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# Environmental Sustainability and Urban Growth Issues: Empirical Evidence from Osogbo Capital Territory, Nigeria

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**A B S T R A C T**

Worldwide, urban centers have continued to see exceptional increase in spatial urban growth since more than 50 years ago in the majority of emerging countries. Osogbo, the capital of Osun State, is hardly discussed despite being one of the cities in Nigeria that is quickly urbanizing. In order to establish a justification for good governance in the pursuit of environmental sustainability, the article examines challenges related to urban growth and environmental sustainability in the Osogbo Capital Territory. Four Hundred and Fifty (450) questionnaires were distributed among the residents of six (6) residential areas and 384 questionnaires were retrieved, representing 85.33%, ergo judged fit for analysis of this study. Using a Stratified Random Sampling Techniques in order to ensure a fair representation of different socio-economic groups in Osogbo, Primary Data were obtained from field surveys with the administration of questionnaires across the Three (3) neighborhood strata to include: Core area, intermediate area and new areas. A pilot survey was conducted to test the reliability of the research instruments which paved the way for the refinement of the final questionnaire. The study used the severity index test of association, mean weighted score, and percentage-based descriptive methodology. The analysis's findings indicated that urban population growth had a big impact on environmental sustainability in terms of the state of the infrastructure and facilities, people's satisfaction with the facilities that are currently available, and the environmental issues in the neighborhood that was chosen. In order to maintain our cities and ensure the future well-being of inhabitants, the paper consequently advises proper methods of crucial policies to be held in order to achieve sustainable development, as this will further promote sustainability of Nigerian cities.

## INTRODUCTION

Cities around the world are progressively growing (Ekandem et al., 2014). Its expansion is influenced by natural increase, technological advancement, rural-urban migration, and social advancement (Oluseyi, 2006). Land use density that is higher in urban regions is associated with structural growth of the city. Nigeria is one of the most urbanized nations in the world, with some of its cities expanding at a pace of 4 to 5% annually (Ogundele et al., 2011). Cities are important for both production and consumption in Nigeria and other parts of the world (Oduwaye, 2009). The rate of urbanization in Nigerian cities has far outpaced their capacity to offer necessary basic services. Cities are important for both production and consumption in Nigeria and other parts of the world (Oduwaye, 2009). Rapid urbanization in Nigerian cities has outpaced their ability to offer the necessities of basic services to its citizens, leading to haphazard development patterns in city centers. The disorganized placement of buildings and land uses that disregards all planning guidelines illustrates the overall impact of the urbanization process. According to Akhmat and Bochum (2010), urbanization is the driving force behind the nation's economic growth; however, success in this area should focus on

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enhancing rather than degrading the environment (Newman 2002; Jiboye, 2009). The need to halt urban growth in order to ensure the metropolitan area's long-term viability has emerged as one of the world's major developmental problems in recent years. Urban growth and environmental sustainability are seriously threatened by the spontaneous nature of urban growth, which is accompanied by a range of socio-economic, environmental, and cultural challenges in the form of congestion, squalor, pollution, loss of bio-diversity, insanitation, and other dreadful situations in most of the world, particularly in developing countries. Urbanization in Nigeria has resulted in a variety of issues, including a population bomb, traffic, housing, sociocultural issues, the environment, and food shortages. Knowing that everyone in urban areas is impacted by one or more of these problems show that we are not exempt from the present and potential urban challenges. In order to control the nation's urbanization process and ensure long-term development in both urban and rural areas, it is imperative that the Nigerian government put the recommendations in this paper into practice (Malanima, 2000).

Urbanization, which is the primary drive behind modernization, economic progress, and expansion, has the unfortunate effect of causing environmental issues that hinder social fairness and welfare in terms of access to social infrastructure and employment opportunities. Environmental issues can be categorized as ecological, poaching and habitat loss, accelerating desertification, and soil erosion, according to Uchegbu (2004). The article went on to focus on pollution, deforestation, global warming, slum development, etc., claiming that each of these has a direct impact on the general public's quality of life. This issue is also present in housing and related services like waste disposal, water, and electricity. The demand for white collar work and the advantages of living in an urban region put a lot of strain on the available infrastructure and medical facilities.

According to Oyebanji et al. (2017), more than 50% of the economically active and growing population of the African race and other developing economies rely on the environment for their sustenance because they primarily depend on agriculture, animal husbandry, fishing, commerce, foraging and forestry, real estate markets, among other things. All national stakeholders must pay more attention to sustainable development in order to stop or lessen the effects of the issues caused by urbanization and the necessity to safeguard sources of livelihood while maintaining a quality environment.

Urban area growth must be environmentally friendly and sustainable in order to meet everyone's and the environment's immediate requirements without jeopardizing those of the future. It is advisable to scientifically evaluate the problems related to urban growth and environmental sustainability in light of the aforementioned. So, in order to support the case for environmental sustainability, the research examines how the ideas of sustainable development and the environment interact. The research made the assumption that such expansion must be sustainable despite the fact that it is unavoidable given the current realities of globalization, industrialization, and other related growth factors.

