

Developing Sustainability in Analysing Sanitary and Environmental Conditions to Improve Quality of Life in Selected Informal Settlements of Port Harcourt Municipality, Nigeria

Abstract

Sustainability is a principle and practice that drives a balanced urban community. The study focused on developing sustainability by analysing the sanitary and environmental conditions to improve the quality of life in selected informal settlements of Port Harcourt Municipality, Nigeria. The study's objectives were to identify sanitary and environmental conditions in the selected informal settlements, analyse the impacts of the sanitary and environmental conditions on quality of life, and identify physical planning measures that will develop sustainability to improve residents' quality of life and neighbourhood quality. The study employed a Mixed Methods Research approach using a sequential explanatory research design. The study employed purposive and simple random sampling techniques to select two informal settlements: Nembe and Bundu waterfronts. Three hundred ninety-nine (399) respondents (households) were determined and interviewed using the Taro Yamane formula at a 5% precision level. In addition, six (6) key informants, including photographs and personal observations, were interviewed and used for data collection and analysis. The study found the sanitary and environmental conditions of the neighbourhoods were deplorable and unsustainability attributed to a lack of public water supply to buildings, poor drainages and housing conditions, employing unsustainable waste and disposal methods and prone to flooding. The study also showed that there are public health concerns and pollution of water bodies because of the unplanned nature, lacking basic urban infrastructure and services and non-compliance with provided building regulations and standards. The study's findings suggest that the government should extend the ongoing public water reticulation project by African Development Bank in Port Harcourt Municipality to the informal settlements. In addition, regular studies of informal settlements should be carried out to understand the dynamics and possible measures to improve living conditions and the well-being of residents, and urban renewal schemes should be carried out to provide urban infrastructure and services in the settlements.

Keywords: Sustainability, Sanitary and Environmental Conditions, Quality of Life, Informal Settlements, Port Harcourt Municipality

1. INTRODUCTION

The proliferation of informal settlements in urban areas is increasing at an alarming rate in the contemporary urban planning movement (Mohanty, 2020). Developed and developing countries are all experiencing this urban phenomenon. According to the United Nations Human Settlements Programme (UN-Habitat) (2015), informal settlements are settlements characterised by inhabitants not having the security of tenure, the neighbourhoods lacking essential services and infrastructure, and the housing does not comply with planning and building regulations in a geographical and environmentally sensitive area. These conditions connote squatter and slum developments. Informal settlements are driven by several factors attributed to uncontrolled growth of urban population, lack of affordable housing, increasing rural-urban migration, poor urban planning, and management, increasing unemployment and underemployment, poor local economic structure and plan and displacement of urban residents caused by disasters and forceful evictions (Avis, 2016). The hallmark of these factors is considered to be caused by poor urban governance (Avis, 2016).

A total of 55% of the world's population representing about 4.2 billion inhabitants as of 2018, reside in urban areas. This assertion is further affirmed by the UN report of 2014 as more than half of the world population, which is over 1 billion (25%) of these urban inhabitants, are living in informal settlements (United Nations (UN), 2018; United Nations (UN), 2014; World Bank, 2020). A large percentage of these global informal settlements population is in urban areas of developing countries of Asia and Africa, which has created

(United Nations Statistics Division (UNSD), 2018). The proliferation of informal settlements has created concern for urban governments, authorities and residents in developing countries (Muzondi, 2014). Consequently, according to the World Bank (2020), about 90% of the informal settlements in developing countries are in hazard-prone environments that may expose the inhabitants and structures to disasters and other environmental challenges. This common phenomenon of informal settlements presents them with many challenges, including poor sanitary conditions and environmental degradation, which leave a conscious mark on the settlements and their inhabitants. Portraying the characteristics of poverty, inequality, overpopulation, poor housing, lack of basic urban infrastructure and services, pollution of various types, and unhygienic conditions have affected the quality of life and neighbourhood quality of the inhabitants. Conceptually, quality of life is described as the aggregation of positive and negative impacts on the living conditions of individuals and the societies in which they live (Eyenghe, 2020). It considers life satisfaction, physical health, family, education, employment, wealth, safety, freedom to freedom, religious beliefs and environment (Barcaccia, 2013). With this description, informal settlement is crucial to achieving sustainability in the urban environment. However, the complexities portrayed by informal settlements are also conspicuous in urban areas in Nigeria without exempting Port Harcourt Municipality.

