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Effect of Poor Urban Planning and Ineffective Development Control on Flooding in Katsina-Ala Town of Benue State, Nigeria.

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Abstract

The study examines the effect of poor urban planning and ineffective development control on flooding in Katsina-Ala town, Benue State. The research employed a mixed methods design in which qualitative and quantitative data were collected. Secondary data from Benue state urban development board on master plan and development control standards/measures as well as development permits were used. Primary data was collected through field observations, interviews and questionnaire administration. The field survey employed purposive non-probability sampling techniques where five residential zones that were affected by the disaster within the study area were selected for questionnaire administration to test the three null hypotheses formulated. The respondents for the survey were selected randomly from five residential zones affected by recurrent flooding. Fifty respondents were selected from each of the five (5) sampled settlement zones given a sample size of 250 respondents. Data collected were analyzed using descriptive statistics. The study revealed that the recurrent flooding in Katsina-Ala town is occasioned by poor urban development and ineffective development control and has significant socio-economic effect on the lives of the inhabitants and also has significant effect on the environmental condition of the inhabitants. The study recommends among others integration of flood risk assessment into the planning process, enforcement of strict zoning laws that limit construction in vulnerable areas and encouragement of community participation in the planning process.

Key words: Poor Urban Planning, Ineffective Development, Flooding, Risk Assessment, Environmental Management

Introduction

The world has become increasingly urbanized in the last one and a half decade with urban population outstripping the rural population from 2007. The changes in land use associated with urban development is the cause of flooding in many cities (Liman, Akilu&Idris, (2022). The alarming rate of rapid urbanization experienced in many developing countries, including Nigeria especially in cities has less regard for urban planning and development control (Adeleye, Popoola, Sanni, Zitta & Ayangbile, (2019), Hafiz & Kolade, (2019) and Adah & Abok, (2019). The resulting consequences include severe housing shortages and proliferation of improperly constructed housing structures and informal settlements, poor environmental management and sanitation practices, dearth of critical infrastructures, rising crime rates and flooding (Junaid, (2017). Flooding has become a perennial problem in many cities in the developing countries where several lives and property worth millions of US Dollars are lost annually in addition to the dislocation of several socio-economic activities (Adeleye, Popoola,Sanni,Zitta & Ayangbile,(2019).

Urban flooding can be coastal fluvial or pluvial or a combination of these types of floods. Flash floods are normally a result of runoff from a torrential downpour, particularly if the catchment slope is able to absorb and hold a significant part of the water. Other causes of flash floods include dam failure or sudden break up of ice jams or other river obstructions. Flash floods are potential threats particularly where the terrain is steep, surface runoff is high, water flaws through narrow canyons and where severe rainstorms are likely(Albert, Olatinwo, Olayemi Alalade, Agbolade & Ayuba, 2019).River floods take place in river systems with tributaries that may drain large geographic areas and encompass many independent river basins. In contrast to flash floods, river floods normally build up slowly, are often seasonal and may continue for days or weeks (Albert, et al, (2019).

Mohammed (2018) and Hafiz & Kolade (2019), viewed the perennial flood experienced in Lokoja and also in other urban centres in Nigeria are human induced and could be linked to the poor implementation and enforcement of 1992 Nigeiran Urban and Regional Planning Law where development control requirements are clearly stated. They further argued that if various development control instruments were effectively deployed, the incidence of flood experienced in Lokoja would have been prevented. Abaje, Ogoh, Amos & Abashiya (2015) cited in Rufai, Murtala & Amina (2021), Posit that most of the flood occurrences in Katsina state owe their reasons not only to high torrential rainfall but also improper physical planning, blockage of drainage channels, deforestation and erection of structures in areas of high risk. Onwubiko (2017), also asserted that the perennial flooding experienced in Suleja was manmade and can directly be linked to the poor application of development control measures in the settlement.

In Benue State, Urban Development Board is a creation of the Urban Development Board edict No. 8 of 1986. The Board was created to, among other functions, administer, execute and enforce the

provisions of the town and country planning law. The Board is therefore empowered to plan, promote and secure the physical development and regional development policies, plans and activities in respect of all urban areas of the state. It is instructive to add that it was the desire of government to eliminate the bureaucratic bottlenecks, which believe the ministries that were handling physical planning and development functions that informed the creation of the Urban Development Board as a specialized unit to meet the urban development needs of the state.
The edict was amended in 2020 designating all local government headquarters as urban centres including Zaki biam and Ogbokolo.

