

THE EFFECTS OF UNREGULATED URBANIZATION ON THE WETLAND-RIPARIAN ECOSYSTEM OF YENAGOA METROPOLIS, BAYELSA STATE

***DEINNE, C.E.,¹ ELI, H.D.¹ AND UDOIBEH, N.J.²**

¹Department of Geography and Environmental Management, Faculty of Social Sciences, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.

²Department of Urban and Regional Planning, Faculty of Environmental Science, Niger Delta University, Wilberforce Island, Bayelsa State, Nigeria.

* Corresponding author: cedeinne@gmail.com

Abstract

This study examines the effects of unregulated urbanization on wetland-riparian ecosystem of Yenagoa metropolis, Urbanization in Africa started later than any other part of the globe and at an extraordinary rate of roughly 40%. Africa is the continent that is urbanizing the quickest in the globe right now. A mixed research design was adopted. A 3-staged stratified sampling technique was utilized. At first, Yenagoa metropolis was purposively selected, secondly, 16 communities within the metropolis were purposively selected and thirdly, 400 copies of structured questionnaires were randomly administered to household heads in the selected communities. The result of Pearson Chi-Square value of 84.729 at p-value of 0.001 indicates that unregulated urbanization affects wetland loss. The effects of unregulated urbanization include infrastructure gap, proliferation of squatter settlements, contamination of ground water, uncontrolled mining of sand, which negates the idea of sustainable development. Spreading development to lower order settlements entail conscious socio-economic and sustainable environmental planning, and the integration of professionals in planning of sustainable wetland and riparian coastal cities.

Keywords: *Unregulated, Urbanization, Wetland loss, stratified sampling, Sustainable planning, Yenagoa Metropolis*

Introduction

According to US Environmental Protection Agency (EPA, 2026), urbanization could be defined as the concentration of human populations into discrete areas. This concentration leads to the transformation of land for residential, commercial, industrial and transportation purposes. It can include densely populated centers, as well as their adjacent periurban or suburban fringes. Oyeleye (2013)

stated that urban areas are defined based on population benchmarks set by different countries or economic activities. Aluko (2010) and Beulah (2012) noted that an urban centre in Japan had at least 30,000 people, in United States at least 50,000 people, in Greece at least 10,000 people, in Australia at least 1,000 people and in Denmark, Sweden and Finland at least 200 people. The Nigerian (1952) census designated an area with a population of

more than 5,000 as urban. However, the 1963 census designated an area with 20,000 and above as urban.

Although, there is no universal definition of an urban area. Instead, the UN relied on national governments specific criteria to define these zones. Urbanization's geographic landscape is rapidly shifting in a number of ways. The way that cities interact with the global environment is being fundamentally changed by these shifts in the features of modern urbanization. Wang (1999), defined urbanization as the process of rural to urban migration complementing the immense and rapid growth of urban areas. Caldeira (2017) observed that in the Global South, urbanization follows unique patterns that differ from those in industrialized nations. Peripheral urbanization, characterized by informal settlements, self-built housing, and unregulated expansion, is a defining feature of cities in developing nations.

Federal Ministry of Housing and Urban Development (2024), stated that Nigeria's urban population is expanding rapidly, driven by an annual growth rate of 4.1%. From just 9.4% in 1950, our urban population now exceeds 52%, with projections indicating a rise to 70% by 2050. The World Bank Group (2025), reported that Nigerian cities face major hurdles in scaling their economic potential and livability. Rapid urbanization outpaces planning and service delivery, severely limiting productivity. Five core challenges drive this crisis: These include unplanned spatial growth, critical infrastructure deficits, severe housing shortages, environmental vulnerability, and fragmented urban governance.

According to Worldometer (2026), Nigeria's population has officially reached approximately 242.4 million. The

projections from (UN DESA, 2018) revealed the eight largest cities in Nigeria. The 2030 Prospection suggests that the population growth of Nigeria's biggest city Lagos will be up to 20 million people. Other cities like Abuja, Kano, Port Harcourt and Ibadan will also almost double their population

Bhutia *et al.* (2025) posited that globally, urbanization is one of the most dominant forces influencing land use and land cover (LULC) change. As urban areas expand, they frequently do so at the expense of ecologically sensitive zones, particularly floodplains. The premise from Shabu (2021) and Odufuwa *et al.* (2024) highlights how unplanned urban expansion degrades ecosystems. Research by Adelekan (2016) on Nigerian cities like Lagos corroborates that human driven environmental factors drastically amplify flood risks. Inadequate stormwater management and unregulated development-such as building on floodplains and waterways-heavily reduced natural drainage capacity, turning localized heavy rainfalls into devastated urban floods. This narrative of unregulated urban expansion, lack of effective urban planning regulation, lack of drainage infrastructure, widespread encroachment on the wetlands and floodplains are visible in the city of Yenagoa and its Metropolis with attendant effects of higher surface runoff, and severe flooding.

