



Impacts of Flood on Inhabitants Living Around Lagos Lagoon Corridors: Emphasis on MAKOKO, IDO, and OTO

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ABSTRACT

Flooding is inevitable to some areas given that it is part of the natural disasters that occurred due to heavy rain and climate change. However, there are some human activities responsible of flooding that could be avoided such inadequate waste management and collection, poor drainage system and government negligence among others. This study adopted the descriptive survey method in assessing the impact of flood on inhabitants in the selected areas of Lagos state. Purposive sampling method was adopted in selecting the study areas and population. The area studied included Makoko, Iddo and Otto located in Lagos state given their proximity to the coastline which makes them vulnerable to rising sea levels and flooding hazards, as well as their classification as poor communities residing on sensitive landscapes. 100 individual participated in the study that were selected randomly from each of the selected communities. A self-made questionnaire was adopted for data collection; while data collected was analyzed descriptively using frequency and percentages. The result from the study indicated the following causes of flooding: poor waste management, sand infill and land reclamation activities; and building on drainage channels are also causative factors which could be avoided if taken proper precautionary measure. The study further revealed that flooding has negative impacts on the individual residing in the flooded areas as well as the nation's economy at large. Based on the result of this study, it was recommended that, resident temporary evacuate the flooded area, especially if the causes is natural disaster which no one has control over. The study further recommended proper disposal of waste, as well as adequate government commitment in the fight against flooding through the building of appropriate drainage system in the area and by enacting policies and laws that ensures proper management of waste; also, buildings should be raised to certain significant levels to avoid flooding.

Key words: Impacts of flood, inhabitants, Lagos lagoon corridors

Introduction

The United Nations (2015) estimated that by 2050, there would be an increase in population by an additional 2.5 billion people, majorly in the Asian and African continents. Of this growth, almost 40% is expected to be from China, India and Nigeria. This estimate holds true for the city of Lagos state, Nigeria, which has transformed into a megacity and witnessed an increase in its population size. However with its upgrade to a megacity status, came increased exposure of residents to environmental hazards such as flooding. This is aided by factors such as inconsistent climate system, unpredictable rainy season and inadequate flood management facilities with low capacity of coping with events; all of which heightens the risk of flooding. Flooding tends to occur more in developing countries, and poor communities appear to be more prone to flooding disaster (Atufu & Holt, 2018).

Lagos is under developmental pressure as it is bordered by the Atlantic Ocean, which increases pressure on the available land. This also contributes to the issue of flooding that challenges some areas in Lagos state. The impact of flooding as a natural disaster cannot be overemphasized as it has proven to be disastrous, especially in situations that lack adequate flood prevention and management strategies. Tagged as one of the fastest growing cities, Lagos has seen an immense population growth over the years. As at 1960, the population was less than a million, which grew to 4 million by 1990, and then 15 million by 2015. As at 2020 there was an estimate of 21 million people in Lagos state, as well as the home of many industries. This is an indication of the perception of many of Lagos being a place of opportunities, hence the attraction and subsequent migration from rural areas. This rapid growth in the population is largely responsible for the growing number of slum areas, given that more than half of the population reside in informal settlements, thus causing environmental and social challenges such as security risks, traffic density, and pollution amongst others (Ministry of environment and water resources, 2021). The bane of some of these settlements is flooding, which is an annual hazard occurrence in the state (Adelekan & Asiyebi, 2016).

The increased exposure to flooding in the state can be attributed to the inability of the authorities to control urban development. This can be seen from the large number of buildings that keeps being erected on flood plains, drainage paths and coastal areas. The cost of most of these buildings despite being built in unapproved areas is outrageously high, which leads to a mass settlement of the population in swampy and low lying areas (Atufu & Holt, 2018). The impact of flooding on the state, economically, is estimated at USD 3.992 billion annually, translating to 4.1% of the state's GDP or 1.0% of national GDP (Croitoru, Miranda, Khattabi & Lee, 2020). Flooding also has severe implications in areas of health, displacement of residents, reduction of

sources of income and even increased mortality rate. In view of the foregoing, this study investigates the impacts of flood on inhabitants living around Lagos lagoon corridors: Makoko, Ido, and Oto.