Port Harcourt Municipality, one of the fast-growing urban areas in Nigeria, is characterised by the increasing proliferation of informal settlements across its urban landscape, especially along its coastline areas with marginal lands for physical development. The municipality is described as a birthing informality questioning the ability to achieve sustainability in its urban settings. Therefore, there is the need for assessment and analysis of the informal settlements found within the municipality territories in terms of their sanitary and environmental conditions become necessary to improve the quality of life of residents and the neighbourhood quality of these settlements to achieve sustainable cities and communities which is the cardinal point of the United Nations Human Settlements Programme (UN-Habitat), governments, urban planners and managers, urban communities and individuals.

1.1 Statement of the Problem

The importance of sanitary and environmental conditions in human settlements cannot be overemphasised in terms of quality of life and neighbourhood quality. In informal settlements, sanitation and environmental factors are crucial to the living standard of the dwellers and the governments. Over the years, Port Harcourt Municipality has experienced the proliferation of informal settlements. This increase in quantity has affected the living conditions of the dwellers of these settlements, which are gradually degrading in quality, sanitary and environmental conditions resulting from doubting achieving the city and its urban community's sustainability. This proliferation has led to poor sanitation, hygiene and environmental conditions for the quality of the residents and neighbourhoods. These conditions may be attributed to poor urban planning mechanisms and the municipality's improper **land use** planning and implementation. The lack of urban planning and **land use** management has reconfigured the urban landscape into squatter and slum development, especially along the coastal peripheries of the municipality. The continuous proliferation of informal settlements without basic sanitary and environmental infrastructure and services will further degrade the living condition and neighbourhood quality of the settlements, thereby affecting the quality of life of residents and the quality of the neighbourhoods and generally deteriorating the urban environment. Therefore, there is a need to assess and analyse the sanitary and environmental conditions of these informal settlements in Port Harcourt Municipality to develop sustainability in the urban environment irrespective of their nature

and add to the knowledge of informal settlements in reference to their sanitary and environmental conditions.

1.2 Aim and Objectives of the Study

The study aims to develop sustainability by analysing the sanitary and environmental conditions of selected informal settlements in Port Harcourt Municipality, Nigeria.

The specific objectives of the study are to:

1. Identify sanitary and environmental conditions in the selected informal settlements of the study area;
2. Analyse the impacts of the sanitary and environmental conditions on the quality of life in the study area; and
3. Identify physical planning measures that will develop sustainability to improve residents' quality of life and neighbourhood quality in the study area.

Scope of the Study

Geographically, the study covers two (2) selected informal settlements identified in the study area namely; Nembe and Bundu waterfront settlements (see Figure 1). Contently, the study covers the **nature** of sanitary and environmental conditions in the selected informal settlements of the study area; **determining and describing** the impacts of the sanitary and environmental conditions in the study area; and **providing** physical planning measures that will develop sustainability to improve residents' quality of life and neighbourhood quality in the study area.

