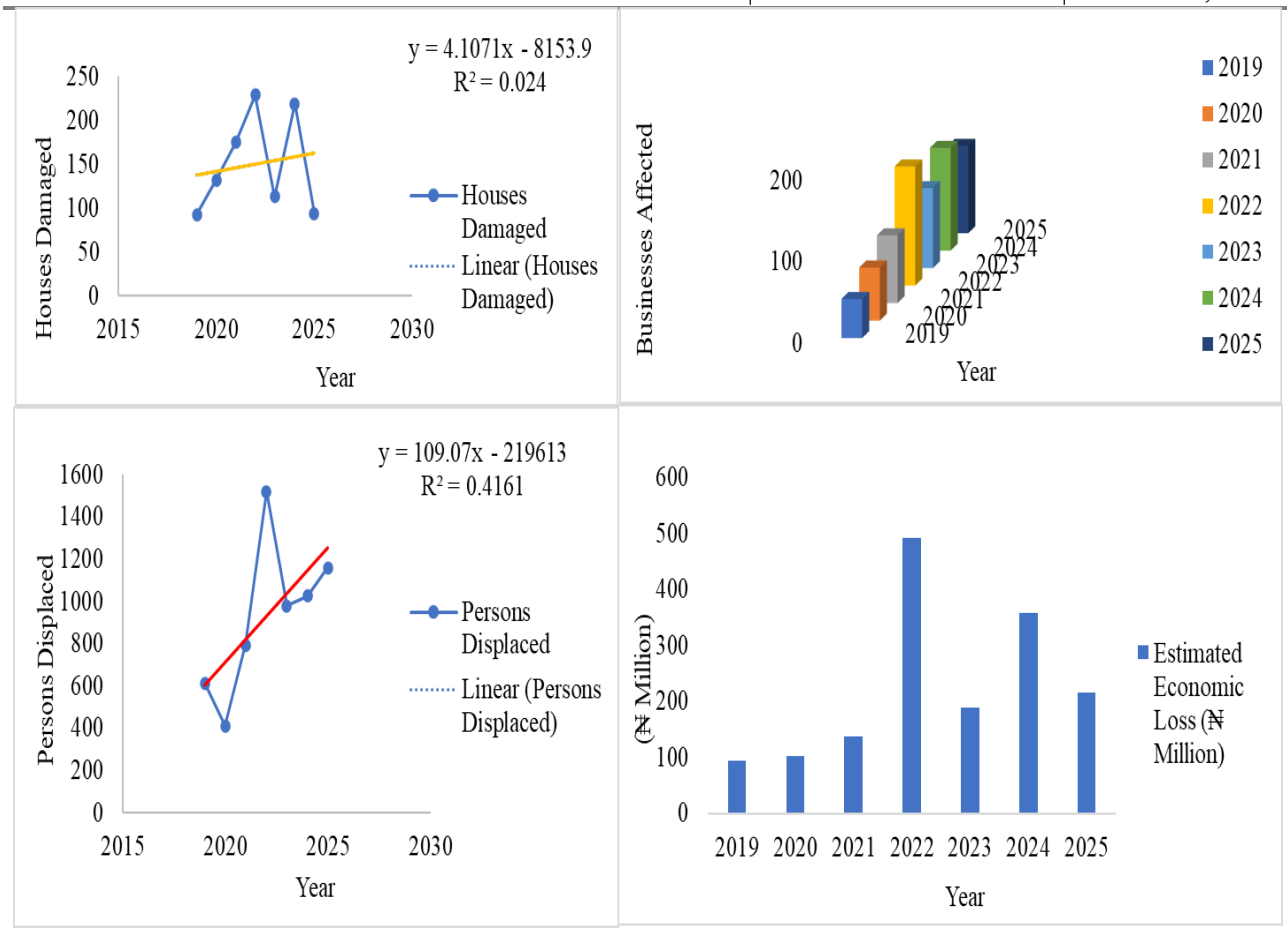

Figure 7 Records of Property Damage and Population Displacement (2019–2025)

Source: Port Harcourt City Local Government and Community Development Reports.