### *Significance and Justification for the Study*

This kind of study is important because it will yield a substantial amount of information that Nigeria, and the study area - Osogbo capital territory in particular - might employ for urban growth, planning, and management. This will also assist decision-makers in developing and putting into practice effective urban growth management policies and practices, as well as in making prompt decisions about such projects in a timely manner.

### *Conceptual issues, theoretical framework and related literature review*

Basic issues significant and noteworthy for better comprehension of the content of this study to conceptualize the various issue raised by this work include: Sustainable development, Concept of urban growth, Urban growth and environmental sustainability, Concept of urbanization, environmental problems and urbanization.

#### *Sustainable development*

Well before the turn of the century, the idea of "Sustainable development" was already in existence. It is a socio-ecological process whereby human needs are satisfied and the quality of the natural environment is continuously upheld. This idea gained widespread acceptance with the 1987 report of the Brundtland Commission, officially known as the Global Commission on Environment and development. This Commission, which was established by the UN General Assembly, came up with the most well-known definition of sustainable development: "development that satisfies the demands of the present generation without jeopardizing the ability of future generations to meet their own needs (WCED 1987 ; Jiboye, 2011c; Daramola and Ibem 2010).

A sustainable environment is defined by the accessibility of water sources, the quality of the air, and the availability of environmental infrastructure for sanitation and waste disposal. Urbanization necessitates the construction of sustainable environmental infrastructure, which can be accomplished by implementing fair access policies, educational initiatives, and pricing policies that are both financially and environmentally sound (York and McGee, 2017; Gara, 2018). A country is said to be expanding or progressing when it becomes more urbanized, and as a growing nation, the country is anticipated to see an influx of immigrants from other nations as well as rural to urban migration. The population of Nigeria has been growing at a concerning rate, according to data available (Muhammed et al., 2015). The majority of people on Earth reside in urban areas. Africa is anticipated to become 54% urban by 2025, with over 90% of future population increase focused in cities in developing nations, with a significant portion of this population being impoverished (United Nation 1996, United Nation 2002).

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***Concept of urban growth***

Urban expansion is defined as an absolute or relative rise in the population of towns and cities, which may lead to structural or functional changes. Natural population growth, net migration, or the reclassification of rural settlement into towns and cities can all contribute to the growth of the urban population (Skwirk, 2014). Urban expansion was defined by Cheng and Masser (2003) as a system that results from a complex dynamic interaction between the spatial, Urban growth is the consequence of the interaction between these three systems; the spatial/conceptual system offers the planning controls necessary for urban expansion, while the socio-economic and physical/ecological systems each contribute activities/stimulant components for development. Physical expansion indicates that something has altered in order to make room for others wherever it occurs. Green spaces and agricultural fields would have to make way for new construction and other land use types as a community grows. Urban expansion also refers to an increase in a town's population, which implies that the town will undergo internal changes that will have an impact on the local environment and social infrastructure (Kenk & Cotic, 1983). Despite government regulations and efforts to either regulate or enhance it, urban expansion has become a prevalent phenomenon in almost all Chinese large cities (ADB, 2006). The majority of these growth and expansion projects have cost agricultural lands. Millions of farm families have either been relocated or expelled, and the forest that once surrounded cities has been developed for infrastructure, commercial, industrial, and residential purposes.

The definition of urban depends on the methodology used to quantify it, which varies even within the same nation based on the nature of local jurisdictions and potential historical changes (Charles, 1989; Clark 2003; Otoo, Whyatt, and Ite 2006). Urban growth research has gone in a number of distinct directions. One school of thought has concentrated on the urbanization's historical facets. Massive population transfers from rural to urban areas around the world have spurred urbanization (Otoo et al., 2006). The concentration of people and economic activity in cities may rise as agents move from rural to urban regions (urbanization) or as economies grow in terms of both population and output, leading to both urban and rural growth. Urban centers may not be able to support themselves unless agricultural production has increased enough to allow people to leave the farm and devote themselves to non-food generating industries (Hartshorn 1991; Clark 2003). The distribution of city sizes is intimately tied to the process of rapid urban growth (Daura et al., 2006). The expansion of urban areas is caused by a number of causes. One of the factors is the expansion of urban work options. The rapid growth of cities and towns is mostly due to rural-urban migration, which is combined with a natural increase in population brought on by an improvement in living conditions. Rural residents are being pushed out of their rural communities due to poverty, a desire for higher living conditions, environmental deterioration (deforestation and desertification), a lack of essential amenities and services, among other issues.