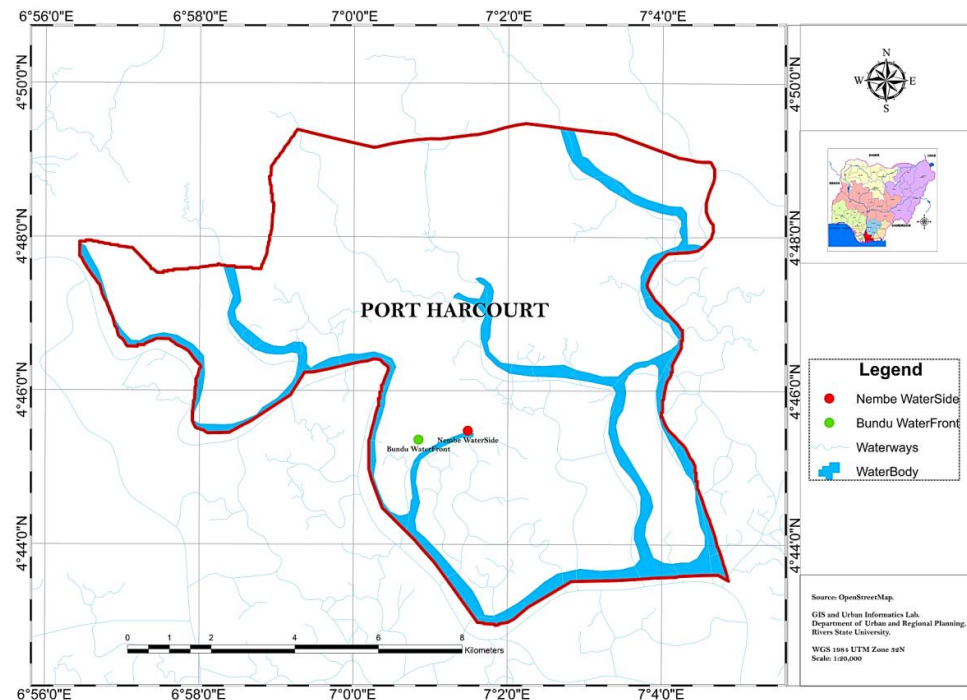


Figure 1: Map of Port Harcourt Municipality Indicating the Studied Neighbourhoods
Source: GIS Lab, Urban and Regional Planning Department, Rivers State University, Port Harcourt, 2021

2. LITERATURE REVIEW

2.1 Informal Settlements: Overview

Informal settlement development has been an occurring phenomenon in urban societies, including developed and developing economies, including New York, London, Paris, Nairobi, Mumbai, Rio de Janeiro, and Mexico City, over the years, irrespective of the level of development and growth of these societies (Surajit, 2017). According to Wasantha (2015) and Darshan and Tripathi (2014), in 2013, over one billion of the world's population lived in an area characterised as informal settlements, also known as urban slums, lacking access to basic infrastructures and services and equally not planned and housing condition not adequate for human habitation. These conditions have caused sanitary and environmental challenges in these settlements and amongst their inhabitants. The United Nations (UN) reports in 1990 states that the living conditions and population of informal settlements in developing societies are worse than in developed countries. It occurs mainly in Asia, with 550 million informal dwellers. In Africa, there are 187 million and 128 million in Latin America and the Caribbean, which have the highest number of informal dwellers in the world as against the developed societies having 54 million informal dwellers (Wasantha, 2015).

The continuous existence of poverty has given birth to several other social problems and disparities in urban societies. These challenges include gender injustice and inequality, addiction and crimes, violence and poverty, poor housing conditions and neglect of the poor. The intricacy of poverty and vulnerability has forced us to view poverty from different dimensions (Masoumeh, 2012). Socio-economic poverty and human and cultural poverty have become current phenomena of urban poverty, degenerating some sectors of urban societies to forming informal settlements in many urban centres. These poor living conditions have caused many informal settlement dwellers to portray deplorable conditions, with high rates of malnutrition, communicable diseases, and exposure to violence. In other words, it refers to informal areas suffering from problems of accessibility, narrow streets, the absence of vacant land and open spaces, very high residential densities, and insufficient infrastructure and services (World Bank, 2008).

Poor urban management and planning have further increased the proliferation of informal settlement development across cities such as Rio de Janeiro, Sao Paulo, Mexico City, Bangkok, Chennai, Lagos, Cairo, Dar es Salaam, Nairobi, Ouagadougou, Mumbai, Karachi, (Fellmann et al., 2005). The informal settlements in these cities are characterised by informal housing, overcrowding, pollution, crime and violence, political inequality, poor sanitation and healthcare, and other social pathologies (gender inequality, child labour, prostitution and drug abuse) (Surajit, 2017). Moreover, it has affected the sanitary and environmental conditions, thereby jeopardising the quality of life (QoL) and neighbourhood quality of the informal dwellers.

According to Masoumeh (2012), slums pose risks to the dwellers' life, health, tenure and inadequate housing. These risks are due to the buildings experiencing severe deterioration over time because of lack of maintenance, being located in a hazardous site or being exposed to damaging health conditions such as lack of safe drinking water and basic sanitation. These unplanned areas, especially in the inner urban pockets of the city core and sometimes at the urban peripheries with severely deteriorated conditions, are characterised by high poverty and unemployment rates among the youths as a severe problem that threatens the area's security to increase the complexity of informal settlements. Informal settlements differ in size and other characteristics. The dynamics sometimes exhibit a lack of sanitation services, supply of potable water, reliable electricity, law enforcement and other basic infrastructures and services. Informal residences vary from shanty houses to professionally built dwellings which have deteriorated in the settlements because of poor quality construction and inadequate

provision of infrastructure and services (United Nations Human Settlements Programme (UN-Habitat), 2007).