This article examines the effects of unregulated urbanization on wetlands in Yenagaoa metropolis with a view to provide a comprehensive analysis of urbanization trends, spatial pattern of urban agglomeration, and effects of unregulated urbanization on wetlands. The proposed hypothesis that unregulated urbanization does not significantly affect

wetland loss in Yenagoa metropolis was tested at 0.05 level.

Study Area

Bariweni *et al.* (2002) defined the study area by Latitude $4^{\circ} 45' - 5^{\circ} 10' N$ and Longitude $6^{\circ} 00' - 6^{\circ} 40' E$ encompasses the Yenagoa Metropolis, and Epie Creek which flows into Ekoile Creek at Swali. According to Gunn and Deinne (2025), the metropolis of Yenagoa spans between 5km and 15km in radius with Okoloba, Agudama and Akenfa to the North of Yenagoa metropolis, Edepie,

Biogbolo and Imiringi to the east, Akoba, Ikibiri, Fangbe and Oweikorogha to the west and Azikoro, Elebele, Agbura, Otukpoti, Emeyal and Otuogori to the south (Figure 1 and Figure 2). The metropolis is drained by Orashi River, Nun River, Epie Creek and Ekoile Creek. The vegetation of the Yenagoa metropolis is primarily characterized by freshwater swamp forests, lowland forests and mangrove forests. The area features a typical deltaic setting with high water tables and numerous wetlands.