According to Adindu and Ogbonna (1998), falling soil fertility, rising rural poverty, deteriorating living conditions, unrestricted rural migration, and rural unemployment all contribute to urban growth. According to the report, all of these are to blame for individuals moving from rural to urban areas. According to Oyesiku (1995), the difference in natural levels between rural and urban areas has a greater impact on growth than the natural increase in the portion of the total population already living in cities. People migrate from rural areas to urban areas and vice versa in response to urban socioeconomic prospects. Adedibu, Opeloveru, and Ibrahim (1998), Every city's pattern of development is influenced by two main factors. Whereas the other is a centripetal force, the first is centrifugal in nature. Elements that compose the later force drive the development of most of the cities in developing countries while centrifugal force is generally connected with cities in wealthy countries. Salami (2006) also noted that the kind of urban uses, the configuration of the environment, the location of development plans, government policy, and the pattern of route development are all contributing elements to growth in Nigeria. Route development is a significant factor in the reorganization of land use. According to Nkanbwe (1984), the key indices of progress for any region are the rate of economic growth and population increase. While urbanization has both advantages and disadvantages. Particularly in developing nations where fast urban growth is sometimes uncontrolled or uncoordinated, the negative effects are more prominent. Some potential benefits of urban urbanization include increased economic output, better employment prospects for the unemployed or underemployed, and opportunities for better basic and specialized services. Unfortunately, urban growth frequently leads to the establishment of higher density settlement, which is severely polluted due to insufficient urban utilities like electricity, paved roads, sewers, running water, among others, especially in poor nations, of which Nigeria is not an exception (Bhatta, 2010) Yet, the current phenomena of urban centers growing quickly around the world is to blame for a number of environmental and social changes in the urban environment today, and its impacts are closely tied to difficulties with climate change (Almas et al. 2010; Bhatta 2010).

The term "urban growth" describes construction that extensively uses land for the erection of buildings and impermeable surfaces. Urban growth, which can result from natural population growth, reclassification of the urban and rural systems, and migration from rural to urban areas, is what causes urbanization (Agbola, 2004). The population of Nigeria's major cities is expected to surpass 100 million by the year 2020. Although the rate of urban population growth has fallen from 5.7% in 1985 to 4.0% in the present, it is still much higher than the rate of population increases in Nigeria as a whole (Onokerhoraye & Omuta, 1994). Studies show that Nigeria has one of the world's quickest rates of urbanization. and the consequent rise in the urban population has not been accompanied by an equivalent rise in the social, economic, or technological advancement (Mabogunje, 1974). The nation where urbanization is occurring has been described as having a

stagnant economy with slow industrialization expansion (Salau, 1992). It is alarming to think of the detrimental effects Nigeria's growing urbanization will have on the labor market, food and human security, the economy, waste management, infrastructure, and services, among other things. In light of this, the purpose of this study is to examine the problems with urbanization and growth in Nigeria today, forecast problems in the future and provide solutions to significantly lessen problems in order to ensure sustainable development in both urban and rural sections of the nation.

***Urban growth and environmental sustainability***

The number of people living in cities has been rising quickly in recent years. There is a growing interest in establishing a sustainable urban environment in both developed and developing countries because urban areas in both will feel the effects of phenomena like climate change, resource depletion, food insecurity, and economic instability more and more. Such an environment is defined by the "three pillars of sustainable development," which include a safe environment, economic productivity, and social inclusion. All of these problems must be adequately resolved if cities are to be sustainable in the twenty-first century since they will all have a substantial impact on how towns and cities are transformed. According to Ahern (2011), the sustainability of cities will have a significant impact on how sustainable the globe is in the twenty-first century. The United Nations Settlement Programme and UN Habitat define a sustainable city as one where social, economic, and physical achievements are made to endure.

***Environmental sustainability***

The ongoing and ideal operation of the environment in support of people is referred to as a component of sustainable development. It suggests that interactions with the environment be carried out with the intention of preserving it as naturally as possible through ideal-seeking behavior. 2009; Wikipedia. Environmental sustainability includes both the natural and built environments, where the former helps to support human life and activities while the latter, particularly in towns and cities, offers shelter and security for a variety of human activities (Folarin, 2003).

However, for instance, a sustainable social, economic, or environmental system should achieve distributional equity by, among other things, providing enough social services like housing, health care, and education as well as a safe and livable environment (Jiboye, 2009). To build a strong and sustainable nation, it is essential to achieve urban environmental sustainability. Urban realities today have shown that considerable work needs to be done before Nigeria can experience any kind of long-term growth. Nonetheless, it has been asserted that a commitment to sustainable development for present and future generations will be useless if a collaborative strategy is not adopted (Oyeshola et al., 2009). When these efforts are targeted and combined with the right techniques, the intended result may be realized.

***Concept of urbanization***

Urbanization has an impact on the economic, social, and cultural components of society. It is the outcome of both the extension of urban areas, populations, or processes, as well as the movement of people or processes from rural to urban areas. Hussain and Imtiyaz (2016). People who work in agriculture in rural areas relocate to urban areas where commercial and industrial activity predominates. This movement is explained by the urbanization process (World Population Policies 2003, 2004). Urban expansion is a slow-moving process that accelerated city development in the areas of transportation, agriculture, production, and new trade, among other areas having an impact on the environment. According to Muoghalu (2018), the environment-a composite of all physical, non-physical, living, and non-living situations-determines the growth, existence, and survival of man. Thus, it is necessary to control the environmental actions that are done as a result of urbanization.

