Exploring Environmental Quality Domain on Quality of Life in Informal Settlements of Port Harcourt Municipality

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Abstract

The study explores environmental quality domain on quality of life in informal settlements of Port Harcourt Municipality. Objectively, the study identified indicators that will be used to build environmental quality domain to assess quality of life in informal settlements of the study area; examined environmental quality indicators on quality of life of informal settlements in the study area; and identified measures to improve environmental quality to enhance quality of life in the informal settlements of the study area. The study employed quantitative approach and descriptive research design. The study employed judgmental and simple random sampling techniques for selection of respondents and data collection which 4 settlements were selected namely: Bundu, Nembe Waterside, Okrika and Rex Lawson waterfronts for the study. A total of 399 respondents were determined and interviewed using Taro Yamane formula at 5% precision level. Hence, for collation and analysis, 394 questionnaires were retrieved and valid for analysis. The study employed domestic waste disposal method, sewage disposal method, availability of drainage, functionality of drainage and neighbourhood environmental condition to explore environmental quality for quality of life measurement and assessment in the informal settlements. The study found the prevalent domestic waste disposal and sewage waste methods in the settlements were dump into waterbody, and pit toilet and open defecation. The study further found that all settlements studied have drainages but not adequately functional and neighbourhood environmental condition from residents' ratings are bad and very bad. Therefore, to improve environmental quality and quality of life in informal settlements, the study suggested the following recommendations include Rivers State Government should extent sustainable waste disposal service to the informal settlements; government should collaborate with leadership of the informal settlements to setup Environmental Sanitation Committees (ESCs) to clean drainages monthly and educate residents on public health and basic sanitation; and government should collaboration with international development organisations such as UN-Habitat, UNEP, AfDB and World Bank and other local organisations to provide basic environmental infrastructure and facilities in the informal settlements of the study area.

Keywords: *Environmental Quality, Quality of Life, Informal Settlements*

Introduction

The living conditions determine the quality of life (QoL) of individuals in their living environment. The variance of these conditions determines the individual's satisfaction with their environment and perceived QoL. QoL is described as the summation of positive and negative conditions of life lived of individuals which narrate their perceptions about their societies (Eyenghe, 2020; Eyenghe, Brown & Ibisiki, 2022). QoL has been used to assess the general well-being of individuals in societies considering various aspects of life including housing, health, education, environmental quality, employment, participation in

decision-making and other basic infrastructure (Yousef, Mohammad, Arasteh, Bahareh, Mona, Hossein & Ali, 2021). It examines the perception and opinion of a person's physical state, economical state, values, social relationships, personal beliefs, and their relationships to salient features of the environment. Basically, QoL is measured by several factors and conditions within the individual's environment which enable them to derive personal satisfaction in their living environment taking congnisance of advantages and disadvantage found with the society (Ruževičius, 2014). One critical aspect of QoL is the issue of the environment. This aspect of life has been used to develop one of the domains of

QoL index for studies. Several organisations such as the United Nations Human Settlement Programme (UN-Habitat), Economist Intelligent Unit (EIU), Mercer and Organisation for Economic Cooperation and Development (OECD) have all used environment to build QoLI for their studies which has form critical anchor of QoL studies.

In exploring the environment as a concept to be used as an assessment criterion for QoL of individuals and societies is crucial for sustainable urban development. However, environment and its quality have been fused into forming environmental quality as a domain for QoL assessment. Rapid urbanisation usher in informal settlements in many urban areas especially in developing countries. Informal settlement is one of phenomenon and attribute of unplanned and poorly managed urbanisation. Informal settlement is defined as a settlement where the residents have no security of tenure, neighbourhood usually lacking basic services and infrastructure, and the housing may not comply with planning and building codes and regulations, and is located in geographical and environmental sensitive areas (United Nations Human Settlements Programme (UN-Habitat, 2015). These conditions portrayed squatter, slum and squalor in many ramifications which indicates environmental quality concerned. Port Harcourt Municipality in Nigeria is dotted with informal settlements that are characterised with environmental quality issues that help to define the QoL of its inhabitants.

