

# **Assessment of the Effect of Flooding on Property Values in Ogbaru Local Government Area, Anambra State, Nigeria.**

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## **Abstract**

*This research focused on assessing the effect of flooding on property values in Ogbaru Local Government Area, Anambra State, Nigeria. Data were collected through questionnaire instruments administered on both the residents in Ogbaru Local Government Area and registered Estate Surveying and Valuation firms in Anambra State. A total of 97 copies of the questionnaire were administered on the residents out of which 83 (86%) copies were retrieved and a total of 26 questionnaires were administered on Estate Surveying and Valuation firms in Anambra State out of which 20 (77%) were retrieved. Data obtained were analyzed using table, percentage and mean item score. Respondents were required to scale the factors based on five points likert scale. The study revealed that almost 71% of the residents have witnessed flood occurrence while only 24% have not experienced flooding. The result of the findings shows that heavy rainfall was ranked first, sea level rise was ranked 2<sup>nd</sup>, lack/poor drainage system was ranked 3<sup>rd</sup>, improper refuse disposal was ranked 4<sup>th</sup>, topography was ranked 5<sup>th</sup> and illegal physical development the least of the factors responsible for flooding. The study therefore recommends that construction of drainage channels should be made wide enough to drain a large quantity of rain and sewage water within the area. Also, there should be adequate public awareness and education on dangers of flooding.*

**Keywords:** *Effect, Flooding, Property Value, Ogbaru Local Government Area and Nigeria.*

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## **I. Introduction**

Flooding is a natural disaster and sometimes can be caused by human activities. Flooding is one of the most frequent and widespread disasters which affect life, livelihood and properties globally. It basically accounts for nearly more than half of all the natural disasters in both developed and developing nations of the world (UNISDR, 2012). Flood disasters frequently occur in Nigeria, as such most states are experiencing increased distress from yearly flooding most often during the rainy seasons due to rainfall (Aja and Olaore, 2014). Flooding can be defined as a high-water stage in which water overflows its natural or artificial banks into normally dry land causing unpredicted damage and threat to life. It is a situation that results when land that is usually dry is covered with water from overflowing rivers or heavy rain, flooding occurs naturally on the floodplains which are prone to flood disaster (Omisore, 2011). Udobi (2021) noted that damage caused by floods to agriculture, homes and public facilities around the world runs into several millions of dollars annually. Floods are among the most devastating natural disasters in the world, claiming more lives and causing more property damage than any other natural phenomena due to its occurrences (Oginni, Chukuma, Akinrogunde, and Akinola, 2021). It occurs when water in the river overflows its banks, or sometimes results from a constructed dam. Across the globe, floods have posed tremendous danger to people's lives and properties. Flooding is one of the factors responsible for the spread of diseases such as diarrhea, typhoid, scabies, cholera and malaria. More so, it immensely affects the value of property (it decreases the value of property in those areas compared to those areas where flooding is minimal).

Flood disasters in Nigeria can be mainly attributed to anthropogenic causes which are being aggravated by poor urban planning and inadequate environmental infrastructure. The nonexistence of Flood Risk

Management (FRM) strategy or all-inclusive flood risk maps in the country, for instance, is evidence that flooding issues are poorly attended to (Oladokun and Proverbs, 2016). For instance, a location with a minimal basic infrastructure, unplanned growth and rapid urbanization in addition with the effects of climate change means heavy rainfall could bring about flooding (Baker, 2012). Whenever the problem of flooding occurs, many homes especially those that are susceptible to flooding are swamped and properties worth millions of naira are often destroyed and sometimes human lives are involved as the flood tide sweep away everything on its path thereby leaving residents to recount their losses (Ayedun, et al, 2018). Flooding which is one of the frequently occurring disasters in Nigeria is often in the form of river floods, flash floods, urban floods or coastal floods (Collins and Sampson, 2007). In the history of flooding in Nigeria, the severest case occurred between July and October 2012 when 363 persons lost their lives, 2.1 million persons across ten states were displaced and 18,282 were injured (NEMA, 2012). Ayedun, et al (2018) stated that flood do occur as a result of heavy rains, dam breakage and blockage of the channels and when soil and vegetation cannot absorb all the water, the excess water then runs off the land in quantities that cannot be carried in streams, channels or retained in natural ponds and constructed reservoirs such as dams. However, between September and October 2012, the torrential rainfall hit the entire low land areas of Nigeria resulting in flooding along most rivers and streams in the country, which were very devastated (Al-Amin, 2013). This historic flooding has increased awareness of flood hazards in Nigeria, especially those living within the flood prone areas (Egbenta, Udo and Otegbulu, 2015).