Urbanization is a driving factor behind modernization, progress, and economic expansion, but it also creates environmental issues like pollution, land/property value increases, and garbage disposal issues, among others. Inadequate infrastructure services, urban slums, unemployment, bad sanitation, traffic, and overpopulation are just a few of the issues that cities are facing as they grow (Muhammed et al., 2015). Concerns have been raised regarding how this increase would affect people's livelihoods, their health, and the environment. Urban areas are described as areas having a greater concentration of economic activity, significant physical development, and essential amenities and services (Harvey, 2000). A group of people concentrated on non-agricultural activity makes up an urban center. Urban centers, according to Mabogunje (1974), are sites where residents are able to perform specialized tasks, such providing financial support for neighborhood services. Urban centers are defined by varied population densities in various nations. Urbanization is the term for the settlement of a reasonably large population at a particular spot on the surface of the globe (Onokerhoraye and Omuta 1994; Agbola 2004; Olotuah and Adesiji, 2005). Yet, according to another school of thinking, urbanization is more about achieving specific standards, such as modernization, physical and economic development, and vocational diversity, than it is about population expansion (Wirth 1938 and Harvey 2000). Urbanization as it is understood in developing nations is reflected in the first school of thought, whereas urbanization as it is understood in developed nations is reflected in the second. So, unlike agglomeration of people, which is typically the result of rural-urban drift, urbanization in industrialized countries is the product of rapid development, modernization, and industrialization. Although urbanization in Nigeria, like in most other emerging nations, is the result of the "push" from rural areas and the "pull" from metropolitan centers (Aluko, 2011).

Jiboye (2003) argued that inadequate governance mechanisms, poor urban management, and insufficient policy execution led to disorganized, unplanned, and unregulated physical growth. The document also made note of the lack of urban infrastructures,


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including housing, social amenities, and an effective and managed transit system, to support the expanding population. Meeting present-day demands without jeopardizing those of future generations is what is meant by sustainability (Seto et al., 2010). Environmental sustainability, according to Morelli (2011), is a condition of equilibrium, resilience, and interconnectedness that enables human civilization to meet its demands without going beyond the capability of the ecosystems that support it to replenish the services required to do so.

The only way to ensure a sustainable environment is to promote sustainable development, which calls for the provision of adequate infrastructure, the implementation of housing policies, the regulation of development, and the assurance of adequate funding for the provision of shelter, particularly for the most vulnerable. All governmental organizations should work together to ensure good governance and sustainable urban development at the local, national, and regional levels (Jiboye, 2011). Sustainable development, according to Adedeji (2005), is the ability of urban areas and their regions to continue operating at levels of desired communal quality of life without restricting the options available to current and future generations and producing a variety of impacts both inside and outside of their borders.

***Environmental problems and urbanization***

The biggest urbanization challenge in Nigerian cities is the environment. Several environmental problems in Nigeria are categorized by Uchegbu, Chike, and Udeh (2021). These problems include ecology, poaching, habitat degradation, expanding desertification, and soil erosion. Examples of subcategories include deforestation, global warming, slum development, and pollution (water, land, visual, and aural). Petroleum drilling is currently polluting Nigeria's coastal regions (oil leaks, gas flare-ups), and the nation's appalling living circumstances are an insult to human decency (Adedeji and Ezeyi, 2010).

Environmental problems in Nigeria's cities have had a severe impact on the nation's economy as well as a number of health problems. Environmental problems have effects on people's mind in addition to the obvious ones on their physical health. Urban slum dwellers, for instance, are infamous for their antisocial behavior, lack of interest in government initiatives, and prostitution, crime, and juvenile delinquency (Adedeji and Ezeyi, 2010). Poor waste management has made the sociocultural fabric of many Nigerian cities unappealing. Traffic congestion, which increases automobile pollution due to delays in traffic, is another significant environmental problem in Nigerian cities. Slum growth in urban areas not only harms the physical environment but also increases crime and violence. Due to the perception that environmental issues are a result of more widespread human activities in cities, they are more prevalent in urban regions than in rural ones.

## METHOD

### *The study area/research setting*

Osogbo is located at latitude 70 46' N and longitude 40 34' E. Following the creation of Osun State in 1991, it was elevated to the status of state capital. According to the 2006 census, Osogbo has a population of 156,694 people and a total land area of 2,875 km2. The city has grown dramatically in terms of both size and population through or over the years. The location of Osogbo as the state capital, combined with other development considerations, has resulted in an inflow of people from other cities and villages in recent years. Due to the town's fast urbanization and population growth, some basic infrastructures are now more readily available and provided for, although their quality and condition remain woefully inadequate. Infrastructure and housing facilities are typically of poor quality and do not meet expectations. For the socio-cultural and physical well-being of individuals as well as for the development of the nation, adequate housing is crucial. One observes progress as they travel from Osogbo's interior to its periphery, with the majority of commercial areas coexisting with residential areas.

