Original Research Article

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

Abstract

Sustainability is a principle and practice that drive a balanced urban community. The study focused on developing sustainability through analysing the sanitary and environmental conditions to improve quality of life in selected informal settlements of Port Harcourt Municipality, Nigeria. Specifically, objectives of the study 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 sequential explanatory research design. The study employed purposive and simple random sampling techniques to select two informal settlements namely: Nembe and Bundu waterfronts. A total of 399 respondents (households) were determined and interviewed at 5% precision level employing Taro Yamane formula. Key informants were also interviewed including photographs and personal observations. The study found the sanitary and environmental conditions of the neighbourhoods were deplorable and unsustainability attributed to lack of public water supply to buildings, poor drainages and housing condition, employing unsustainable waste and disposal methods and prone to flooding. The study also showed that there are public health concerns and pollution of waterbodies because of the unplanned nature, lacking basic urban infrastructure and services and non-compliance with provided building regulations and standards. Based on these conditions found by the study, the study suggested that government should extent the ongoing public water reticulation project by African Development Bank in Port Harcourt Municipality to the informal settlements; regular studies of the informal settlements should be carried to understand the dynamics and possible measures to improve living conditions and the well-being of residents; 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 to better the quality of life and neighbourhood quality; public awareness on public health and hygiene should carried out in the settlements to improve sanitation and environmental safety among residents; and conscious planning of these informal settlements should be carried to bring sustainability and good governance in the social and physical fabrics of the neighbourhoods.

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

Introduction

The proliferation informal settlements in urban areas is increasing in alarming rate in contemporary urban planning movement (Mohanty, 2020). Developed and developing countries are all experiencing this urban phenomenon. Informal settlements are characterised from the United Nations Human Settlements Programme (UN-Habitat) (2015) definition as settlements where the inhabitants have no security of tenure, neighbourhood usually lacking basic services and infrastructure, and the housing may not comply with planning and building regulations that is located in geographical and environmental sensitive area. These conditions connote squatter and slum developments. Informal settlements are driven by a number of factors attributed by 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).

Globally, 55% of the world's population, accounting for 4.2 billion inhabitants in 2018 is residing in urban areas which further affirmed with the UN report of 2014 as more than haft of the world population which over 1 billion (25%) of these urban inhabitants are living in informal settlements (United Nations (UN), 2018; United Nations (UN), 2014; World Bank, 2020). Large percentage of these global informal settlements population is in urban areas of developing countries of Asia and Africa and this has created (United Nations Statistics Division (UNSD), 2018). Proliferation of informal settlements has created concern to 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 located in hazard prone environment that may expose the inhabitants and structures to disasters and other environmental challenges. This common phenomenon of informal settlements presents them to many challenges including poor sanitary condition and environmental degradation which lives a conscious mark on the settlements and its inhabitants. Portraying the characteristics of poverty, inequality, over population, poor housing, lack of basic urban infrastructure and services, pollution of various types, and unhygienic condition has 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 of living conditions of individuals and the societies they live (Eyenghe, 2020) considering life satisfaction, physical health, family, education, employment, wealth, safety, security 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 which is one of the fast growing urban areas in Nigeria is characterised with the increasing proliferation of informal settlements across her urban landscape especially along its coastline areas having marginal lands for physical development. The municipality is described as birthing informality that is questioning the ability of achieving sustainability in its urban settings. The need for assessment and analysis of the informal settlements found within the municipality territories in term of their sanitary and environmental conditions become necessary to improve quality of life of residents and the neighbourhood quality of these settlements to achieve sustainable cities and communities which is cardinal point of the United Nations Human Settlements Programme (UN-Habitat), governments, urban planners and managers, urban communities and individuals.

Statement of the Problem

The importance of sanitary and environmental conditions in human settlements cannot be overemphasised in quality of life and neighbourhood quality. In informal settlements sanitation and environmental factors are crucial the living standard of the dwellers and the governments. However, it is observed in Port Harcourt Municipality currently the proliferation of informal settlements is increasing in quantity and the living conditions of the dwellers of the settlements is gradually and incrementally degrading in quality in reference to sanitary and environmental conditions resulting to doubt in achieving the city and its urban community's sustainability. This has led to poor sanitation, hygiene and environmental condition of the residents and neighbourhoods' quality. These conditions may be attributed to poor urban planning mechanisms and improper landuse planning and implementation in the municipality. The lack of urban planning and landuse 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. There need to assess and analyse the sanitary and environmental conditions of these informal settlements in Port Harcourt Municipality in order to develop sustainability in the urban environment irrespective of their nature and add to the body of knowledge of informal settlements in reference to their sanitary and environmental conditions.