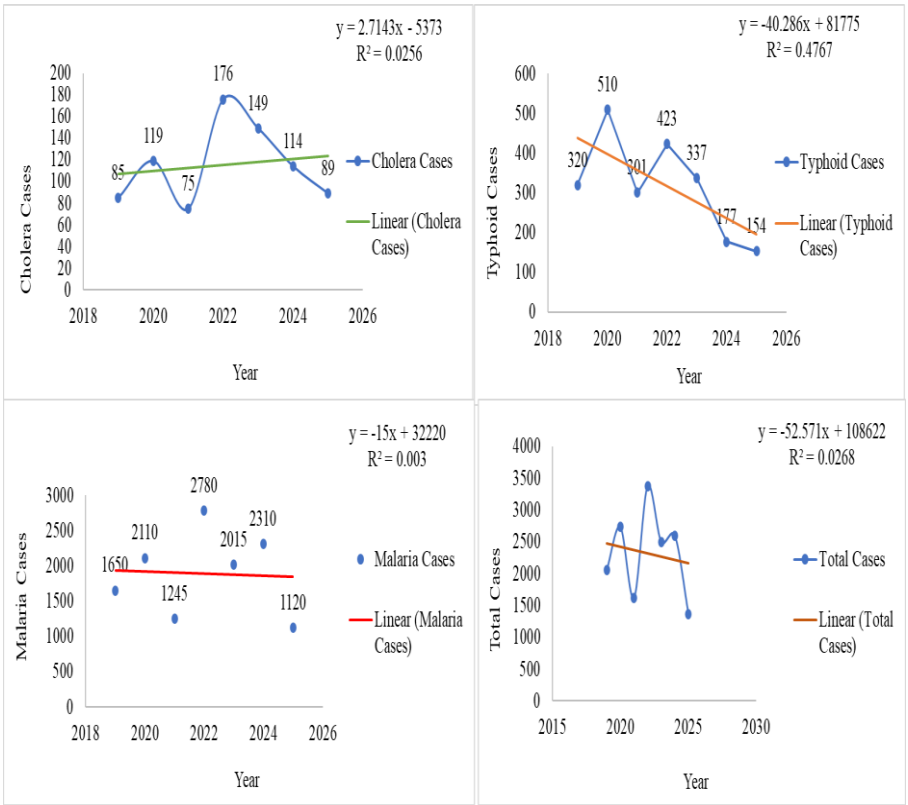

Figure 8 Hospital Records on Cholera, Typhoid, and Malaria Cases (2019–2025)

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Source: Selected Hospitals and Primary Health Centres within Port Harcourt Metropolis.