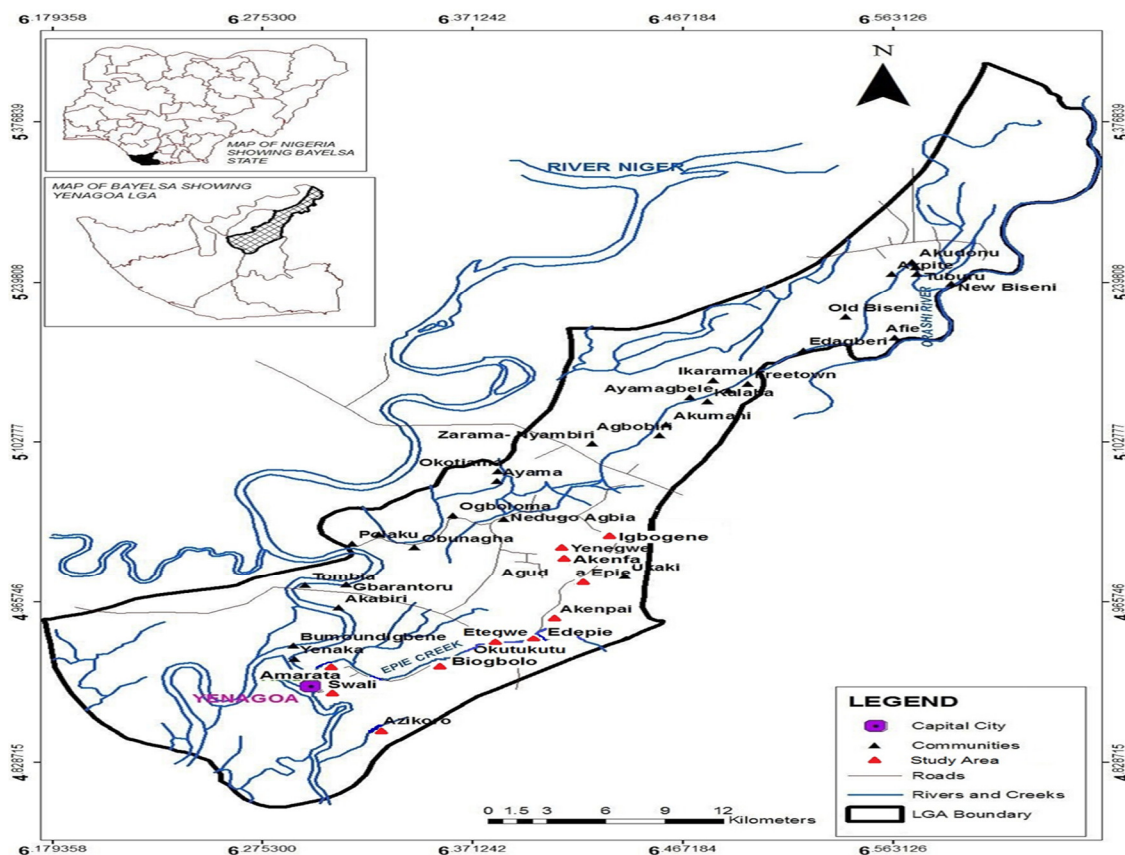


Fig. 1: Yenagoa Metropolis
Source: Surveyor-General Office (2024)

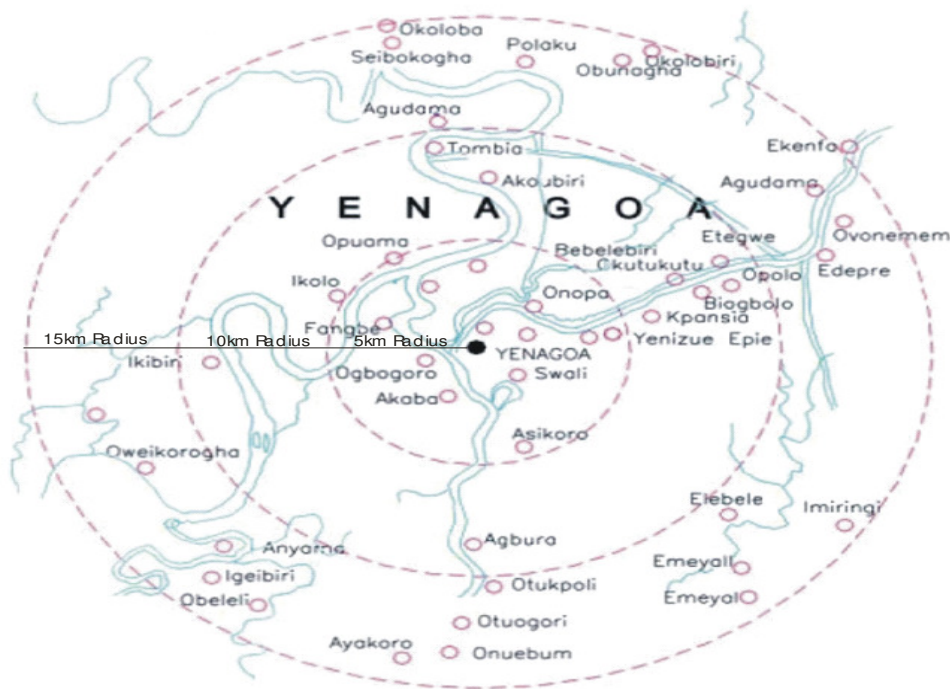


Fig. 2: Yenagoa Metropolis Planning Area
Source: Bayelsa State Government (2004)

Methodology

A mixed research design was adopted. A structured questionnaire was administered to sought primary data, while secondary data was obtained from secondary sources, and archived data on urbanization trends and spatial variation in urbanization relevant to the study of unregulated urbanization and environmental issues in wetland areas of coastal Nigeria.

Sample Size

The Yamane (1967) formula was utilized to determine the sample size:

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

Where:

N= Population

n= Sample Size

e= Error (0.05)

$$n = 175,076.86 / (1+175,076.85)0.05^2$$

$$n = 399$$

Sample size approximately = 400

A 400 structured questionnaire was administered, while 320 were retrieved with a response rate of 80%.

Sampling Technique

A 3-staged stratified sampling technique was adopted. At first, Yenagoa metropolis was purposively selected for this study due to rapid urbanization experienced. In the second stage, 16 communities in Yenagoa metropolis were purposively selected. In the third stage, 400 copies of questionnaires were randomly administered to household heads in the selected communities using table of random numbers.