Katsina-Ala town which is an ancient colonial town, before the edict empowering the urban development board to monitor planning and development activities in all urban centres in the state had no existing master plan. And by this there was a chaotic physical development and poor development control in the town. In view of the above, the taking over of the urban planning and development control role by the Benue state urban development board from the local government survey department became a cumbersome task in terms of correcting the already existing chaotic physical development and enforcing a new physical development plan. For instance, haphazard development, inadequate infrastructure, disregard for environmental considerations such as the 6metres set back that is to be observed in flood prone areas was not adhered to, the absence of existing master plan, lack of awareness by the inhabitants; among other factors may have implications on the influence of urban planning and development control on flooding in Katsina-Ala town. Hence this research is set to investigate the effect of poor urban planning and ineffective development control on flooding in Katsina-Ala town.

Literature Review

Concept of Urban Planning

Rufai, Murtala & Amina (2021) considers urban planning as being a technical and political process concerned with the development and use of land, protection and use of the environment, public welfare, and the design of the urban environment, including air, water, and the infrastructure passing into and out of urban areas such as transportation, communications and distribution network. Also LFN, (2004) defines town planning as being “the ordering and control of the sitting and erecting of buildings and other structures and the provision of open spaces and similar use of land, as the case may be, for the improvement of the human environment”. Therefore, the aim of urban planning according to Chadwick (1971) as cited in Adah & Abok (2019) is to attain the best use of land and greatest possible improvement in human environment.

Urban planning according to Simon and John (2017), is the process of guiding and directing the use and development of land, urban environment, urban infrastructure, and related ecosystem and human services—in ways that ensure the maximum level of economic development, high quality of life, wise management of natural resources, and efficient operation of infrastructures. In more detail, urban planning entails drawing up, evaluating, and forecasting an organized, coordinated, and standardized physical arrangement of a city and the underlying infrastructural systems, processes, functions, and services, i.e. the built form (buildings, streets, neighborhoods, residential and commercial areas, parks, etc.), urban infrastructure (transportation, water supply, communication systems, distributed networks, etc.), ecosystem services (energy, raw material, water, air, food, etc.), human services (public services, social services, cultural facilities, etc.), and administration (delivery of services and provision of facilities to citizens, implementation of mechanisms for adherence to established regulatory frameworks, policy recommendations, various technical and assessment studies, etc.). The ultimate aim of urban planning is to make cities more sustainable and hence livable and attractive places. As an academic discipline, urban planning is concerned with research and analysis, sustainable development, strategic thinking, environmental planning, transportation planning, land–use planning, landscape architecture, civil engineering, policy recommendations, implementation, administration, and urban design

Concept of Development Control

Development control in the context of urban planning viewed by Yemi (2004) cited in Adeleye, Popoola, Sanni, Zitta & Ayangbile (2019) is the process of implementing buildings and land subdivision regulations and specifications to regulate land use and physical development of land. Development control in this regard is a professional activity carried out by town planners, planning authorities and physical planning agencies in order to ensure compliance with approved master plan. It is viewed as a mechanism and measure put in place to maintain standards and guide orderly urban development Salami, Von & Giggins (2017). Development affects the general public most as it ensures an orderly growth of settlements by stipulating adequate standards for all aspects of land use through the provision of adequate lighting, ventilation, open spaces, and other socio-cultural facilities that make life worth living (Hafiz & Kolade (2019). Development control positively encourages developers to focus on the protection and enhancement of built environment; the co-ordination of both public and private investments in land and property to ensure that land is efficiently used, and the control of pollution. To ensure a more effective measure to control spatial development, the 1992 Nigerian Urban and Regional planning decree was established in which 47 sections confer power on the federal, state and local government council to establish planning authorities and prepare a physical development planning scheme at each level (Kio- Lawson, Duru, John & Eebee, 2016). Following this, the state and local government councils established several planning authorities in different states to regulate physical development, despite the existence of these physical planning agencies, majority of the urban centres in Nigeria including Katsina-Ala town, still show evidence of environmental decay, incompatible physical development, increasing

states of slums and flooding in some cities in the country (Kio – Lawson Duru, John & Eebee 2016). Development control is therefore one of the important mechanisms in planning to ensure that the purpose of urban development complies with planning guides.

Study Area

Katsina-Ala town is the administrative head quarters of Katsina-Ala Local Government Area of Benue State. It lies approximately between latitude $7^{0}23^{'}30"$ to $7^{0}12^{1}30"$ North of the equator and longitude $9^{0}15^{'}0"$ to $7^{0}23^{'}30"$ East of the Greenwich Meridian. Katsina-Ala town has an area of about 84.98 square kilometers and has an elevation of between 105-185 metres above sea level. It is located at the loop of the flood plains of the bank of river Katsina-Ala, which makes it vulnerable to flooding. (see fig.1). Katsina-Ala is the most densely populated and fastest growing settlement in Katsina-Ala local government area. The high population concentration in the town also has implication on flooding. The prevailing tropical wet and dry climate as well as the hydrographic condition has a lot of influence on the vulnerability of katsina-Ala town to flood risks (Hundu, Anule, Kwanga & Dam, 2021).