2.2 Sustainability and Informal Settlements

The United Nations Department of Economic and Social Affairs (UN-DESA) (2015) set specific targets for its member countries through Sustainable Development Goals (SDGs) as an urgent call for action to achieve sustainable human and environmental development globally. In addition, the SDGs are expected to develop a global partnership framework for countries to key in and achieve sustainability. The SDGs are an offshoot of the Millennium Development Goals (MDGs), which expired in 2015. There are seventeen (17) SDGs and one hundred and sixty-nine (169) Targets. The UN put them in place to eradicate extreme poverty, reduce deprivations, improve health and education, reduce inequality, improve economic growth and tackle climate change to promote environmental sustainability and develop a global partnership for development (UN-DESA, 2015).

However, to achieve these goals, member countries were mandated to set their own goals that are in line with the UN-SDGs and Nigeria as a nation followed suit to design her SDGs that are in line with the UN-MDGs. However, SDG 11 of the SDG is concerned with sustainable cities and communities by making cities and human settlements inclusive, safe, resilient and sustainable for their inhabitants with ten (10) Targets and fifteen (15) indicators. Informal settlements were considered in SDG 11 of Target 1 and Indicator 11.1.1 to improve these settlements' living conditions and socio-economic well-being. SDG 6 also focused on ensuring the availability and sustainable management of water and sanitation for all by the year 2030. It is embedded in SDG 11 of the UN-SDG as part of the provision of essential services to human settlements. Goal 6 has eight (8) Targets and eleven (11) indicators (UN-DESA, 2015). The combination of SDGs 11 and 6 promote the development of cities and communities to achieve sustainability.

Target 1 of the SDG 11 states that by the year 2030, governments and their societies should ensure that there is a significant improvement in the lives of the urban population living in informal settlements through "access to adequate, safe and affordable housing and basic services and upgrade slums" (Ritchie *et al.*, 2018). Furthermore, Nigeria has yet to meet the provision of water and sanitation improvement (UN-DESA, 2015). This failure has led to a sharp increase in the informal characteristics of several urban centres across Nigeria. This situation needs urgent policy and programme to develop and improve informal dwellers living conditions in Nigeria. In addition, informal settlements require appropriate and well-thought programmes to develop better shelter conditions and programmes to legalise tenure in informal settlements to reduce social and economic instability (Eyenghe *et al.*, 2019).

Urban blight is common in most Nigerian cities, especially in neighbourhoods with living conditions of informal settlements. This condition is common in cities such as Lagos, Ibadan, Kano, Yenagoa, and even Nigeria's capital, Abuja. Port Harcourt City, the capital of Rivers State, Nigeria, is not an exception. The primate city status of Port Harcourt Municipality, characterised by its increasing population size and spatial growth, has led to the proliferation of informal settlements due to poor urban planning and land use management. Some of the causes of informal settlement formation were attributed to long-term neglect and failure of governments to implement structural plans in the city that have been prepared over the years, to enforce development control standards and regulations and to provide adequate infrastructures and services in the city (Ibisiki & Eyenghe, 2021). This situation has generally

affected the QoL and neighbourhood quality of the inhabitants of these settlements, which are perceived to exhibit poor sanitary and environmental conditions within the municipality.