Results and Discussion

Table 1: Demographic Characteristics of Respondents

Variable	Frequency	Percentage
Gender		
Male	173	54.1
Female	147	45.9
Total	320	100.0
Age		
Below 20 years	21	6.6
20 - 29 years	96	30.0
30 - 39 years	87	27.2
40 - 49 years	61	19.06
50 - 59 years	34	10.6
More than 60 years	21	6.6
Total	320	100.0
Marital Status		
Single	115	35.9
Cohabiting	38	11.9
Married	101	31.6
Divorce	39	12.2
Widowed	27	8.4
Total	320	100.0
Household Sizes		
Less than 4 persons	74	23.1
5-8 persons	155	48.4
9-12 persons	53	16.6
More than 12 persons	38	11.9
Total	320	100.0
Duration of Stay in Yenagoa		
Below 1 year	22	6.9
1-5 years	93	29.1
6-10 years	102	31.9
More than 10 years	103	32.1
Total	320	100.0
Experienced Unregulated Urbanization		
Yes	289	90.3
No	31	9.7
Total	320	100.0
Experienced wetland loss		
Yes	276	86.3
No	44	13.7
Total	320	100.0
Wetland loss		
Strongly Agree	144	45.0
Agree	121	37.8
Disagree	38	11.9
Strongly Disagree	17	5.3
Total	320	100.0

The general information on the demographic characteristics of the respondents is shown in Table 1. It revealed that 173(54.1%) were males, while 147 (45.9%) were females. This information implies that there were more male than female participants. Also, the age distribution of the respondents surveyed showed that 96 respondents representing (30.0%) are within 20–29 age group, followed by 87 (27.2%) between 30–39 age group, 61(19.06%) in 40–49 age group, while 34 (10.6%) are between 50–59 age group. Respondents below 20 years and more than 60 years comprised 21 (6.6%). This implies that most of the respondents surveyed are within youthful population 20–49 years of age.

Information on the marital status of the respondents surveyed revealed that 115(35.9) of respondents were single, 101(31.6%) were married. A smaller portion of 39(12.2%) were divorced, while 38(11.9%) were cohabiting, 27(8.4%) were widowed while for household size, 155(48.4%) respondents lived in households comprising 5–8 persons, followed by 74(23.1%) that lived in households with 1–4 persons. Meanwhile, 53(16.6%) of the respondents had 9–12 household members, 38(11.9%) lived in households with more than 12 persons. This implies that many residents in Yenagoa metropolis are from large households, this contradicts the World Health Organization (WHO, 2022) standard of between 1.8 and 3.1 persons per room, while the Nigerian Government stipulates 2.0 persons per room.

With respect to the duration of stay of the respondents surveyed, 103(32.1%) had lived in Yenagoa for over 10 years, while 102(31.9%) had stayed between 6–10 years. About 93 (29.1%) had lived in the area for 1–5 years, and 22(6.9%) had

lived for less than 1 year. This implies that 205(64.0%) of the respondents had long-term residency in the study area. While information on unregulated urbanization experienced by the respondents surveyed showed that 289(90.3%) of the respondents surveyed have experienced unregulated urbanization in Yenagoa metropolis in the last 10 years, while only 31(9.7%) indicated that they have not experienced unregulated urbanization. This information implies that most of the respondents have experienced unregulated urbanization as the city expands rapidly over the years encroaching on wetlands, riparian forests and flood plains without implementation of the urban ecological planning regulations by government agencies. This result aligns with the findings of Rex *et al.* (2017) which showed that major challenges encountered in uncontrolled urban growth include lack of planning policies.

Majority of the respondents 276(86.3%), acknowledged an increase wetland loss and riparian forest loss over the past few years, while 44(13.7%) said otherwise. This finding is in tandem with the observations of (Adelekan, 2016; Agbefe *et al.*, 2022) that unregulated encroachment on wetlands, riparian forests, and farmlands, amplifying ecological decline and hydrological vulnerability. While a considerable number 144(45.0%) of the respondents strongly agreed that rapid urbanization contributes to wetland loss, while 121(37.8%) also agreed. On the other hand, 38(11.9%) disagreed, while only 17(5.3%) strongly disagreed. This implies that 265(82.8%) of the respondents agreed that unregulated urban expansion is a key driver of wetland and riparian forest loss within Yenagoa metropolis. Studies by Ajibade *et al.* (2020) affirmed that loss of

wetland increases peak flood discharges and duration during rainfall. UN-Habitat (2021) reported that loss of wetlands led

to environmental degradation, biodiversity loss, water pollution, and climate disruption.