Like many other states in Nigeria, the state of Osun has experienced rapid urbanization, which has been fueled by the State's towns and cities seeing unprecedented spatial and demographic growth. Rising unemployment, widespread poverty, the lack of modern amenities and basic social services in rural communities, the establishment of States and Local Government Areas, and other interrelated socioeconomic and political factors have all contributed to the country's population shift to urban areas. As a result, many rural residents have continued to relocate into metropolitan regions over time in quest of what they consider to be a better life there.

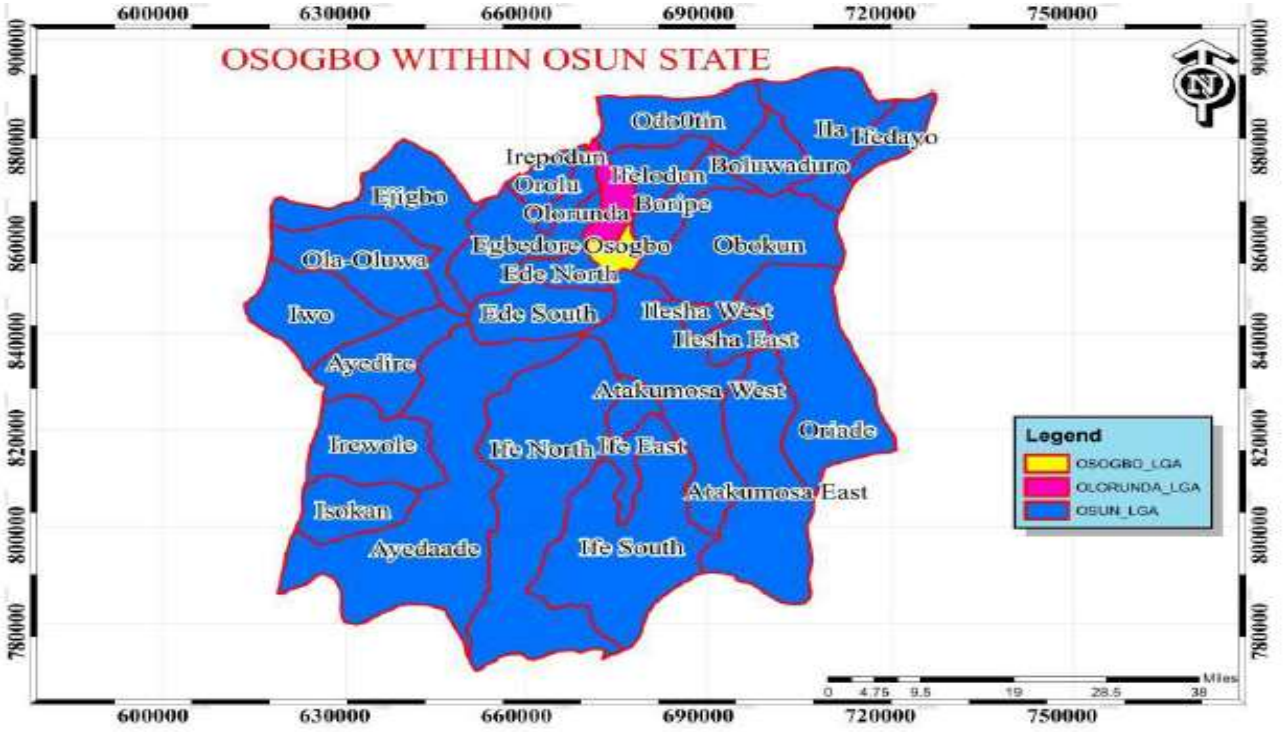


Figure 1: Map of the study area, Osogbo and Surrounding towns within Osun State
Source: Ministry of urban development (2019)

### *The study population and data requirements*

Primary and secondary sources were used to gather information on urban growth and environmental sustainability. Field surveys including the administration of questionnaires yielded primary data. In order to provide a balanced representation of different socioeconomic classes in Osogbo, a stratified sample technique or stratified random sampling technique was used. Core Area-Oja Oba, Intermediate Area-Sabo/Ajegunle, Ayetoro, and New Area-Oke-fia GRA/Dada Estate were designated as key data collection sources for the project. Using a "Google earth" map of the area, streets were found in each sampling stratum. The questionnaire was created in response to the research questions and the study's goals. A pilot survey was done to ensure the research instruments' dependability, paving the path for the final questionnaire's improvement. In the study region, a total of 450 questionnaires were distributed in a stratified random sample method at an interval of three (3) houses, following the pattern outlined in table 1 along important lines of accessibility. Three hundred and eighty-four (384) were recovered and found to be suitable for this study's analysis.