Statement of research problem

Natural disaster has become a growing concern globally in recent times, owing to the disruption and damages it causes. In Lagos state, the rising case of flood reinforces the need for flood prevention and management strategies (Atufu& Holt, 2018). The topographical features of Lagos state, ineffective waste management system and poor infrastructure management makes the city prone to flooding events. The result of floods include disruptions to business operations, infrastructural and environmental damages, displacement of residents, pollution of water, social unrest, widespread of diseases, economic downturn and loss of life (Ministry of environment and water resources 2021). The coastal location of Lagos state makes it possible for the occurrence of flooding hazards aided by uncontrolled human activities, as well as poverty and ignorance. Thus, the study seeks to examine the impact of flood specifically in Makoko, Ido and Oto areas of Lagos state, given their exposure to flooding hazards.

Research objectives

The study specifically aims to;

1. Determine residents' perception on factors responsible for flooding in the study area.
2. Assess the impact of flood on the inhabitants in the study area.
3. Investigate the coping strategies adopted by residents in the study area

Research questions

1. What are the factors responsible for flooding in the study area?
2. What is the impact of flood on the inhabitants in the study area?
3. What are the coping strategies adopted by residents in the study area?

Literature review

Floods occur naturally and are part of the physical and biological process which shapes a nation's landscape. It occurs in environments where there is heavy rain fall for long-lasting periods of time. Floods are the reason for most natural disasters affecting societies. In urban areas, floods refer to any overland flow over urban streets enough to cause momentous property damage, traffic obstructions and health hazards (Elenwo, 2015).

Human activities can amplify the risks of flood as a result of human and ecological interaction. In the face of poor socio-economic conditions, urban flood has become one of the major threats to be dealt with, for instance, underprivileged people tend to erect houses and live in areas considered to be affordable and also prone to flood. Most of them also depend on the government and other stakeholders for support when flood events hit (Osuret et al., 2016).

Activities of man such as disposing rubbish into river bodies can cause flood in the raining season (Tabiri, 2015; Danso&Addo, 2017). Also, most of the inhabitants dispose their waste into gutters, bushes and streets causing health problems. This suggests that improper waste disposal in urban areas can cause floods (Tasantab, 2019). In urban areas, compacted soil areas have increased impermeable surfaces which increase surface water runoff. This also leads to the increase in discharge that overloads drainage channels.

Effects of flood

Flood water is usually polluted by various pollutants, such as human and animal faeces, sewage, pesticides etc. This impairs the clean water sources and drinking and washing with such polluted water is dangerous to health (Husain, Trak, & Meshram, 2018). Floodwater carries with it whatever is present on the land and upstream. Human and animal waste, oil, dirt, bacteria and chemicals present in it makes contact with food crops and edible items, making them unsafe to consume and harmful to human health.

Flood causes economic basic structure such as electricity, roads and bridges to be damaged, communities, cut-off and some economic activities disrupted (Mensah&Ahadzie 2020). This can bring normal life to a standstill and increase community vulnerability economically. Due to the absence of infrastructure and effective policies to mitigate flood effects, the impact of flood leads to the deterioration of people's health, including waterborne diseases, animal bites and injuries especially among the underprivileged (Songsore, 2017). Floods can also leave victims and their families in shock for long periods of time as they lose loved ones and are displaced from their homes.

Empirical review

Chukwu (2014) in a study assessed the impact of flooding on families of fishermen in Pedro village, Iwaya, Lagos by interviewing a sample size of 50 fishermen randomly selected in the community using structured questionnaires. Using descriptive statistics, data collected were summarized and computed and results revealed that flooding damaged fishing implements, hampered the fishing business, negatively influenced the social life of the inhabitants, increased environmental pollution, interrupted children's schooling, increased the occurrence of water borne diseases, reduced fish catch and subsequently affected family income.

A critical analysis by Magami, Yahaya and Mohammed (2014) reviewed the causes and consequences of flooding in Nigeria and found that many cases of flood experienced in Nigeria are caused by dam failure, coastal storms, congestion of the major rivers, delay in evacuating flood victims, ignoring

warnings from the Nigerian Meteorological Agency (NIMET) and settlement of people in regions prone to flood such as waterborne areas and sea coast.

Abubakar et al. (2020) examined the socio-economic impact of floods on inhabitants of riverine communities of River Benue in Adamawa state. Questionnaires were used for data collection from randomly selected residents of three riverine communities purposively selected for the study. Results revealed that over the years, thousands of hectares of farmlands and other properties have been ruined by flood and that agricultural productivity in the area is limited due to lack of effective means of mobility.