3. MATERIALS AND METHODS

The study employed a Mixed Methods Research approach using a sequential explanatory research design to collect and analyse data for the study. The study employed purposive and simple random sampling techniques to collect data in the study area. The study applied the Taro Yamane formula to determine the sample size of 399 respondents (households). Thus, to determine the sample size for the study area, two (2) informal settlements were purposively selected for sampling, namely, Nembe and Bundu waterfront settlements. The population of the study settlements were projected from the 1991 Census report (National Population Commission (NPC), 1991) to 2021 using a 6.5% growth rate (NPC, 2018). The average household size of 5 persons (National Bureau of Statistics (NBS), 2016) was used to determine the total number of households in the settlements. Taro Yamane formula was employed at a 5% precision level, and a total of 399 sample size was determined (see Table 1). The study also used key informant methods to select six (6) key informants and other knowledgeable persons to obtain their opinions on the subject matter. Hence, questionnaire administration was carried out to collect primary data from households in the study area using closed and opened ended questionnaires. However, after a survey of households in the study area, 387 questionnaires were considered valid for collating and analysing data for the study. The key informants interviewed were the Rivers State Ministry of Physical Planning and Urban Development staff and professional Town Planners. Photographs and personal observations were also used to characterise the study area and the settlements' prevailing sanitary and environmental conditions.

Table 1: Sampled Settlements and Sample Size for the Study

Sampled Waterfront Settlements	1991 Population	2021 Population (Projected Using 6.5% Growth Rate)	No. of Households (HH) 5 persons per HH	No. of Population Sampled
Nembe	71,388	443,320	88,664	325
Bundu	16,266	101,012	20,202	74
Total	87,654	544,332	108,866	399

Source: NPC, 1991; NPC, 2018; NBS, 2016; Researchers' Fieldwork, 2021

4. RESULTS AND DISCUSSIONS

4.1 Identified Sanitary and Environmental Conditions of Informal Settlements in the Study Area

The study has identified sanitary conditions in the study area, including the absence of a public water supply, lack of drainages and poor housing condition that lacks basic housing facilities, including toilets, bathrooms and kitchens. From table 2, the modal source of water supply to residents' buildings in the neighbourhoods was private boreholes, which accounted for 54.2%, followed by water vendors, which accounted for 28.7% of the distribution. Other water supply sources to residents were public boreholes, well and rainwater harvesting, represented by 10.6%, 5.2% and 1.3%, respectively. Rainwater harvesting is most used during the year's rainy season as this period is experienced between the months of March to October annually. Furthermore, Table 3 shows that most buildings were not directly supplied with water in their bathrooms and kitchens, accounting for 94.8%. These conditions help characterise the sanitary condition of these informal settlements regarding the quality of sanitation and public health.

The methods for waste disposal and sewage disposal in the neighbourhoods characterised the environmental condition of the study area. From table 4, residents' modal waste disposal methods were dumping into a waterbody and dumping in open space, accounting for 79% and 10.6%, respectively. Some other methods employed by residents identified were dumping into available drainages, burning and burying accounted for 7.3%, 2.6% and 0.5%, respectively. Residents employed these methods as their neighbourhoods are not serviced by the municipal authority and Rivers State Waste Management Agency (RIWAMA) on this aspect of the municipal service. Also, the sewage disposal methods employed in these neighbourhoods are not environmentally friendly and sustainable. As presented in table 5, most residents used pier toilets and defecated into waterbody methods for sewage disposal, accounting for 55.3% and 35.4%, respectively. Some other methods used for sewage disposal by residents in the neighbourhoods were open defecation, water cistern and pit latrine methods accounted for 7%, 1.3% and 1%, respectively. Residents used these methods because the neighbourhoods are not planned, do not follow any physical planning regulations and standards and lack basic urban infrastructure and services needed for the well-being of the residents.

Table 2: Sources of Water Supply to Building

Water Supply Sources	No.	%
Rain water harvesting	5	1.3
Public boreholes	41	10.6
Private borehole	210	54.2
Well	20	5.2
Water vendors	111	28.7
Total	387	100

Source: Authors' Field Survey, 2021

Table 3: Availability of Water in Bathroom and Kitchen of Building

Availability of Water in Bathroom and Kitchen	No.	%
Yes	20	5.2
No	367	94.8
Total	387	100

Source: Authors' Field Survey, 2021

Table 4: Methods of Waste Disposal in the Neighbourhood

Methods of Waste Disposal	No.	%
Burning	10	2.6
Dump into waterbody	306	79
Burying	2	0.5
Dump into available drainage	28	7.3
Dump in open space	41	10.6
Total	387	100

Source: Authors' Field Survey, 2021

Table 5: Methods of Sewage Disposal in the Neighbourhood

Methods of Sewage Disposal	No.	%
Pit latrine	4	1
Pier toilet	214	55.3
Defecate into waterbody	137	35.4
Open defecation	27	7
Water cistern	5	1.3
Total	387	100