Table 1. Showing the Sample frame for questionnaire administration for the study

| Spatial location | Name of the area | No of Streets | No of house administered questionnaire on each Street | Total no of questionnaire administered |
|---|---|---|---|---|
| **Core Area** | Oja Oba | 35 | 47 | 50 |
| **Intermediate** | Ajegunle/Old garage | 40 | 40 | 87 |
| | Sabo | 15 | 34 | 75 |
| | Ayetoro | 45 | 16 | 50 |
| **New Area** | Oke Fia/GRA/Dada Estate | 60 | 30 | 43 |
| | Ilesha garage | 45 | 51 | 79 |
| **Total** | | 195 | 167 | 384 |

Source: Authors' field survey and conceptualization (2023)

### *Empirical results and discussion of findings*

Descriptive analysis was used to analyze the data collected from the questionnaire. The main results of the study, which are covered under multiple subheadings, were descriptively analyzed using a weighted mean score and a basic frequency distribution table, and are shown below.

### *Socio-Demographic characteristics of the respondents*

Table 2 shows that over half of the participants (77%) were between the ages of 20 and 39, with only 9.4% of those aged 50 and up. Men made up 65.5 percent of the participants. Also, 58.1 percent of those polled were married at the time, compared to 31.8 percent who were not yet wed and 6.5 percent who were wed but were either separated or divorced. No respondents were younger than 18, which further suggests that the information received from the respondents is more credible,


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according to the demographic data displayed in table 1. More over half of the participants had a bachelor's degree, according to table 1, which also reveals that respondents came from both the formal and informal sectors.

Table 2 displays the percentages of the ten (10) attitudinal comments for each item as well as the frequency distribution of environmental issues. Environmental problems are prevalent in most respondents' neighborhoods, they said. More than half of the respondents highlighted flooding, deforestation, waste management, careless trash disposal, inadequate restroom facilities, and poor traffic control as having an influence on the environment. Only two of the ten signs (uncontrolled motorist actions and bush burning) had a higher percentage of respondents who did not feel that they constituted a challenge, as seen in table 2. The most common method of disposing of waste in the area is to drop it off (see plates 1 and 2) and have a private trash collector pick it up. Before the garbage collector comes, it unfortunately produces an unclean view because the collection stations are on the road medians. Nonetheless, it was also observed that most locals and visitors alike continue to carelessly leave their trash in areas where no measures for collection have been made.

Table 2. Socio-Demographic characteristics of respondents (N=384 Variables)

| Socio-Demographic variables | | Frequency | Total | Percentage % | Total |
|---|---|---|---|---|---|
| Gender: | Male | 240 | | 62.5 | |
| | Female | 144 | 384 | 37.5 | 100 |
| Age of respondents: | 20-29 | 181 | | 47.1 | |
| | 30-39 | 115 | | 29.9 | |
| | 40-49 | 53 | | 13.5 | |
| | 50yrs and above | 36 | 384 | 9.4 | 100 |
| Marital status: | Single (never Married) | 122 | | 31.8 | |
| | Married | 223 | | 58.1 | |
| | Widowed | 14 | | 3.6 | |
| | Divorced | 22 | | 5.7 | |
| | Separated | 3 | 384 | 0.8 | 100 |
| Highest educational qualification: | No formal education | 33 | | 8.6 | |
| | Primary education | 42 | | 10.9 | |
| | Secondary education | 97 | | 25.3 | |
| | Tertiary education | 212 | 384 | 55.2 | 100 |
| Ethnic group: | Yoruba | 318 | | 82.8 | |
| | Igbo | 42 | | 10.9 | |
| | Hausa | 20 | | 5.2 | |
| | Others | 4 | 384 | 1.0 | |

Source: Authors' field survey and analysis (2023)

Table 3. Conditions of infrastructures and facilities in the study areas

| S/NI | Infrastructures and facilities | Residents to core area | | Residents intermediate to area | | Residents' new area | |
|---|---|---|---|---|---|---|---|
| | | Mean | Rank | Mean | Rank | Mean | Rank |
| 1 | Water Supply | 3.78 | 1st | 3.89 | 1st | 2.89 | 1st |
| 2 | Refuse Collection | 2.78 | 9th | 3.11 | 11th | 2.11 | 11th |
| 3 | Sewage | 3.39 | 6th | 3.87 | 2nd | 2.87 | 2nd |
| 4 | Drainage | 3.17 | 7th | 3.72 | 3rd | 2.72 | 3rd |
| 5 | Road network | 3.17 | 7th | 3.50 | 5th | 2.50 | 5th |
| 6 | Schools and educational centres | 3.61 | 3rd | 3.06 | 12th | 2.06 | 12th |
| 7 | Health facilities | 3.56 | 4th | 3.42 | 7th | 2.42 | 7th |
| 8 | Commercial centres | 2.83 | 8th | 3.48 | 6th | 2.48 | 6th |
| 9 | Recreational centres | 3.17 | 7th | 3.39 | 8th | 2.39 | 8th |

| S/NI | Infrastructures and facilities | Residents to core area | | Residents intermediate to area | | Residents' new area | |
|---|---|---|---|---|---|---|---|
| 10 | Electricity | 3.61 | 3rd | 3.17 | 10th | 2.17 | 10th |
| 11 | Telecommunication infrastructure | 3.44 | 5th | 3.32 | 9th | 2.32 | 9th |
| 12 | Security services | 3.67 | 2nd | 3.53 | 4th | 2.52 | 4th |