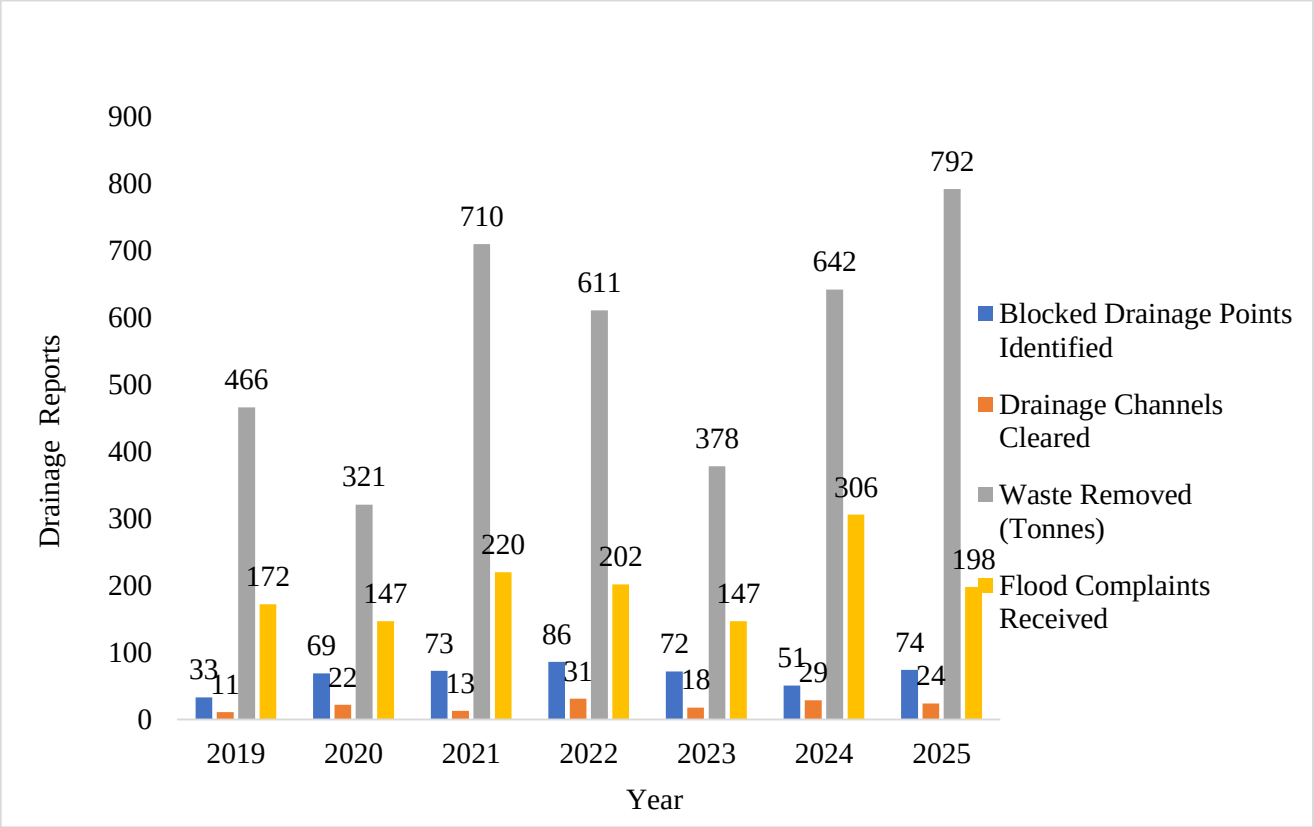

Figure 9 Drainage and Waste Management Reports from Port Harcourt City Council (2019–2025)

Source: Port Harcourt City Council Environmental and Sanitation Department.

Objective Two: The socio-economic impact of flooding on the people

Table 2 Perception of Respondents on the socio-economic impact of flooding on people

	Socio-economic impact of flooding	**SA**	**A**	**D**	**SD**	**Mean**	**SD**	**Remarks**	**Rank**
		4	**3**	**2**	**1**				
1	Flooding around ITA Wogba Creek negatively affects the livelihoods of people in the area (e.g., farming, fishing, and small businesses).	305	95			3.76	.426	Accepted	1
2	Flooding causes significant damage to residential and commercial properties in the vicinity of ITA Wogba Creek.	198	202			3.49	.501	Accepted	2
3	Flooding increases health risks such as waterborne diseases and infections for residents living near ITA Wogba Creek.	183	211	6		3.44	.527	Accepted	3
4	Flooding forces people to evacuate their homes, leading to temporary	78	322			3.19	.397	Accepted	6

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	or permanent displacement and challenges in finding shelter.								
5	Flooding disrupts education by damaging schools and hindering students' ability to attend classes.	192	179	19	10	3.38	.695	Accepted	4
6	Residents around ITA Wogba Creek face increased financial burdens due to flood-related expenses such as repairs, medical costs, and loss of income.	93	307			3.23	.423	Accepted	5
7	The community's ability to cope with and adapt to flooding impacts is limited, leading to long-term socio-economic challenges.	111	270	19		3.23	.522	Accepted	5
	Total					**3.39**	**.499**		