Theoretical framework: Urban dynamics theory

Urban dynamics theory proposes three primary forces which are aging of housing and business structures, and the feedback associations among population, housing and jobs that bring about urban growth and decline guided by percepts of relative attractiveness. As noted by Forrester (1971), often policies that have been adopted for correcting a difficulty are actually intensifying it rather than producing a solution. In other words, actions believed to alleviate the difficulties of a city can actually make matters worse (Oluwashinaayomi, 2014).

Urban dynamics theory as noted by Moody (1970), explained four common programmes intended to improve the depressed nature of central cities. First programme was jobs creation; second was a skill training programme to amplify skills of the lowest-income group; third was fiscal aid to depressed cities and fourth was low-cost housing erection for low income earners. These four programmes vary from unproductive to detrimental judged either by their effect on the economic health of a city or by their long-range effect on the low income populace. The results both corroborate and elucidate much of what has been happening over the last several decades in cities (creation of informal settlements, environmental dilapidation and susceptibility to disasters).

Urban dynamics theory views cities as complex social and economic systems formed by the relations of individual efforts to realize personal goals. It is a theory of the forces that outline human settlements which also shape human history. The theory is loaded with subtle nuances and shows the idiocy of traditional thinking, mutually for cities and for the world. Human systems, from all indications are too complex for intuitive solutions (Oluwashinaayomi, 2014).

Methodology

The study adopted the descriptive survey method in assessing the impact of flood on inhabitants in the selected areas of Lagos state. Purposive sampling method was used in selecting the study areas, Makoko, Iddo and Otto located in Lagos state. These areas were selected because of their proximity to the coastline which makes them vulnerable to rising sea levels and flooding hazards, as well as their classification of poor communities residing on sensitive landscapes. Using the random sampling method, 100 people were selected from each of these communities as respondents for the study. This was achieved by randomly moving from house to house and selecting a person available, willing and knowledgeable about the issue under study. Questionnaire was used as the instrument for data collection and was designed using a four point likert scale format and containing the questions formulated to guide the study. The data derived was descriptively analyzed using frequency and percentages.

Data Presentation, Analysis and Discussion

Research Question 1: What are the factors responsible for flooding in the study area?

Table1: Factors responsible for flooding in the study area

RQ1	What are the factors responsible for flooding in the study area?		SA	A	D	SD	% in agreement
1	Poor waste management and collection	F	49	50	1	0	100.0
		%	49.0	50.0	1.0	0.0	
2	Flooding from river or lagoon	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
3	Lack of appropriate drainage	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
4	Failure of storm drains	F	30	47	13	10	77.0
		%	30.0	47.0	13.0	10.0	
5	Overpopulation	F	25	50	10	5	75.0
		%	25.0	50.0	10.0	5.0	
6	Climate change	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
7	Government negligence	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
8	The presence of the lagoon and increases in its water level	F	17	79	2	2	96.0
		%	17.0	79.0	2.0	2.0	

9	Sand infill and land reclamation activities	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
10	Building on drainage channels	F	30	68	0	2	98.0
		%	30.0	68.0	0.0	2.0	
11	Heavy rainfall	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	

Field Survey (2021)

Table 1 above presents the respondents opinions on the factors responsible for flooding in the study area. As indicated in the Table above, 11 statements accompanied the research questions with all the statements having between 75% to 100% agreement rates. This indicates that all the items in the statements were accepted. This implies that the following factors are responsible for flooding in the study area: Poor waste management and collection; Flooding from river or lagoon; Lack of appropriate drainage; Failure of storm drains; Overpopulation; Climate change; Government negligence; The presence of the lagoon and increases in its water level; Sand infill and land reclamation activities; Building on drainage channels; and Heavy rainfall. This result supports some findings from earlier studies which share similar views such as Tasantab(2019)Atufu and Holt (2018); Danso and Addo(2017); Osuret et al., (2016); Tabiri, (2015); and Magami, Yahaya and Mohammed (2014) respectively.

Research Question 2: What is the impact of flood on the inhabitants in the study area?