Source: Authors' field survey and analysis (2023)

Infrastructure is viewed from the perspective of facilities offered to make human life complete and comfortable while discussing infrastructural provision. Drainage, transportation, communication, security, education, health services, water supply, garbage disposal and recreation are just a few examples of the infrastructure that needs care in order to foster economic growth and improve the quality of life for locals. The evaluation of the state of the infrastructure facilities present in the chosen neighborhoods is presented in table 3 Results from the Core residential areas demonstrate that security services and water supply are both in good shape and are placed first and second, respectively, with mean scores of 3.67 and 3.78, respectively. With a mean score of 2.78 and a ranking of 9, refuse collection is the least/relatively in a fair state. Water supply was rated as being in very good condition by residents of the Intermediate areas, receiving a mean score of 3.89 and ranking first. This is closely related to the good condition of drainage and sewage disposal, which received mean scores of 3.87 and 3.72 and ranked second and third, respectively. The results show an improvement in the condition of infrastructure in the study area when compared to those of Akindele et al. (2014), who had earlier discovered a poor condition of infrastructures in the study area. However, all the infrastructures and facilities identified were found to be in at least average condition, as their Mean score were all above 1.5.

Table 4. Level of satisfaction with available infrastructures and facilities in the study areas

| S/NI | Infrastructures and facilities | Residents core area | | Residents intermediate area | | Residents of new area | |
|---|---|---|---|---|---|---|---|
| | | Mean | Rank | Mean | Rank | Mean | Rank |
| 1 | Water supply | 4.22 | 1st | 3.89 | 2nd | 4.84 | 2nd |
| 2 | Refuse collection | 2.22 | 9th | 3.11 | 10th | 3.73 | 10th |
| 3 | Sewage disposal systems | 4.17 | 2nd | 3.87 | 5th | 4.62 | 5th |
| 4 | Drainage | 3.72 | 3rd | 3.72 | 6th | 4.41 | 6th |
| 5 | Road network | 3.72 | 3rd | 3.50 | 4th | 4.73 | 4th |
| 6 | Schools and educational centres | 3.56 | 4th | 3.06 | 7th | 4.08 | 7th |
| 7 | Health facilities | 2.50 | 8th | 3.42 | 11th | 3.58 | 11th |
| 8 | Commercial centres | 2.83 | 6th | 3.48 | 8th | 3.91 | 8th |
| 9 | Recreational centres | 1.89 | 11th | 3.39 | 11th | 3.58 | 11th |
| 10 | Electricity | 2.22 | 10th | 3.17 | 3rd | 4.75 | 3rd |
| 11 | Telecommunication infrastructures | 3.11 | 5th | 3.32 | 9th | 3.87 | 9th |
| 12 | Security services | 2.72 | 7th | 3.53 | 1st | 4.94 | 1st |

Source: Authors' field survey and analysis (2023)

Table 4 displays the respondent's level of satisfaction with the infrastructures. Water, which has the greatest mean score of 4.22 and is ranked first, has the highest level of satisfaction among Core Area residents. Sewage disposal and road network and drainage, which received mean scores of 4.17 and 3.72 and were ranked second and third, respectively, are closely behind this. The recreational center, which is ranked 11th, is the least satisfied. Contrarily, residents of the Federal Housing estate

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indicated a high level of security satisfaction with a mean score of 3.94. Water supply and power, which are ranked second and third respectively and have mean scores of 3.84 and 3.75, are closely behind this. Health and recreational satisfaction scored 11th and 12th, respectively. When Tables 3 and 4 are compared, there are disparities in the satisfaction with the infrastructure, facilities, and their state. The degree of satisfaction for some infrastructure and facilities had increased, whilst the level of contentment for others had decreased at both estates, according to one report. Only the water supply was able to keep the Core Areas' residents' satisfaction with it in first place and at a high level. Infrastructure and facilities like garbage collection, sewage disposal, and telecommunication infrastructure saw an improvement in rank at the level of satisfaction in all three residential areas, whereas health facilities saw a decline in rank in the chosen communities. Infrastructures and facilities that were ranked higher for resident satisfaction than for their condition suggest that even though their condition was not as good as that of other infrastructure and facilities that were ranked higher, they were more appreciated by the residents. Also, while it is possible that a facility or infrastructure may be in good shape, this does not necessarily mean that it will serve its purpose as intended based on the infrastructures that had a better rank in their condition than their rank at the level of satisfaction. The health facilities, for instance, might be in better shape than the power in Intermediate Areas, but it still doesn't fulfill residents' needs the same way as it does in the neighborhood.