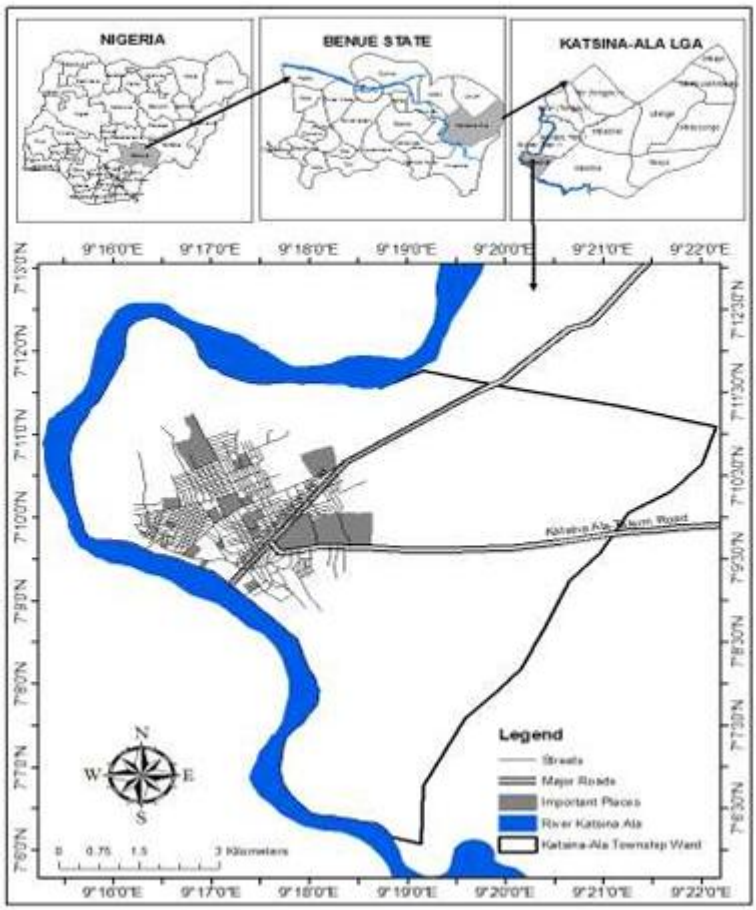

Fig 1: Map of Katsina-Ala Township

Source: GIS Laboratory Benue State University Makurdi.

Methodology

The study used mixed methods design, in which qualitative and quantitative data were collected. In this study, secondary data from Benue state urban development board on master plan development control standards/measures as well as development permits were used to examine poor planning and non-adherence of development control measures in Katsina-ala town. Primary data was collected through field observations, interviews and questionnaire administration. Questionnaire survey explored information on the socio-economic characteristics, factors influencing flooding as well as socio-economic and environmental effects of flooding in the town. The field survey employed purposive non-probability sampling techniques where five residential zones that were affected by the disaster within Katsina-Ala town were selected for questionnaire administration to understand the factors influencing flooding as a result of poor urban planning and ineffective development control measures and identify the effects of flooding on the inhabitants within the study area. The respondents for the survey were selected randomly by visiting households in the five residential zones affected by recurrent flooding. Data from the households were analyzed using descriptive statistics; fifty respondents were selected from each of the five (5) sampled settlement zones in Katsina-Ala town namely: NKST Adzege, Gbor-Aya, Hausa Quarters, Tse-Tsav, Abaver areas, given a sample size of 250 respondents.

Statement of Research Hypotheses

Ho_1 Factors Influencing Flooding in Katsina-Ala Town has no significant relationship with Poor Urban Planning and ineffective development control.

Ho_2 Flooding in Katsina-Ala town has no significant effect on the socio-economic lives of the inhabitants.

Ho_3 Flooding in Katsina-Ala town has no significant effect on the environmental condition of the inhabitants.