Aim and Objectives of the Study

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

The specific objectives of the study are to:

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

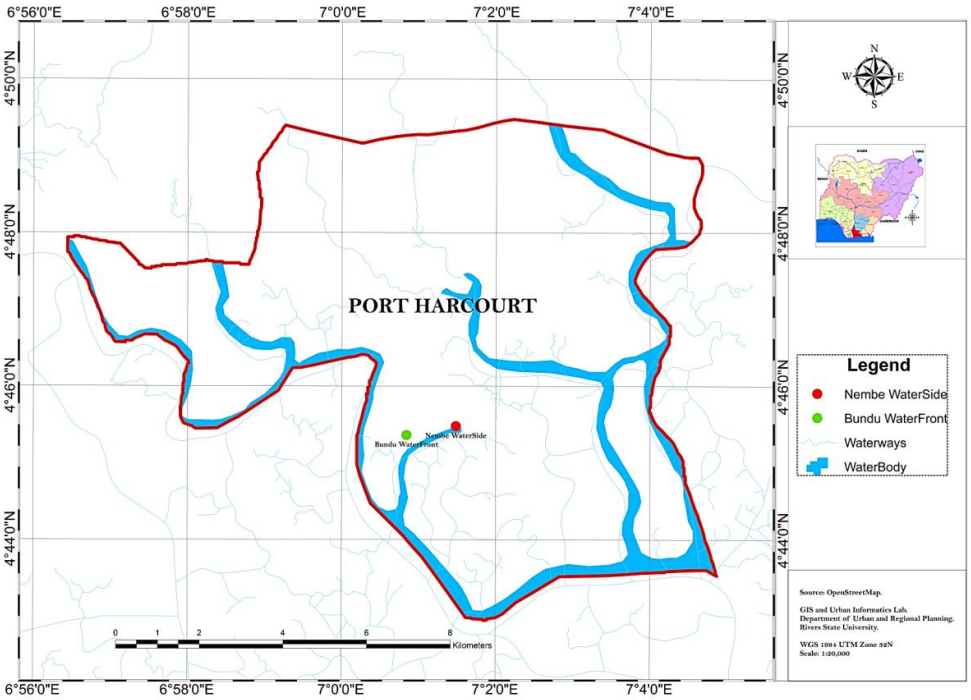

Figure 1: Map of Port Harcourt Municipality Indicating the Studied Neighbourhoods
Source: GIS Lab, Urban and Regional Planning Department, Rivers State University, Port Harcourt, 2021

Literature Review

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, Mexico City, over the years irrespective of 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 population live in 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 its inhabitants. It was reported by the United Nations (UN) in 1990 that informal settlements conditions and population are worst in developing societies especially in Asia with 550 million informal dwellers, Africa 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 a number of other social problems and disparities in urban societies. Some of the problems include gender injustice and inequality, addiction and crimes, violence and poverty, poor housing conditions and neglect of the poor. The intricacy of the poverty and vulnerability has forced to view poverty from different dimensions (Masoumeh, 2012). Socio-economic poverty, human and cultural poverty have become current phenomena of urban poverty which degenerate some sectors of urban societies to the formation of informal settlements in many urban centres. These poor conditions of living have cause vast majority of informal dwellers to portray deplorable condition, 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 has 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, Quagadougou, Mumbai, Karachi, etc (Fellmann, Getis, Getis & Malinowski, 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). This 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 are characterised by posing risks to life, health, tenure and inadequate housing to the dwellers. These risks are due to the buildings experiencing severe deterioration over time because of lack of maintenance, being located in a hazardous site or exposed to damaging health condition such as lack of safe drinking water and basic sanitation. The unplanned areas especially in inner urban pockets in the city core and sometimes at the urban peripheries with severe deteriorated conditions are characterized with high poverty and unemployment rates especially among the youths as a severe problem that threatens the security of the area to increase the complexity of informal settlements. Informal settlements differ in size and other characteristics, the dynamics sometimes exhibit 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).

Sustainability and Informal Settlements

The United Nations Department of Economic and Social Affairs (UN-DESA) (2015), set specific targets for her member countries through Sustainable Development Goals (SDGs) as an urgent call for action to achieve sustainable human and environmental development globally. The SDGs is expected to develop a global partnership framework for countries to key-in and achieve sustainability. The SDGs is an off-shoot of the Millennium Development Goals (MDGs) which expired in 2015. There are seventeen (17) SDGs and one hundred and sixty-nine (169) Targets that were put in place by the UN to eradicate extreme poverty, reduce deprivations, improve health and education, reduce inequality, improve economic growth and tackling 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 own 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 its inhabitants with ten (10) Targets and fifteen (15) indicators. Informal settlements were considered in the SDG 11 of Target 1 and Indicator 11.1.1 as to improve the living conditions and socio-economic well-being of the residents of these settlements. Thus, SDG 6 of the SDG is also focused on ensuring the availability and sustainable management of water and sanitation for all by 2030 is embedded in SDG 11 of the UN-SDG as part of provision of basic services to human settlements. The 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 stated that by 2030, governments and their societies should ensure that there is 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, Roser, Mispy, Ortiz-Ospina, 2018), and the provision of water and improvement of sanitation (UN-DESA, 2015) which has not been met by Nigeria and this failure has led to a sharp increase in informal characteristics of several urban centres across Nigeria. This present situation needs urgent policy and programme to the development and improvement of informal dwellers living conditions in Nigeria. Informal settlements require appropriate and well thought programmes to develop better and appropriate shelter conditions and programmes to legalise tenure in informal settlements to reduce social and economic instability (Eyenghe, Williams & Tobi, 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 in Nigeria capital city 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 landuse management. However, 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 effective infrastructures and services in city (Ibisiki & Eyenghe, 2021). This has generally affected the QoL and neighbourhood quality of the inhabitants of these settlements which is perceived to exhibit poor sanitary and environmental conditions within the municipality.