Source: Researcher's Fieldwork, 2024

Table 2 presents respondents' perceptions of the socio-economic impacts of flooding on people living around ITA Wogba Creek. The findings indicate that all the listed impacts were accepted, as their mean scores were above the criterion mean of 2.50. Flooding was perceived to have the greatest impact on the livelihoods of residents, including farming, fishing, and small businesses, ranking first with a mean score of 3.76 (SD = 0.426). Damage to residential and commercial properties was identified as the second most significant impact, with a mean score of 3.49 (SD = 0.501). Increased health risks, such as waterborne diseases and infections, ranked third with a mean score of 3.44 (SD = 0.527). Disruption of education through damage to schools and reduced school attendance was also considered a major consequence of flooding, ranking fourth with a mean score of 3.38 (SD = 0.695). Residents increased financial burdens resulting from repair costs, medical expenses, and loss of income ranked fifth with a mean score of 3.23 (SD = 0.423). Similarly, the community's limited ability to cope with and adapt to flooding impacts also ranked fifth, with a mean score of 3.23 (SD = 0.522). Forced evacuation and displacement of residents ranked sixth with a mean score of 3.19 (SD = 0.397). The overall mean score of 3.39 (SD = 0.499) shows that respondents generally agreed that flooding has serious socio-economic consequences on residents around ITA Wogba Creek, affecting livelihoods, property, health, education, and economic well-being.

Objective three: Coping strategy of the people in the study area

Table 3 Perception of Respondents on coping strategy during the flood

	Coping strategy	**SA**	**A**	**D**	**SD**	**Mean**	**SD**	**Remarks**	**Rank**
		4	**3**	**2**	**1**				
1	During flooding events, people in the community come together to support each other with resources and assistance.	132	102	112	54	2.78	1.051	Accepted	5
2	Residents evacuate to safer areas temporarily until floodwaters recede.	334	66			3.83	.372	Accepted	1
3	Individuals construct makeshift barriers using sandbags or other	281	104	11	4	3.65	.585	Accepted	2

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	materials to protect their properties from flooding.								
4	People elevate their valuable belongings or furniture to higher ground to minimise damage during floods.	72	328			3.18	.385	Accepted	4
5	Residents use boats or canoes to navigate flooded areas for transportation or rescue purposes.	242	131	16	11	3.51	.704	Accepted	3
6	Communities ensure access to emergency supplies such as food, water, and medical aid during flooding situations.	71	63	197	69	2.34	.963	Rejected	6
7	People share information about flood warnings, evacuation routes, and safety measures through community networks or social media platforms.	63	72	137	128	2.18	1.050	Rejected	7
	Total					**3.07**	**.730**		

Source: Researcher's Fieldwork, 2024

Table 3 presents respondents' perceptions of the coping strategies adopted during flooding events in the study area. The findings show that five of the identified strategies were accepted, while two were rejected based on the criterion mean of 2.50. The most common coping strategy was temporary evacuation to safer areas until floodwaters receded, which ranked first with a mean score of 3.83 (SD = 0.372). This was followed by the construction of makeshift barriers, such as sandbags, to protect properties from flooding, ranking second with a mean score of 3.65 (SD = 0.585). The use of boats or canoes for transportation and rescue during floods ranked third with a mean score of 3.51 (SD = 0.704). Respondents also indicated that elevating valuable belongings and furniture to higher ground was a common coping strategy, ranking fourth with a mean score of 3.18 (SD = 0.385). Community support through the sharing of resources and assistance during flooding ranked fifth with a mean score of 2.78 (SD = 1.051). However, ensuring access to emergency supplies such as food, water, and medical aid was rejected, ranking sixth with a mean score of 2.34 (SD = 0.963). Similarly, sharing information on flood warnings, evacuation routes, and safety measures through community networks or social media was rejected and ranked seventh with a mean score of 2.18 (SD = 1.050). The overall mean score of 3.07 (SD = 0.730) indicates that respondents moderately agreed that various coping strategies are employed during flooding, with evacuation and property protection being the most commonly adopted measures.