Table 5. Effect of increasing urban growth in the study area (Environmental challenges)

| S/N | Environmental challenges | Residents of core area | | Residents of intermediate area | | Residents of new area | |
|---|---|---|---|---|---|---|---|
| | | Mean | Rank | Mean | Rank | Mean | Rank |
| 1 | Traffic congestion and control | 4.32 | 1st | 4.22 | 2nd | 3.50 | 2nd |
| 2 | Breakdown of infrastructures due to increasing population without maintenance | 4.24 | 2nd | 4.00 | 4th | 3.48 | 3rd |
| 3 | Cluster of infrastructural facilities | 4.17 | 4th | 3.98 | 5th | 3.46 | 4th |
| 4 | Waste management problem | 4.04 | 5th | 3.96 | 6th | 3.35 | 6th |
| 5 | Increase in anti-social vices such as robbery, stealing, kidnapping etc | 4.01 | 6th | 4.07 | 3rd | 3.23 | 7th |
| 6 | Noise pollution | 3.93 | 7th | 3.65 | 7th | 2.98 | 9th |
| 7 | Air pollution | 3.85 | 9th | 2.34 | 13th | 2.96 | 10th |
| 8 | High rental/capital values of properties | 3.58 | 9th | 3.00 | 12th | 2.65 | 11th |
| 9 | Bad roads | 3.51 | 10th | 3.54 | 8th | 3.66 | 1st |
| 10 | Breakdown of vehicles | 3.44 | 11th | 3.24 | 11th | 3.20 | 8th |
| 11 | Security services | 4.24 | 2nd | 4.33 | 1st | 2.48 | 13th |
| 12 | Flooding | 3.28 | 12th | 3.27 | 10th | 3.43 | 5th |
| 13 | Waste generation | 4.24 | 2nd | 4.00 | 4th | 3.48 | 2nd |
| 14 | Poor pedestrian control | 4.20 | 3rd | 4.00 | 4th | 2.32 | 14th |
| 15 | Incessant road clashes | 3.05 | 13th | 3.38 | 9th | 2.54 | 12th |

Source: Authors' field survey and analysis (2023)

Respondents' perceptions were sought on fifteen (15) identified variables on environmental challenges (effect of increasing urban growth) in the study area. Four points likert scale was adopted with the following assertions; 1 indicating strongly disagree (SD), 2 for disagree (D), 3 for agree and 4 for strongly agree (SA). The responses were analysed using mean score. The results in Table 5.0 shows that traffic congestion and control, (M=4.32), breakdown of infrastructure due to increasing population without replacement (M=4.24), security services (M=4.24), cluster of infrastructural facilities (M=4.17), waste management problems were the most pressing effect of increasing urban growth (environmental challenges) in the Core residential areas. While in the Intermediate areas, shows that security services (M=4.33), traffic congestion and control, (M=4.22), breakdown of infrastructure due to increasing population without replacement (M=4.00), poor pedestrian control (M=4.00), cluster of infrastructural facilities (M=3.98), waste generation (M=4.00) were the most pressing effect of increasing urban growth (environmental challenges). The result further revealed in the table 5 that traffic congestion, bad roads, waste generation, breakdown of infrastructure due to increasing population without replacement, cluster of infrastructural facilities and flooding with corresponding mean score of 3.66, 3.48, 3.48, 3.46 and 3.43 were the most pressing effect of increasing urban growth (environmental challenges) in the new areas.

## CONCLUSION

The issues of urban growth and their effects on the environmental sustainability of the urban environment in Nigeria have been empirically studied in this article (Osogbo Capital Territory). According to the study, the characteristics and incidence of globalization, industrialisation, and population expansion are the main causes of the spontaneous urban growth rate in the largest cities of emerging countries. The effects of this increase include a deteriorating environment, traffic congestion, homelessness, the creation of slums, and bad living circumstances for the majority of urban poor populations. The study concludes that series of environmental challenges were associated with urban growth and these include among others traffic congestion, waste management problems, increase in criminal activities such as robbery, smuggling, kidnapping etc. All of these however had bad consequences such as bad roads and traffic congestion which often results into increased travelling time, breakdown of vehicles among others. Factors such as lack of drainage, poor road maintenance by the appropriate agency and pressure from heavy vehicle passing were among factors responsible for bad roads. The study therefore recommends that road expansion; construction of car parks should be done by the government as this will reduce the congestion caused by public vehicles. Likewise, adoption of capital punishment on criminal activities should be encouraged to serve as a deterrent to others who may still have evil minds. These, if implemented will minimize the negative consequences of urban growth in the study area.

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