Methodology

The study employed a Mixed Methods Research approach using sequential explanatory research design for collection and analyses of data for the study. The study employed purposive and simple random sampling techniques for collection of data in the study area. The study applied Taro Yamane formula to determine the sample size which a total of 399 respondents (households) were interviewed. 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 6.5% growth rate (NPC, 2018). 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 5% precision level which a total of 399 sample size was determined (see Table 1). The study also, used key informal methods to select 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 survey of households in the study area, 387 questionnaires were considered valid for collation and analysis of data for the study. The key informants interviewed were staff of the Rivers State Ministry of Physical Planning and Urban Development, and professional Town Planners. Photographs and personal observations were also used for characterised the study area and the prevailing sanitary and environmental conditions of the settlements.

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

Results and Findings

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

The study has identified sanitary conditions of the study area including absence of 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 borehole accounted for 54.2% and followed by water vendors accounted for 28.7% in the distribution. Other sources of water supply to residents were public boreholes, well and rain water harvesting represented by 10.6%, 5.2% and 1.3%, respectively. The rain water harvesting is most used during rainy season of the year as this period is experienced between the months of March to October annually. Furthermore, in table 3 showed that most of the buildings were not directly supplied with water in their bathrooms and kitchens accounted for 94.8%. These conditions help in

characterising the sanitary condition of these informal settlements in term of the quality of sanitation and public health.

The environmental condition of the study area was characterised by the methods for waste disposal and sewage disposal in the neighbourhoods. From table 4, the modal waste disposal methods employed by residents were dump into waterbody and dump in open space accounted for 79% and 10.6%, respectively. Some other methods employed by residents identified were dump 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 service 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 environmental friendly and sustainable. As presented in table 5, most of the residents used pier toilet and defecate 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. These methods were used by residents because the neighbourhoods are not planned, does not followed 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 20	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

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

The poor sanitary and environmental conditions that characterised these neighbourhoods as earlier shown in tables 2, 3, 4 and 5 portrayed a deplorable and unsustainable status of the neighbourhoods. The status of the neighbourhoods which are unplanned in nature, 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 to spreading of sicknesses and diseases and 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 in reference to sanitary and environmental conditions as indicated by the residents were increase in public health concern, 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 showed 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" accounted for 29.2%. The remaining residents rated the sanitary and environmental conditions of the neighbourhoods as "fair", "satisfactory" and "very satisfactory" accounted for 10.6%, 3.9% and 1.5%, respectively. The conditions impacted on the quality of life of the residents and equally affected the neighbourhood quality from 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

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

From the data as showed in table 10, the identified measures to improve sanitary condition in the neighbourhoods, the modal suggestion by residents is providing pipe-borne water to the neighbourhoods accounted for 54% of the responses while other suggestions were 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 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 discourage people from building on water channels and provide 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 loan accounted for 48.6% and 24%, respectively. Other suggestions were initiating site and service schemes and subsidising building materials 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 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 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

Conclusion

Informal settlements have significantly impacted on fabrics of urban societies. Irrespective of their negative impacts, they provide the basis for informed physical planning and management to achieve sustainable development. This study has looked at sanitary and environmental conditions two notable informal settlements found within the Port Harcourt Municipality. The assessment of conditions of these settlements in reference to sanitary and environmental conditions has portrayed deplorable and unsustainability attributed to lack of public water supply to buildings, poor drainages and housing condition, employing unsustainable waste and disposal methods and prone to flooding. These conditions have caused public health concerns and pollution of waterbodies in these 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 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.

Recommendations

The study suggests the following recommendations:

i. Government should extent the ongoing public water reticulation project by African Development Bank (AfDB) in Port Harcourt Municipality to these informal settlements to improve sanitary conditions of the residents;
ii. Regular studies of the informal settlements should be carried to understand the dynamics and possible measures to improve living conditions and the well-being of residents;
iii. 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;
iv. Public awareness on public health and hygiene should carried out in the settlements to improve sanitation and environmental safety among residents of the neighbourhoods; and
v. Conscious planning of these informal settlements should be carried through the collaboration of the municipal authority and the residents of the communities to bring sustainability and good governance in the social and physical fabrics of the neighbourhoods.

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