Floods are major disasters affecting Ogbaru Local government Area, Anambra state. The recent incidence of flood disaster in the area has been attributed to increased rainfall as well as topography of the area. Flooding has rendered some of the people in Ogbaru homeless and destroyed their means of livelihood. Ogbaru Local government Area experiences flooding annually especially during the rainy season. Flooding posed a major concern to the residents of Ogbaru especially those living in flood prone areas. The access roads to some of their properties during the rainy season are usually in their worst states and this deteriorates year after year. As a result of the increasing intensity and frequency of flooding in the recent past, attempts have been made to investigate the natural and human causes of flood and flood related disasters. This study therefore set to identify main factors responsible for flood and their effects on property value in Ogbaru Local Government Area, Anambra State

### **Study Area**

The study area is in Ogbaru Local Government Area, Anambra State. Ogbaru is a local government area in Anambra State, south-central Nigeria. The area's local government headquarters is in the port city of Atani. Ogbaru people boundaries with Anioma people in Delta State and Ndoni people in Rivers State. Towns within the region include Atani, Akili-Ogidi, Akili-Ozizor, Amiyi, Mputu, Obeagwe, Ohita, Odekpe, Ogbakugba, Ochuche Umuodu, Ossomala/Ossomari, Ogwu-aniocha, Umunankwo, Umuzu, Okpoko, and Ogwu-Ikpele. Ogbaru is neighbored to the north by Onitsha, a major commercial city in Nigeria also located in Anambra State.

Ogbaru is surrounded by River Niger to the west, from okpoko town to Ogwu-ikpele boundary with Rivers state (west end) and the Orashi River to the East along Ogwu-aniocha and Osomari forest reserve (east end), Ogbaru boundary with Ihiala and goes up to Okija, Ihiala, Owerri Onitsha road, also borders Ozubulu, Oraifite and Oba to its northeast. The presence of the river makes the area subject to frequent flooding due to heavy rainfall during the rainy season which affect houses, local farms and crops. A major flood in 2018 killed 12 people and polluted nearby rivers (Onyeizugbe and Onyejiaka, 2020). The overflow of River Niger and downpour in the past few days fuelled the rise of the water level. Houses, farmlands, markets and business houses have been swallowed by the flood. Flood has taken over places like OgwuIkpele, Akili Ogidi, Obeagwe, Ossomala, Umunankwo, Ogbakuba, Ochuche, Akili Ozizor, Atani, Ohita, Odekpe, Amiyi, Iyiowa, Ogbeukwu, Okoti, Ochuche Umuodu and parts of the slum Okpoko near the commercial city of Onitsha. One of the impacts of the flood is house collapse causing death in the community.