Objective Four: The health impact of flooding in the study area

Table 4 Perception of Respondents on the health impact of flooding in the study area

	The health impact of flooding	**SA**	**A**	**D**	**SD**	**Mean**	**SD**	**Remarks**	**Rank**
		4	**3**	**2**	**1**				
1	Flooding increases the risk of waterborne diseases such as cholera and typhoid fever among residents.	337	63			3.84	.365	Accepted	1
2	Exposure to damp and mouldy environments during flooding	287	113			3.72	.451	Accepted	3

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	exacerbates respiratory problems such as asthma and allergies.								
3	Standing water post-flooding serves as a breeding ground for mosquitoes, leading to an increase in vector-borne diseases like malaria and dengue fever.	279	121			3.70	.460	Accepted	4
4	The stress and trauma associated with flooding events have adverse effects on residents' mental health, including anxiety and depression.	112	288			3.28	.450	Accepted	6
5	Floodwaters pose risks of injuries and accidents due to submerged hazards, debris, and swift currents.	242	137	21		3.55	.594	Accepted	5
6	Flooding disrupts access to healthcare services, hindering residents' ability to seek medical attention and treatment.	81	319			3.20	.402	Accepted	7
7	Exposure to floodwaters and contaminated environments may lead to long-term health issues among affected individuals.	307	93			3.77	.423	Accepted	2
	Total					**3.58**	**0.449**		

Source: Researcher's Fieldwork, 2024

Table 4 presents respondents' perceptions of the health impacts of flooding in the study area. The findings indicate that all the identified health impacts were accepted, as their mean scores exceeded the criterion mean of 2.50. Flooding was perceived to increase the risk of waterborne diseases such as cholera and typhoid fever, ranking first with a mean score of 3.84 (SD = 0.365).

Exposure to floodwaters and contaminated environments, which may result in long-term health problems, ranked second with a mean score of 3.77 (SD = 0.423). Exposure to damp and mouldy environments that aggravate respiratory conditions such as asthma and allergies ranked third with a mean score of 3.72 (SD = 0.451). Similarly, standing water after flooding was identified as a major health concern because it provides breeding grounds for mosquitoes, increasing the prevalence of vector-borne diseases such as malaria and dengue fever. This factor ranked fourth with a mean score of 3.70 (SD = 0.460).

Flood-related injuries and accidents caused by submerged hazards, debris, and strong currents ranked fifth with a mean score of 3.55 (SD = 0.594). The psychological effects of flooding, including stress, anxiety, and depression, ranked sixth with a mean score of 3.28 (SD = 0.450), while disruption of access to healthcare services ranked seventh with a mean score of 3.20 (SD = 0.402). The overall mean score of 3.58 (SD = 0.449) indicates that respondents strongly agreed that flooding has serious health consequences, affecting both the physical and mental well-being of residents in the study area.

Tested Hypothesis

H_0: There is no statistically significant relationship between flooding frequency and socio-economic losses in the study area

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Table 5: **Correlation Coefficient between flooding frequency and socio-economic losses in the study area**

Correlations			
		Flooding frequency	Socio-economic losses
Flooding frequency	Pearson Correlation	1	.881
	Sig. (2-tailed)		.000
	N	400	400
Socio-economic losses	Pearson Correlation	.881	1
	Sig. (2-tailed)	.000	
	N	400	400
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation coefficient between flooding frequency and socio-economic losses was presented in Table 5 in the study area. There is a positive and statistically significant relationship between flooding frequency and socio-economic losses in the study area ($r = .881$, $p < .001$). This shows that there is an increase in the socio-economic losses suffered by the people of the study area, as there is an increase in the frequency of flooding. This shows that the recurrence of flooding contributes significantly to damage to properties and economic losses of the people of the study area. Also, the flooding frequency contributed significantly to the variance of socio-economic losses in the study area, as 77.62% of the variance of socio-economic losses can be explained by the flooding frequency ($R^2 = 0.7762$). Thus, there is a statistically significant relationship between flooding frequency and socio-economic losses in the study area.