Source: Authors' Field Survey, 2021

4.2 Analyse the Impacts of Sanitary and Environmental Conditions on Quality of Life in the Study Area

The study from assessment of the sanitary and environmental conditions of the neighbourhoods found that most of the residents' buildings are prone to flooding, as 57.1% affirmed "Yes" to this environmental phenomenon. In comparison, 42.9% said "No" that their buildings are not prone to flooding from the data presented (see Table 6 and Figure 2). Thus, table 7 further presented the causes of flooding of the buildings in these neighbourhoods, including blocked drainage, building on wetlands, and lack of drainage as the most prominent factors accounted for 31.8%, 22.8% and 20.5%, respectively. Other causes attributed to the flooding of buildings in the settlements were built-in water channels and excess rainfall, represented by 13.5% and 12.4%, respectively. From key informants interviewed, other recognised causes of flooding were the land developed by the residents are naturally floodplains and mangrove swamps and regular increase in the water table.

The poor sanitary and environmental conditions that characterised these neighbourhoods, as shown in Tables 2, 3, 4 and 5, portrayed the neighbourhood's deplorable and unsustainable status. The status of the unplanned neighbourhoods, lacking basic urban infrastructure and services and non-compliance with provided building regulations and standards, presented concern to residents (see Figure 3). These conditions have resulted in the spreading of sicknesses and diseases, and a dirty environment accounted for 33.3% and 26.6%, respectively, as the modal impacts indicated by residents. Other resultant effects of the current status of the neighbourhoods regarding sanitary and environmental conditions, as indicated by the residents, were an increase in public health concerns, deterioration of neighbourhood fabrics and pollution of waterbody surrounding the neighbourhoods accounted for 16.8%, 14.5% and 8.8%, respectively (see Table 8). These conditions have contributed to the rating of the neighbourhoods by the residents. As shown in Table 9, 54.8% of the residents rated the sanitary and environmental conditions of the neighbourhoods as "unsatisfactory", followed by those that rated these conditions in the neighbourhoods as "very unsatisfactory", accounting for 29.2%. The remaining residents rated the sanitary and environmental conditions of the neighbourhoods as "fair", "satisfactory", and "very satisfactory", accounting for 10.6%, 3.9% and 1.5%, respectively. The conditions impacted the residents' quality of life and equally affected the neighbourhood quality from the assessment of the residents, even though the residents are living in informal settlements from international descriptions in standards and principles (UN-Habitat, 2015).

Table 6: Building Environment Prone to Flooding

Building Environment Prone to Flooding	No.	%
Yes	221	57.1
No	166	42.9
Total	387	100

Source: Authors' Field Survey, 2021

Table 7: Causes of Flooding in the Environment

Causes of Flooding	No.	%
Lack of drainage	79	20.5
Blocked drainage	123	31.8
Building in water channel	52	13.5
Excess rainfall	45	12.4
Building on wetland	88	22.8
Total	387	100

Source: Authors' Field Survey, 2021

Table 8: Impacts of Sanitary and Environmental Conditions on the Neighbourhoods

Impacts of Sanitary and Environmental Conditions	No.	%
Increase public health concern	65	16.8
Dirty environment	103	26.6
Spreading of sicknesses and diseases	129	33.3
Deterioration of neighbourhood fabrics	56	14.5
Pollution of waterbody surrounding the neighbourhood	34	8.8
Total	387	100

Source: Authors' Field Survey, 2021

Table 9: Rating of Sanitary and Environmental Conditions of the Neighbourhoods

Rating of Sanitary and Environmental Conditions	No.	%
Very satisfactory	6	1.5
Satisfactory	15	3.9
Fair	41	10.6
Unsatisfactory	212	54.8
Very unsatisfactory	113	29.2
Total	387	100

Source: Authors' Field Survey, 2021



Figure 2: Bundu Waterfront Settlement Prone to Flooding, Exhibiting Unsustainable
Source: Authors' Field Survey, 2021



Figure 3: Nembe Waterfront Settlement Unplanned and Portraying Informality
Source: Authors' Field Survey, 2021

4.3 Identified Measures to Achieve Sustainability and Improve Residents' Quality of Life and Neighbourhood Quality in the Study Area