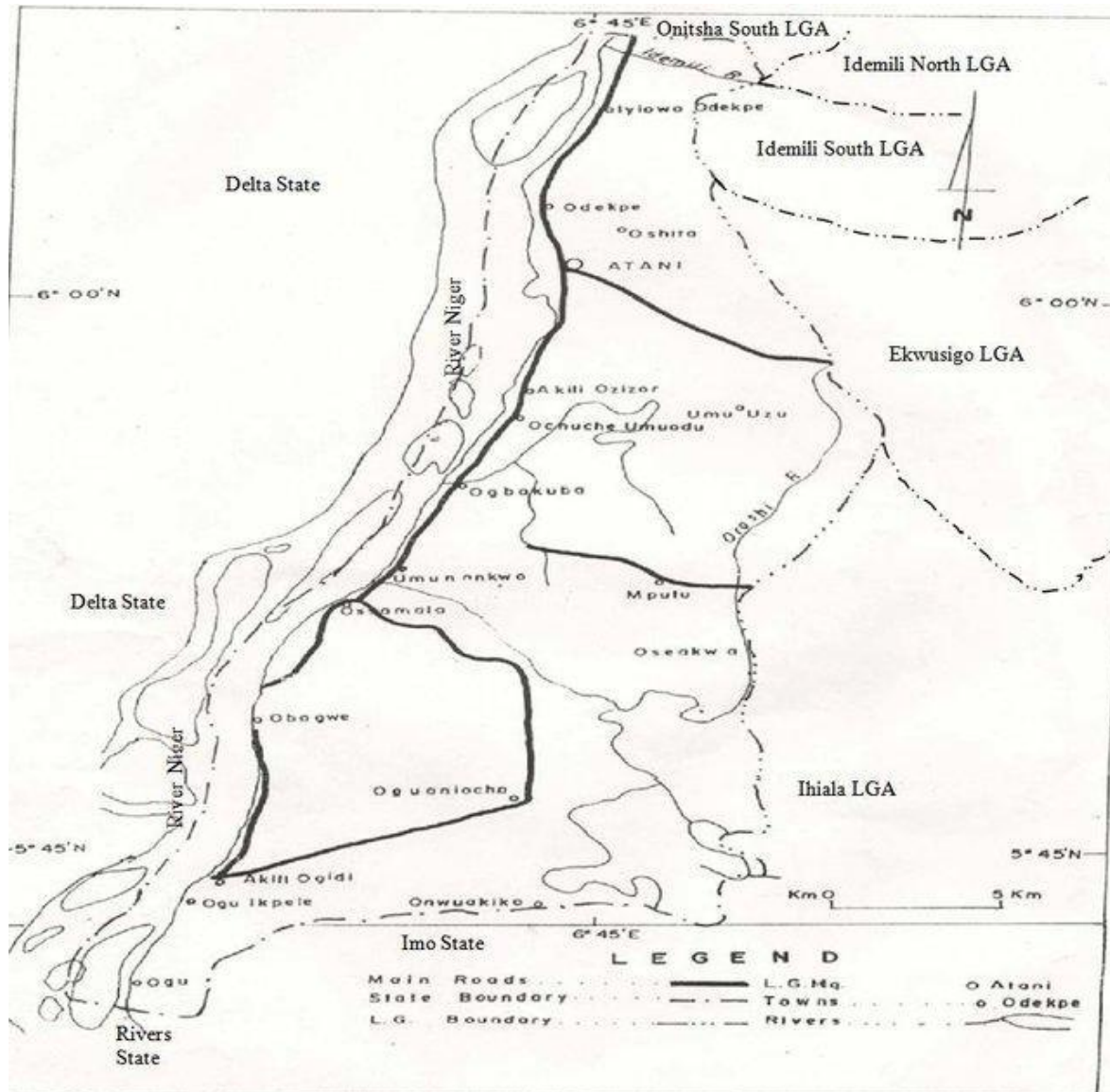


Figure 1: Map of Ogbaru Local Government Area, Anambra state.

## II. Literature Review

### 2.1 Causes of flood

The causes of flood can be categorized into two: natural and man-made. Flood is caused by natural factors when the hydrological cycle is interrupted or changed by extraneous circumstances like heavy rainfall, melting snow, hurricanes, cyclones or tsunamis. On the other hand, man-made causes of flood, according to Keim (2009) are often due to alteration in the environment watershed, due to deforestation, overgrazing, failure of dams, embankments and levees, channeling of stream, urbanization of wetland, slowing run-off into stream and reducing flood peaks. Keim further stated that altering the environment affects global climate change predicted to increase the frequency of flood hazards worldwide. He also noted human behaviour as a factor that increases human vulnerability to the effects of flooding. These include improper solid waste management, lack of awareness, failure in engineering flood control such as levee and dam construction which may contribute to greater human losses and physical damage. Ojo (2011) identifies causes of flood in developing nations as unregulated developments, invasion of public areas, lack of institutional capacity at municipal level, unrealistic regulations, economic pressures from developers, ineffectiveness of planning regulation by allowing development on flood plains and poor and lack of standard drainage system on roads. Ajibola, Izunwanne and Ogungbemi (2012) identify the causes of flooding as; sea-level rise, subsidence and compaction of sediments, riverbed aggradation, soil erosion due to tilling, excessive development, damming of rivers, seismic (earthquake) and neotectonic activities and greenhouse effects. Omisore (2011) grouped the causes as natural causes (heavy torrential rains or storm, ocean storms and tidal waves, usually along the coast and blockade of river or drainage courses by waste) and human causes (lack of meteorological data for weather forecasting, burst