Results

Socio-Economic Characteristics

Table 1: Socio-economic Characteristics of Respondents

	Respondents	**Frequency**	**Percentage**
Sex	Male	155	62
	Female	95	38
	Total	**250**	100
	Less than 20	7	3
Age	21-30	75	30

	31-40	63	25
	41-50	65	26
	51-60	30	12
	Above 60	10	4
	Total	**250**	**100**
Marital Status	Married	133	53
	Divorced/ Widowed	12	5
	Single	105	42
	Total	**250**	**100**
Educational Status	No Formal Education	12	5
	Primary Education	43	17
	Secondary Education	80	32
	Tertiary Education	115	46
	Total	**250**	**100**
Respondents Primary Occupation			
	Farming/ Fishing	55	22
	Trading/Business	32	13
	Retiree	35	14
	Civil servant	30	12
	Student	78	31
	Driver	20	8
	Total	**250**	**100**
Respondents Income Per Month			
	Less than 20,000	70	28
	20,000-39,000	83	33
	40,000-59,000	35	14
	60000-79000	25	10
	80,000-99,000	25	10
	100000-	12	5
	Total	**250**	**100**
Respondent House Type			
	Flat	85	34
	Bungalow	12	5
	Duplex	8	3
	Compound house	145	58
	Total	**250**	**100**
House ownership by respondents			
	Personal house	190	76
	Rented house	50	20
	Government	10	4
	Total	**250**	**100**

Table 1 show that 62% of the respondents were males whereas the female were 38%. The result could be attributed to the socio-cultural setting of the study area in which more males are found performing the role of heads of households and more reachable than their female counter parts.

Majority of the respondents interviewed (96%) were within the productive of from less than 20 to 60 years as captured by NPC (2006). The table also indicates that 53% of the respondents are married, 5% were either divorced/widowed while 42% were single. The higher percentage of married respondents is as a result of early marriage practiced by the people of this region. However, the number of single respondents is also reasonable (42%) which is as a result of large number of students and other low income earners found in those areas.

It is also evident from table 1 that 95% of the respondents had acquired one form of formal education or the other. This is because majority of the people residing in the study area either civil servants or students because of the function of the town as an administrative headquarters and also and also as an educational town which host one of the oldest tertiary institution College of Education, Katsina-Ala and other secondary and primary institutions.

It is also glaring from table on that students (31%)constituted the major occupational group living in the study area followed by farming/fishing (22%), retiree (14%), trading (business), civil servant (12%) and Driver (8%) in that order. A critical look at the occupation of the households heads living in the study area indicates that 61% are living below the National poverty line of 1.90 US Dollars per person per day (NBS, 2023) while only 39% are living above poverty line. This clearly shows that the low income status cannot afford them the opportunity to pay for the desired sanitary services they need for their wellbeing or to buy a plot of land in the highland area because of its expensive nature as well as to build drainage channels in front of their houses.

A look at table 1 again indicates that the compound house type (58%) is the major house type in the study area followed by flat (34%), bungalow (5%) and duplex (3%). It is difficult to handle maintenance in compound house because it contains more than one household. A view from table 1 clearly demonstrates that personal house ownership dominated the study area followed by rented and lastly government. This house ownership can be harnessed for effective flood control since ownership gives control of sanitary activities that are to be household waste collection and disposal. This is because here the owner has power to determine how the entire household should approach sanitation issues.

SN	Items	SA	A	DA	SDA
1	Indiscriminate waste disposal on water is caused by poor urban planning and ineffective development control	160	56	18	16
2	Poor drainage system is as a result of poor urban planning and ineffective development control	122	78	35	15
3	Building in areas liable to flooding is a result of poor urban planning and ineffective development control	100	78	42	30
4	Non-adherence to master plan is as a result of poor urban planning and ineffective development control	120	100	10	20
5	Unauthorized development is caused by poor urban planning and ineffective development control	145	100	2	3

Hypotheses Testing.

$H_0$1 Factors Influencing Flooding in Katsina-Ala Town have no significant relationship with Poor Urban Planning and ineffective development control.

Table 2: **Summary of Chi-square test for factors influencing flooding in Katsna-Ala town as a result of poor urban planning and ineffective development control.**

Responses	O	E	DF	Level of significance	X^2cal	X^2 tab	Decision
Agree	1059	625	4	0.05	642.24	.711	**Rejected**
Disagree	191	625					

Data presented in table 2 shows the calculated value of x^2 as 642.24. This value when compared with the table value of 0.711 at 0.005 confidence level, revealed that the calculated value of x^2 is greater than the table value of x^2 hence the null hypothesis which states that factors influencing flooding in Katsina-Ala town have no significant relationship with poor urban planning and ineffective development control is rejected while the alternative hypothesis which states that factors influencing flooding in Katsina-Ala town have significant relationship with poor urban planning and ineffective development control is accepted.

Ho_2 Flooding in Katsina-Ala town has no significant effect on the socio-economic lives of the inhabitants.