From the data, as shown in Table 10, the identified measures to improve the sanitary condition in the neighbourhoods, the modal suggestion by residents is providing pipe-borne water to the neighbourhoods accounted for 54% of the responses. In comparison, other suggestions were the enforcement of sanitary regulations and connecting buildings in the neighbourhood to public water supply, represented by 24.8% and 21.2%. Also, in table 11, the suggested measures by residents to improve the environmental condition of the neighbourhoods were regular cleaning of the environment, forming environmental sanitation committee to enforce regulations and creating awareness on public health and sanitation accounted for 37.5%, 31.5% and 16.3%, respectively. Other suggestions include discouraging people from building on water channels and providing drainages, represented by 9.3% and 5.4%. However, to improve residents' quality of life and neighbourhood quality, measures suggested by residents the modal suggestions were providing low-income homes and providing housing loans accounted for 48.6% and 24%, respectively. Other suggestions included initiating site and service schemes and subsidising building materials, which accounted for 16% and 11.4%, respectively. Thus, key informants suggested that the neighbourhoods should be physically planned by providing basic urban infrastructure and services that will promote public health, sanitation and environmental sustainability.

Table 10: Suggestions to Improve Sanitary Condition

Suggestions to Improve Sanitary Condition	No.	%
Providing pipe-borne water to the neighbourhood	209	54
Connecting buildings in the neighbourhood to public water supply	82	21.2
Enforcement of sanitary regulations	96	24.8
Total	387	100

Source: Authors' Field Survey, 2021

Table 11: Suggestions to Improve Environmental Condition

Suggestions to Improve Environmental Condition	No.	%
Provide drainages	21	5.4
Discourage people from building on water channels	36	9.3
Regular cleaning of the environment	145	37.5
Forming environmental sanitation committee to enforce regulations	122	31.5
Creating awareness on public health and sanitation	63	16.3
Total	387	100

Source: Authors' Field Survey, 2021

Table 12: Suggestions to Improve Residents Quality of Life and Neighbourhood Quality

Suggestions to Improve Quality of Life and Neighbourhood Quality	No.	%
Providing low-income homes	188	48.6
Initiate site and service schemes	62	16
Subsidising building materials	44	11.4
Providing housing loans	93	24
Total	387	100

Source: Authors' Field Survey, 2021

5. CONCLUSION

Informal settlements have significantly impacted the fabric of urban societies. However, irrespective of their negative impacts, they provide the basis for informed physical planning and management to achieve sustainable development. This study has examined the sanitary and environmental conditions of two notable informal settlements within the Port Harcourt Municipality. The assessment of conditions of these settlements regarding sanitary and environmental conditions has portrayed deplorable and unsustainability attributed to a lack of public water supply to buildings, poor drainages and housing conditions, employing unsustainable waste and disposal methods and being prone to flooding. These conditions have caused public health concerns and pollution of waterbodies in this environment because of their unplanned nature, lacking basic urban infrastructure and services and non-compliance with provided building regulations and standards presented concern to residents. This situation has affected the quality of life and neighbourhood quality of the inhabitants of these settlements in sanitary and environmental dimensions. Based on these situations, the study has suggested some physical planning measures to improve the status of these settlements to achieve urban sustainability.

6. RECOMMENDATIONS

The study suggests the following recommendations:

1. Government should extend the ongoing public water reticulation project by African Development Bank (AfDB) in Port Harcourt Municipality to these informal settlements to improve the sanitary conditions of the residents;
2. Regular studies of the informal settlements should be carried out to understand the dynamics and possible measures to improve living conditions and the well-being of residents;
3. Rivers State Government should declare the study area a blighted area so that urban renewal schemes can be carried out to provide urban infrastructure and services that will improve sanitary and environmental conditions to better the quality of life and neighbourhood quality of the residents;
4. Public awareness of public health and hygiene should be carried out in the settlements to improve sanitation and environmental safety among residents of the neighbourhoods; and
5. Conscious planning of these informal settlements should be carried out through the collaboration of the municipal authority and the residents of the communities to bring sustainability and good governance to the social and physical fabric of the neighbourhoods.

COMPETING INTERESTS

Authors have declared that no competing interests exist

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