Table 2: The impact of flood on the inhabitants in the study area

RQ2	What is the impact of flood on the inhabitants in the study area?		SA	A	D	SD	% in agreement
12	Damage to property	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
13	Income loss due to sickness and medical expenses	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
14	Disruption of economic and livelihood activities	F	57	40	1	2	97.0
		%	57.0	40.0	1.0	2.0	
15	Environmental pollution	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
16	Prevalence of malaria and other diseases	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
17	Depression arising from economic and social costs	F	73	25	2	0	98.0
		%	73.0	25.0	2.0	0.0	
18	Release of toxic materials	F	100	0	0	0	100.0
		%	100.0	0.0	0.0	0.0	
19	Loss of lives	F	80	20	0	0	100.0
		%	80.0	20.0	0.0	0.0	

Field survey (2021)

Table 2 above presents the respondents opinions on the impact of flood on the inhabitants in the study area. With all the eight items receiving above 90% support from the respondents, the following are the impacts of flooding in the study areas: Damage to property; Income loss due to sickness and medical expenses; Disruption of economic and livelihood activities; Environmental pollution; Prevalence of malaria and other diseases; Depression arising from economic and social costs; Release of toxic materials; and Loss of lives. This result confirms that of earlier studies such as Abubakar et al. (2020); Mensah and Ahadzie(2020); Husain, Trak, and Meshram(2018); Songsore(2017); Adelekanand Asiyambi, (2016); Elenwo, (2015); and Chukwu (2014) respectively, who also identified similar items as effects of flood to the affected areas studied.

Research Question 3: What are the coping strategies adopted by residents in the study area?

Table 3: The coping strategies adopted by residents in the study area

RQ3	What are the coping strategies adopted by residents in the study area?		SA	A	D	SD	% in agreement
20	Raising the wall/foundation of building	F	85	15	0	0	100.0
		%	85.0	15.0	0.0	0.0	
21	Construction of drainage channels	F	93	7	0	0	100.0
		%	93.0	7.0	0.0	0.0	
22	Temporary relocation	F	78	12	10	0	90.0
		%	78.0	12.0	10.0	0.0	

23	Insure building and property	F	69	30	1	0	99.0
		%	69.0	30.0	1.0	0.0	

Field Survey (2021)

Table 3 above presents the coping strategies adopted by residents in the study area. With above 90% in agreement to the four statements listed in the table, the study concludes that the residents within the flooded areas adopt the following coping strategies when the area is flooded: raising the wall/foundation of building; Construction of drainage channels; Temporary relocation; and Insure building and property. This result is in consonance with Adelekan and Asiyanni (2016) and Magami, Yahaya and Mohammed (2014) respectively, who made similar suggestions.

Conclusion and Recommendations

Flooding is inevitable to some areas given that it constitutes part of the natural disasters that occurred due to heavy rain and climate change. However, there are some of the activities of man, such as poor waste management and collection; flooding from river or lagoon; lack of appropriate drainage; failure of storm drains; overpopulation; government negligence, sand infill and land reclamation activities; and building on drainage channels, etc. that are regarded as causative factors of flood, according to the outcome of this study. These causative factors could be avoided if taken proper precautionary measures. Regardless of what causes flood, the result from this study clearly revealed that it has negative impacts on individual as well as the country's economy at large. With this in mind, this study recommends proper disposal of waste to avoid its implications of flooding. The study further recommends adequate government commitment in the fight against flooding through building appropriate drainage system in the area, enacting policies and laws that ensures proper management of waste, as well as ensuring that buildings are raised to certain significant levels to avoid flooding.