DISCUSSION OF FINDINGS

Results from the research showed that the lack of proper disposal of solid wastes was the leading cause of flooding near Ita-Wogba Creek. These results are in line with Echendu (2021), who identified the lack of proper disposal of wastes and blockage of drainage systems as the primary causes of flooding in urban areas in Port Harcourt. Likewise, Lucas (2021) indicated that poor waste management and blockage of waterways were among the leading causes of flooding in Nigerian urban areas. In addition, the research findings indicated that a lack of drainage facilities and poor urban planning contributed immensely to flooding, as observed by Richard and Okeke (2023). The results of this study point to the fact that the flood in the study region is mainly caused by anthropogenic factors. It was found that flooding had notable socio-economic implications for the people, especially in terms of interference with economic livelihoods such as trade and fishing. This result is in line with the findings of Talbot et al. (2018), which showed that flooding generally leads to economic losses and interruption of economic activities. It also supports the findings of Kawasaki & Shimomura (2024), who argued that recurring floods lead to poverty and livelihood loss. Other consequences of flooding include property damage and health risks. On coping strategies, temporary evacuation was identified as the most frequently used strategy when it comes to flooding. This is in agreement with the research by Langkulsen et al. (2022), who found that temporary relocation continues to be a popular form of adaptation among people living in areas prone to flooding. The erection of improvised barriers and lifting of household items were other practices commonly done, in agreement with Zhong et al.'s (2018) observation that local adaptations have been commonly used to mitigate flooding impacts. But then again, the low use of emergency preparedness and communication strategies implies a lack of institutional backup. In addition to this, the research also found that there were major public health problems associated with floods. Among them are waterborne diseases like cholera and typhoid fever, which have been mentioned in Suhr & Steinert (2022) as some of the greatest health risks associated with flooding, since flooding causes an increase in the number of diseases caused by water contamination. In the same way, Zhong et al. (2018) found a significant relationship between floods and communicable diseases. The

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problem of being exposed to water contamination, as well as stagnant water and poor environmental sanitation, can also cause serious health problems and vector-borne diseases like malaria.

CONCLUSION

The research highlighted the effects of floods from Ita Wogba Creek on the socio-economic activities of people living in Port Harcourt Metropolis. From the findings, improper waste disposal, lack of drainage system, urbanisation, and poor planning were found to play a critical role in flooding. Flooding brings about negative impacts in terms of loss of livelihood, damage to property, poses health hazards, disruption of education, and economic constraints, among others. Even though there are strategies adopted by people, such as relocation and protecting their properties during flood periods, they are not sustainable.

Recommendations

Based on the findings of this study and the synthesis of existing literature on urban flooding, several recommendations can be proposed to address the identified challenges and enhance resilience in flood-prone areas:

1. Local governments ought to emphasise comprehensive urban planning strategies that incorporate sustainable infrastructure development and effective land use management. This entails allocating resources towards the establishment of efficient drainage systems, the implementation of green infrastructure, and the design of flood-resistant buildings to effectively reduce flood risks.

2. It is essential to prioritise community engagement initiatives to increase awareness of flood risks, enable residents to take part in decision-making processes, and promote collective action in the implementation of flood mitigation strategies. Involving communities can also support the adoption of effective coping mechanisms and improve disaster preparedness efforts.

3. Municipal authorities ought to allocate resources towards the development of sophisticated monitoring technologies and early warning systems to swiftly identify flood occurrences and issue timely notifications to residents. This approach facilitates proactive evacuation strategies and aids in reducing the adverse effects of flooding on public safety and infrastructure.

4. The public health infrastructure and services require significant improvement to adequately tackle the health impacts associated with flooding. This improvement entails expanding access to clean water, sanitation systems, healthcare services, and mental health resources in flood-affected regions. Additionally, public health programs can educate residents on preventive measures against waterborne and vector-borne diseases during flood events. By implementing these strategies, policymakers, urban planners, and community stakeholders can work together to enhance resilience, reduce vulnerabilities, and promote the overall health of urban populations in areas prone to flooding.

5. Government agencies should establish community-based flood monitoring systems and deploy early warning technologies along Ita-Wogba Creek. Such systems will provide timely information on impending flood events and enable residents to undertake preventive actions before floodwaters reach critical levels.

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