Environmental quality as one the vital components of QoL become eminent to government, urban communities and residents. The study of environmental quality impact on QoL seems complex but comprehensive and varies according to the time and beliefs of the individuals and societies. Environmental quality has to do with the ecological traits that impact people and other living things, whether general or specific. It is a way to assess how well an environment meets the needs of one or more species and any needs or purposes related to humans. Environmental quality refers to both the constructed environment and the natural environment. It encompasses factors like air quality, water quality or pollution, noise levels, and any potential consequences that these factors may have on one's physical and emotional well-being (Saranya & Nagaraj, 2023). Environmental quality of the informal settlement most times cannot be completely inadequate on a basis of perception. The study looks into exploring environmental quality domain on quality of life in informal settlements of Port Harcourt Municipality as to improve the residents QoL and achieve sustainable urban environment.

Statement of the Problem

Environmental quality has been an essential component of QoL. Observations on the QoL of informal settlements of Port Harcourt Municipality in recent times, continually portraying deplorable condition as the environmental quality are not humanly fit for habitation in many senses. This has triggered the need to explore the environmental quality on QoL in informal settlements as most settlements condition connote threat to public health and basic sanitation to the residents and equally defacing the urban landscape. This condition may have been caused by poor urban planning and long neglect of the informal settlements in the municipality by government, policy makers and urban planning and development agencies. Resulting to lack of public health infrastructure and facilities including basic sanitary services that has occasioned deplorable living condition and

environment. Researches has shown that informal settlements depict area with poor environmental conditions with poor sanitation, poor waste disposal and sewage disposal methods (UN-Habitat, 2015; Eyenghe, Ibama & Ibisiki, 2022; Surajit, 2017). This study seeks to explore how these environmental quality rubs off on the QoL in the study area and to identify measures to improve the environmental quality of these settlements to achieve better QoL of the residents and general wellbeing of the urban environment.

Aim and Objectives

The study aimed to explore the environmental quality domain on quality of life in informal settlements of Port Harcourt Municipality.

The objectives of the study are as follows:
  i. Identify indicators that will be used to build environmental quality domain to assess QoL in informal settlements of the study area;
  ii. Examine environmental quality indicators on QoL of the informal settlements in the study area; and
  iii. Identify measures to improve environmental quality to enhance QoL in the informal settlements of the study area.

Scope of the Study

The scope of the study geographically covers four (4) selected informal settlements in Port Harcourt Municipality, Rivers State namely: Rex Lawson Waterfront, Okrika Waterfront, Bundu and Nembe Waterside (see Figure 1). The content scope of the study is delimited to identify the indicators that will be used to build environmental quality domain to assess QoL in the informal settlement; examine environmental quality indicators on the QoL of the informal settlement; identify measures to improve environmental quality to enhance QoL in the informal settlements.
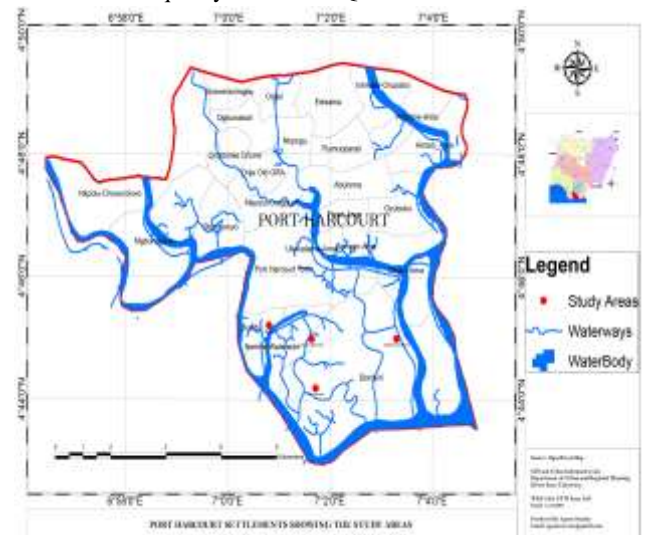

Figure 1: Showing Port Harcourt Municipality and the Study Area
Source: GIS Laboratory, Department of Urban and Regional Planning, Rivers State University

Literature Review

The Concept of Quality of Life

A quality of life theory is developed from Abraham Maslow's human developmental perspective. The theory says a developed society involves those preoccupied in satisfying higher order needs such as their social life, self-esteem and self-actualization. The less

developed society involves those preoccupied in satisfying lower order needs such as biological and safety related needs. He stated that the QoL is based on the hierarchical need satisfaction level of the member of the society both in the developed society and the less developed society. So, the QoL of is determined by the level of need satisfaction. He then stated that "the higher the need satisfaction of the majority in a given society the greater the QoL of that society" (Sirgy, 2006). He argued that progressive increases in QoL are accompanied with hierarchical changes of the societal institutions.