of main pipes, dam burst/levee failures, dam spills, property development along river setbacks and indiscriminate waste disposal).

### **2.1.1 Natural Causes of Flooding:**

- i. High rainfall: Heavy rainfall raises the water level higher than the river bank or the dams, thereby causing flooding.
- ii. Sea-level rise: As a result of rise in sea level, the water body overflows its bank thereby flooding the surrounding areas. Because of global warming, higher temperatures melt ice caps and the water goes into the sea, thereby raising the sea level, leading to flooding.
- iii. Topography: Topography of an area refers to the forms and features of land surfaces. It is a landform in a given area. When the topography of an area is bad it can easily cause flooding.

### **2.1.2 Man-made Causes of Flooding:**

- i. Poorly or non-existent constructed drainage system: Drainage that is poorly constructed or poorly maintained, easily collapses and this results in flooding. Poorly constructed drainage systems are one of the leading contributors and exacerbating factors to flood disaster in Nigeria (Ojo and Adejugbagbe, 2017). Insufficient and poorly managed drainage systems can be considered as a main influencing factor to the rise in the rate of flooding in Nigeria (Ocheri and Okele 2012; Dalil et al., 2015).
- ii. Solid waste disposal / improper refuse disposal: Improper refuse disposal and the habit of disposing solid waste into water channels and drainage often cause intensive flooding in an area.
- iii. Population pressure: Large numbers of people living in areas are at high risk of flooding due to increased human activities. Increased population and increasing human activities has continued to extend development and push people to live closer to the water body.
- iv. Deforestation: Clearing large areas of forest near rivers for settlement, roads and farmland leaving less vegetation to protect the soil, which is lost to rivers and raises the river bed, to overflow its banks easily.
- v. Poor farming: Some farming practices damage vegetation cover thereby exposing the soil to weather conditions vulnerable to be easily washed into the river, silting its bed, raising its level and causing flooding.
- vi. Overgrazing: Grazing too many animals on the land with less vegetation cover results in soil being washed into the rivers easily.
- vii. Over-cultivation: A piece of land being cultivated for a long period of time, soil becomes infertile that no vegetation can grow on it again, hence easily washed into the rivers.

## **2.2 Effects of flooding on property value**

Flood events and its impacts in recent times have arguably been unprecedented and affected the lives of hundreds of millions of people across the world. These impacts have been shared by both developed and developing countries with rapid urban expansion taking place in many flood-prone areas. Concerns for flooding and the associated human impacts are clearly of global significance, especially when allied with the fears of climate change and associated changes in rainfall events and sea level rise (Kundzewicz et al. 2014). Floods are the most frequent natural disasters globally, affecting over 2.8 billion people and are responsible for over 200,000 deaths over the past three decades (Hashizume, 2013). The occurrence of environmental hazards such as flooding is not new. However, what is new is the increasing level of damages to lives and properties witnessed as a result of high magnitude and highly frequent floods experienced in the developing countries like Nigeria. Studies on water, poverty and flood have observed that there was an increasing rate of flood occurrences and severity in recent years; resulting to loss of lives, injuries, homelessness, damage to environment and infrastructure as well as impacting on agriculture, health and education (Sadiq, 2012; Bariweni et al, 2012; Efobi and Anierobi, 2013). In recent years, the ravaging effects of flooding in Nigeria became so drastic that it was seen as a national disaster. Flooding according to Odunuga, Oyebande and Omojola (2012) is a serious disaster in the world, which not only causes serious damage but disturbs normal life and working conditions. Furthermore, according to the World Health Organization (WHO) flooding accounts for 40% of all natural disasters worldwide. The main health impacts are deaths, injuries, waterborne disease and emotional trauma. However, on average, the higher the water depth and the greater the flow velocity of a flood, the greater the damage to property (Gayelord, 2008).