SN	Items	SA	A	DA	SDA
6	Have you experienced any financial losses due to flooding?	92	100	25	23
7	Have you experienced any loss of livelihood due to flooding?	98	113	30	9
8	Have you experienced any displacement or relocation due to flooding?	131	100	12	8
9	Have you been traumatized as a result of flooding?	101	130	7	12
10	Does flooding causes social inequality?	120	130	65	35

Summary of Chi-square Test of Socio-Economic Effect

Responses	O	E	DF	Level of significance	X^2cal	X^2 tab	Decision
Agree	1014	625	4	0.05	557.34	.711	**Rejected**
Disagree	236	625					

It is evident from table 3 that the calculated x^2 (557.34) value is greater than the table value of (0.711) level of significance. It therefore means that flooding in Katsina-Ala town has a significant effect on the socio-economic lives of the inhabitants. Hence the null hypothesis is rejected.

SN	Items	SA	A	DA	SDA
11	have you noticed any changes in water quality due to flooding?	115	100	15	20
12	Has flooding polluted your environment?	90	105	25	30
13	Have you experienced any damage to your home or property due to flooding?	101	108	27	14
14	Have you noticed any increase in health risk due to flooding?	100	89	41	20
15	Has flooding destroyed public infrastructure?	70	100	44	36

Ho_3 Flooding in Katsina-Ala town has no significant effect on the environmental condition of the inhabitants.

Summary of Chi-square Test of Environmental Effect of Flooding

Responses	O	E	DF	Level of significance	X^2cal	X^2 tab	Decision
Agree	978	625	4	0.05	418.84	.711	**Rejected**
Disagree	272	625					

It is discernable from table 4 that the calculated x^2 value (418.84) is greater than tale value (0.711) at 0.05 level of significance. It therefore means that flooding in Katsina-Ala town has significant effect on the environmental condition of the inhabitants; hence the null hypothesis is rejected.

Discussion

The study has shown that poor urban planning and ineffective development control is a factor that is responsible for the recurrent flooding experienced in katsina-Ala town. This findings is in line with the view of Adah & Abok (2019), Adeleye, Popoola, Sanni, Zitta and Ayangbile (2019), Bwala Oladosu & Nghalmi (2016). Who asserts the alarming rate of rapid urbanization experienced in the many developing countries including Nigeria especially in cities has less regard for urban planning and development control. Mohmmmed (2018) and Hafiz and Kolde (2019) also

asserts that the perennial floods experienced in Lokoja and also in other urban centres in Nigeria are human induced and could be linked to the poor enforcement of 1992 Nigerian urban and Regional planning law where development control requirements are clearly stated.

The study also validates the views of Adah & Abok (2019), Albert, Olatinwo, Alalade, Agbolade and Ayuba (2019), who opined that the resulting consequences of flooding includes; severe housing shortages and proliferation of improperly constructed housing structures and informal settlements, poor environmental management and sanitation practices, dearth of critical infrastructures and rising crime rates.

The findings of the study revealed that urban flooding has significant effect on the environmental condition of the inhabitants which corroborates with the findings of Salami, Melding and Giggins (2017), Liman, Akilu and Idris (2022) who confirmed that flood affects so many things such as houses, clinics, transportation routes and educational facilities.

Conclusion

The findings of the study revealed that poor urban planning and ineffective development control is a prime factor influencing the perennial flooding witnessed in Katsina-Ala town. The absence of existing master plan, lack of awareness by the inhabitants, disregard for environmental considerations, haphazard development and inadequate infrastructure have all led to poor urban planning and ineffective development control in the town. Flooding in Katsina-Ala town has serious socio-economic and environmental effects on the inhabitants of Katsina-Ala town.

Recommendations

Based on the findings of the study the following recommendations were made:

- Urban planning practices should be enhanced by integrating flood risk assessment into the planning process, ensuring that new development are located away from flood prone areas, implementing green infrastructure and retrofitting existing urban areas with improved drainage systems.
- Development control measures should be strengthened through enforcing strict zoning laws that limit construction in vulnerable areas and encouragement of community participation in the planning process.
- Investing in early warning system and emergency response plans, provision timely information to residents and educational outreach programs should be organized to create awareness about flood risk and timely information to residents in flood prone areas.
- Benue State Urban Development Board should develop a master plan for Katsina-Ala town ensuring that all the defective developments in the town are corrected.

- Residential areas, commercial establishment and educational institutions should be relocated above 150 meters set back to conform with the standard set by the United Nations' International Strategy for Disaster Reduction (UNISDR).

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