Table 2: Pearson Chi-Square Test

Test	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	84.729	1	0.000
Likelihood Ratio	78.295	1	0.000
Linear-by-Linear Association	83.893	1	0.000
Valid Cases	320		

Table 2 presents the result of Pearson Chi-square test of the stated hypothesis that urban expansion does not significantly affect wetland and riparian forest loss in Yenagoa metropolis. The result of the calculated Chi-Square value of 84.729, at a p-value of 0.001 indicates urban expansion significantly affects wetland loss and riparian forest loss at 0.001 level. This finding aligns with observations of Wizer and Wali (2020) in Obio/Akpor, River State between (2000-2018), wetland cover dropped from 9% to less than 5% due to residential and infrastructural growth.

Effects of Uncontrolled Urbanization on Wetlands in Yenagoa Metropolis

1. Uncontrolled urbanization and unsustainable environmental practices, land uses and improper sanitation and waste management resulted to spontaneous climate change due to unregulated gas flaring by oil companies, artisan refineries by the locals, and the movement of people from the rural to urban area introduces the concept of 'urban heat high land effects' increasing the average temperature of urban areas, and introducing climatic variability.
2. The movement of people from rural areas into urban areas such as

Yenagoa resulted to proliferation of squatter settlements in coastal urban areas without conscious planning based on the regional master plan is visible in some coastal communities of Bayelsa State which is predominantly a wetland ecosystem criss-crossed with gas and crude-oil pipelines. Informal housing, degradation of the environment are the off-shoots of unregulated urbanization in coastal urban areas in Nigeria.

3. Sand mining has become a livelihood activity in the coastal communities as government and unauthorized private companies engage in extensive and unregulated sand mining activities along major rivers (River Nun) and Creeks (Epie, Ekoile), accelerating coastal erosion and river bank erosion in the communities along the coast leading to loss of livelihoods, loss of riparian forests and wetlands, loss of organisms and rare species in the wetland ecosystem.

The future problems of urbanization to professionals involved in environmental issues: (Geographers, Urban planners, Architects, and Engineers) remains multi-dimensional due to rapid and unregulated growth of slums in the lowlands, high level of emissions from oil companies,

likelihood of respiratory diseases due to poor air quality, indiscriminate dumping of wastes and open incineration of wastes among low-income households, ground water pollution/contamination leading to water borne diseases, and water related diseases due to infiltration of heavy metals from artisan mechanic workshops, and coliforms from unplanned settlements, infrastructural decay and loss of aesthetic. Increased traffic congestion and emissions, poor quality of life and low life expectancy and congenital malformation, multi-dimensional poverty, multiple deprivations and socio-economic inequality and high level of crime.

Although, majority of urban centres in the wetlands and floodplains of Bayelsa State are parasitic with lots of squatter/informal settlements which are poorly planned and underdeveloped due to unregulated urbanization. These coastal cities could become centres of growth through deliberate investment in these ecological buffers providing infrastructural facilities, low cost housing schemes, promoting secured environment that fosters socio-economic opportunities, and employment (location of industries), and sustainable development planning in accordance with Mydal's Growth Pole Strategy. According to Bulti and Eshete (2023), understanding the impacts of urbanization and developing sustainable planning strategies starts with analyzing the dynamics of urban growth across different spatial and temporal scales.

Conclusion

This discussion makes the connection between increasing urbanization and environmental sustainability clear. When urban areas grow more quickly than their infrastructure-which includes housing, and clean water, they are said to be

experiencing rapid urbanization. This can lead to environmental degradation and problems like uncontrolled housing, urban sprawl, the emergence of slums, and restricted access to infrastructure, essential amenities, and pollution. Urban dwellers, particularly those living in low-income households, are frequently subjected to high levels of fine particle air pollution, which may have detrimental long-term effects on their health and general well-being (World Bank, 2016). The majority of urban areas are parasitic; rather than acting as the growth pole that spreads development to the periphery and less developed settlements, urban areas are drawing in more infrastructure and people, which encourages squatter settlements and their numerous negative environmental effects. In order to spread sustainable developments to lower order settlements, cities must plan for sustainable development. This can be done by making strategic investments in ecological buffers, providing necessities, creating an environment that fosters socioeconomic opportunities, and promoting spatial processes and mapping economic activity between highly urbanized cities and less urbanized towns and settlements in accordance with the growth pole theory of development's tenets. Adoption of ecological planning in the wetlands and coastal cities is germane to sustainable development of the coastal cities.

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