Flooding may result from increased volume of a body of water such as a river or lake that overflows or breaks levees which then result to some of the water escaping boundaries, in addition, it can also form where there is no stream as for example when abnormally heavy precipitation falls on flat terrain at such a rate that the soil cannot absorb the water or the water cannot run off as fast as it falls (Grima et al., 2011). Lakshmanan (2011) also added that flood is a state of high water level along a river channel or on the coast that leads to inundation of land which is not usually submerged. Against the belief that flooding will seemingly have a major adverse effect on real estate value, Kropp (2012) identifies the following as the most important value influencing factors of real estate: flooding or flood risk, demographic structure, neighborhood, traffic situation,

business situation, social facilities, environment influences urban greening, legal situation, development status, contamination, types and degree of building and land use, protection of historical monuments, form and size of the property, topography, unemployment rate, cost of living, purchasing power, interest on capital and population development. Furthermore, Lamond (2008) concluded that measured impacts of flooding on property price are temporary in nature as they appear to be a reaction to flood events rather than to flood risk designation while the effect of flood status on property value is small relative to location, property size and type.

There are several extant literature both locally and internationally on the impact of flooding on lives and buildings based on events and data such as Omojola (2009), Emodi (2008), Lamond (2008) amongst others. However, research on the effect of flooding on the market value of real estate seems to be limited. Ayedun et al, (2018) in the examination of the impact of flooding on residential properties in Dophin Estate, Ikoyi, Lagos State Nigeria, revealed flooding as having negative impact on the values of properties within the estate as incessant flooding occurrence in the estate forced both rental value and selling prices of flooded buildings in the estate drastically down, thereby resulting to inability of real estate investors in the estate to recoup their capital outlay in good time. Bin and Kruse (2006) have shown that a common finding from several studies is that location of property within floodplains lowers property value anywhere from 4 to 12 percent of average. Bin and Kruse (2006) estimate the effects of flood hazard on residential property values using a hedonic property price method. The results of the study indicate that on average property values are 5–10% lower if located within a flood zone that is not subject to wave action.

### III. Research Methodology

The study was carried out using a survey approach. Random sampling technique was adopted in the selection of the sampled properties. Data collection was done with the administration of instruments (questionnaire) on the selected respondents. Data used for the study was obtained through the use of questionnaires administered on residents of Ogbaru Local Government Area in a flood prone area and registered Estate Surveying and Valuation firms in Anambra state. A total of 97 questionnaires were administered on the Residents in Ogbaru Local Government Area, Anambra state while 26 questionnaires were administered on the registered Estate Surveying and Valuation firms in Anambra state (Nigerian Institution of Estate Surveyors and Valuers, NIESV Directory Anambra State Branch, 2021). A total of 83 (84%) and 20 (77%) copies of the administered questionnaires were retrieved from residents and estate surveying and valuation firms respectively. However, the questionnaire retrieval level indicates a response rate of 84%. In analyzing the data collected, the mean item score was applied in addition to frequency tables and percentage methods. With the use of Likert scale, factors were scaled according to the degree of response: Strongly agree with 5 points, Agree with 4 points, Indifferent with 3 points, and Disagree with 2 points and Strongly disagree with 1 point.

#### 3.1 Result and Discussion

##### Questionnaires Distributions and Response Rates

**Table 1: Distribution and Response Rates to the Administered Questionnaires**

Respondents	No. Distributed	No. Retrieved	Percentages %
Residents	97	83	86
Estate Firms	26	20	77
Total	123	103	84

Table 1 shows that 97 questionnaires were distributed to the residents out of which 83 (86%) were retrieved while 26 questionnaires were administered to estate surveying firms operating in Anambra state out of which 20 (77%) were retrieved.