References

- Abubakar, B., Umar, H., Barde, M. M. & Adamu, S. (2020). Socio-economic Impact of Flooding on the Riverine Communities of River Benue in Adamawa State, Nigeria. *FUTY Journal of the Environment Vol. 14* No. 2.
- Adelekan, I. O., & Asiyanni, A. P. (2016). Flood risk perception in flood-affected communities in Lagos, Nigeria. *Natural Hazards*, 80(1), 445–469. <https://doi.org/10.1007/s11069-015-1977-2>
- Atufu, C. & Holt, C. (2018). Evaluating the impacts of flooding on the residents of Lagos, Nigeria. <https://www.witpress.com/eliibrary/wit-transactions-on-the-built-environment/184/36659>
- Chukwu, M. N. (2014). Impact of Flooding on Fishermen's families in Pedro Community, Iwaya-Lagos, Nigeria. *Journal of Applied Sciences and Environmental Management Vol. 18* (4) 647 – 651. DOI: [10.4314/jasem.v18i4.13](https://doi.org/10.4314/jasem.v18i4.13)
- Croituru, L., Miranda, J. J., Khattabi, A., & Lee, J. J. (2020). The cost of coastal zone degradation in Nigeria: cross River, Delta and Lagos States. World Bank Group. <https://openknowledge.worldbank.org/handle/10986/34758>
- Danso, S. Y. & Addo, I. Y. (2017). Coping strategies of households affected by flooding: A case study of Sekondi-Takoradi Metropolis in Ghana. *Urban Water Journal*, 14:5, 539-545, DOI: [10.1080/1573062X.2016.1176223](https://doi.org/10.1080/1573062X.2016.1176223)
- Elenwo, E. I. (2015). Socio-economic impacts of flooding on the residents of Port Harcourt metropolis in Rivers state, Nigeria. *Natural Resources*, 06.1-8. 10.4236/nr.2015.61001.
- Husain, N. & Trak, H. T. & Meshram, L. (2018). Impact of flood-paused pollutants and Microorganisms on human health. *International Journal of Science and Research (IJSR)* 7. 1375-1377. DOI: 10.21275/17021803
- Magami, I.M., Yahaya, S. & Mohammed, K. (2014). Causes and consequences of flooding in Nigeria: a review. *Biological and Environmental Sciences Journal for the Tropics* 11(2).
- Mensah, H. & Ahadzie, D.K. (2020). Causes, impacts and coping strategies of floods in Ghana: a systematic review. *SN Appl. Sci.* 2, 792. <https://doi.org/10.1007/s42452-020-2548-z>
- Ministry of environment and water resources (2021). Lagos state government: Second five year climate action plan 2020 – 2025. <https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/>
- Oluwashinaayomi, F. K. (2014). *Urban dynamics and vulnerability to disasters in Lagos state, Nigeria (1982 – 2012)*. [Doctoral dissertation, University of Ibadan]
- Osuret, J., Atuyambe, L. M., Mayega, R. W. et al. (2016). Coping strategies for landslide and flood disasters: a qualitative study of Mt Elgon region, Uganda. *PLoS Curr.* <https://doi.org/10.1371/currents.dis.4250a225860babf3601a18e33e172d8b>
- Songsore, J. (2017). The complex interplay between everyday risks and disaster risks: the case of the 2014 cholera pandemic and 2015 flood disaster in Accra, Ghana. *Int J Disaster Risk Reduct* 26:43–50. <https://doi.org/10.1016/j.ijdrr.2017.09.043>
- Tabiri, M. O. (2015). Perennial problem of floods in Accra: what is the way forward? *Int J Adv Res Educ Technol* 2:198–201.
- Tasantab, J. C. (2019). Beyond the plan: how land use control practices influence flood risk in Sekondi-Takoradi. *Jamba: Journal of Disaster Risk Studies Vol 11*, No 1 a638 <https://doi.org/10.4102/jamba.v11i1.638>.
- United Nations Department of Economic and Social Affairs (2015) Population Division, World Urbanization Prospectus: The 2014 Revision, United Nations: New York.

IMPACTS OF FLOOD ON INHABITANTS LIVING AROUND LAGOS LAGOON CORRIDORS: EMPHASIS ON MAKOKO, IDO, AND OTO
REQUEST FOR INFORMATION

Dear Respondent,

I am carrying out a study on “impacts of flood on inhabitants living around Lagos lagoon corridors: emphasis on Makoko, Iddo, and Oto”, and you have been chosen to be part of the study. This questionnaire is only for academic purposes. Kindly select the response which applies to you and all information will be kept confidential

Instructions: Please tick (√) as appropriate where

SA = Strongly Agree (SA), A = Agree, D = Disagree (D), SD = Strongly Disagree (SD)

Key: Strongly agree (4), Agree (3), Disagree (2), and strongly disagree (1).

S/N	ITEMS	SA	A	D	SD
RQ1	What are the factors responsible for flooding in the study area?				
1	Poor waste management and collection				
2	Flooding from river or lagoon				
3	Lack of appropriate drainage				
4	Failure of storm drains				
5	Overpopulation				
6	Climate change				
7	Government negligence				
8	The presence of the lagoon and increases in its water level				
9	Sand infill and land reclamation activities				
10	Building on drainage channels				
11	Heavy rainfall				
RQ2	What is the impact of flood on the inhabitants in the study area?				
12	Damage to property				
13	Income loss due to sickness and medical expenses				
14	Disruption of economic and livelihood activities				
15	Environmental pollution				
16	Prevalence of malaria and other diseases				
17	Depression arising from economic and social costs				
18	Release of toxic materials				
19	Loss of lives				
RQ3	What are the coping strategies adopted by residents in the study area?				
20	Raising the wall/foundation of building				
21	Construction of drainage channels				
22	Temporary relocation				
23	Insure building and property				