**Table 2: Experience of Flooding Occurrence by the Respondent Residents**

Experiencing flooding	Frequency	Percentages %
Yes	73	71
Indifferent	5	5
No	25	24
Total	103	100

Table 4 shows that 71% of the respondent residents have experienced flood occurrence while only 24% have not experienced flooding while only 5% respondents were indifferent. This shows that the majority of the residents had been victims of flooding at one time or the other in Ogbaru Local Government Area.

**Table 3: Effect of flood on liveability**

Responses	Frequency	Percentage%
Very high	14	14
High	65	63
Moderate	14	14
Low	7	7

Very low	3	3
Total	103	100

Table 3 shows that 63% of the respondents see the effect of flooding on the liveability as high, 14% respondents see its effect as “moderate”, while 7% respondents see the effect as low. This means that flooding affects life, property and livelihood of people in Ogbaru Local Government Area.

**Table 4: Responses and Ranking of the Perception of respondents on the factors responsible for flooding**

S/N	Factors	Scales and Number of Respondents					Mean Score	Ranking
		5	4	3	2	1		
1.	Heavy rainfall	63	30	8	3	-	4.51	1
2.	Sea level rise	60	32	7	4	-	4.44	2
3.	Lack/Poor drainage system	56	33	10	3	1	4.36	3
4.	Improper refuse disposal	55	34	9	4	1	4.34	4
5	Topography	53	35	7	5	2	4.25	5
6	Population pressure	43	37	9	11	4	4.00	
7	Deforestation	42	37	8	9	6	3.94	6
8	Illegal physical development	38	38	10	10	7	3.87	8

**Rank:** (Strongly agree -5, Agree -4, indifferent-3, Disagree -2, strongly disagree -1)

Table 4 shows that heavy rainfall was ranked first above all other factors responsible for flooding. Sea level rise was ranked 2nd, lack/poor drainage system was ranked 3<sup>rd</sup>, improper refuse disposal was ranked 4<sup>th</sup>, topography was ranked 5<sup>th</sup> and illegal physical development the least of the factors responsible for flooding. This implies that the major causes of flooding are excessive rainfall and sea level rise. This also means that flooding mostly occurs during the raining season in the area.

**Table 5: Responses and Ranking of the effect of flood on property value**

S/N	Impacts Factors	Scales and Number of Respondents					Mean Score	Ranking
		5	4	3	2	1		
1.	Flooding reduces property value	61	31	9	2	-	4.47	1
2.	Flooding reduces the price of properties	59	32	9	3	-	4.43	2
	Flooding destroyed properties and render residents homeless							

3.		55	34	9	5	1	4.36	3
4.	Flooding affect access road to residential properties	56	32	10	4	1	4.34	4
5	Flooding reduces the size of property	53	33	11	5	1	4.28	5

**Rank:** (Strongly agree -5, Agree -4, indifferent-3, Disagree -2, strongly disagree -1)

From the analysis in table 5, Flooding reduces property value rank 1<sup>st</sup>, Flooding reduces the price of properties rank 2<sup>nd</sup>, Flooding destroys properties and renders residents homeless rank 3<sup>rd</sup> etc. This implies that flooding affects property value.

#### IV. Conclusion and Recommendation

This study intends to assess the effect of flooding on property value. Floods damage properties and endanger the lives of humans. The results show that the prominent causes of flooding in Ogbaru Local Government Area are heavy rainfall and sea level rise (overflow of river). However, other factors responsible for flooding in the area are lack or poor drainage system, improper refuse disposal, topography and population pressure.

The study recommends construction of proper drainage systems by the State Government within the area so that large quantities of rain and sewage water can drain properly in the drainage channel. The study also recommends that the State Government should provide various ways of disseminating information to residents through broadcast media and interpersonal communication on the dangers of flood and its causes as well as the risk of flood. There should be adequate public awareness and education on dangers of flooding. This will get the people in the flood prone area in Ogbaru to prepare and make alternative accommodation for the period of flooddisaster. There should be proper land use planning by the state government to manage the topography of the area.

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