Environmental Quality and Quality of Life

The environmental quality indicators of QoL cover the aspect of house waste disposal method, house hold sewage disposal method, sanitary condition, drainage availability, and functional drainage. It examines people's access to environmental services and amenities, as well as looking at the impact of hazards on human health and environmentally responsible behaviour (Streimikiene, 2015). Basically, an informal settlement is referred to as an unclean environment with a deteriorating housing system and an unattractive landscape. The nature of the environment has a direct impact on the human health and well-being of its inhabitants. A clean environment is a source of satisfaction, improves mental well-being, and allows people to recover from the stresses of everyday life and perform physical activities. QoL can be categorised in three approaches; the first approach describes characteristics of the QoL that are dictated by normative ideals based on philosophical, belief and other systems which depend neither on the subjective experience of people; the second approach to defining the QoL is based on the satisfaction of preferences, in which quality of life of a society is based on whether the citizens can obtain the things they desire; the third approach of quality of life is in terms of the experience of individuals, in which factors such as feelings of joy, pleasure, contentment, and life satisfaction are paramount (Lanrenwaju, 2012). Senecal (2002) sees the QoL in two ways, first it concerns the living environment and involves the patterns of advantages, disadvantages, and opportunities that affect each citizen through access to services, facilities, and amenities. Other elements of the living environment include economic vitality and social equity, which encapsulates an infinite number of specific issues, notably, the quality and affordability of housing. The second approach relates to the natural environment in urban spaces. This approach holds that air, water, soil quality; and the amount of available green space affect the ways we live (Wokekoro & Owei, 2014).

Household wastes are waste that are generated in the day-to-day operations of persons in their houses (McMahon, 2023). As a result of the concern on environmentally friendly living, researchers have focused on type of waste as something which can be easily manipulated to make a difference in the environment. Waste disposal methods has received a lot of attention. Before now a lot of persons disposes their waste by burying or burning it, but these methods gradually faded away as populations started increasing that land fill became the order of the day that disposal site were buried by sand filling. The study looked into the common waste disposal method in the informal settlement of Port Harcourt municipality

The comparative study of the QoL in urban settlements helped to evaluate and analyse the facts among the various settlement and compare their similarities and differences through the perceptions of inhabitants of the settlements. Several studies such as Eyenghe

(2020) and Eyenghe, Brown and Ibisiki (2022) have utilised various indicators that can quantifiable for analysing and comparing QoL in living environment. Some of these domains that have been quantified include housing, educational, healthcare, safety and security, and environmental quality which are built by numerous indicators.

The idea is to record which settlement is perceived more satisfactory and meet human needs in term of comfort, accessibility and functionality and more importantly livable by evaluating and analysing the satisfaction of the residents in reference to their QoL and their level of access to basic amenities. These domains and indicators were assigned points as values to have a quantifiable face value ranging between 1-100 points before they can be used for assessment and comparison (Eyenghe, 2020). It is largely a function of comparing the QoL of residents in the living environment (Ventegodt, Merrick & Andersen, 2003). According to Sirgy (2012), large cities is detrimental to life satisfaction, and on the contrary, rural life is beneficial to life satisfaction.

Measures to Improve Environmental Quality and QoL in Informal Settlements

The purpose of measuring QoL is to value the standard of living that people appreciate and to preserve or improve the elements that could make life more enjoyable. Improving Environmental quality of life to enhance the QoL and lower the high burden of oral-fecal illnesses in informal settlements brought on by widespread open defecation, investments in better sanitation should be given top priority. Sanitation is particularly risky in informal communities due to their high density. The usage of low-cost communal toilet blocks has been successful in areas with severe space restrictions. To establish a demand for sanitation and to assure adequate use by all households, effective hygiene education and awareness development activities are crucial. Storm drainage, community amenities, local markets, street lighting, and health services are just a few of the additional investments necessary for developing informal settlements.

Methodology

Sequentially, to obtain information and data to achieve the aim and objectives of the study, the study employed a quantitative approach and descriptive research design to explore, understand and explain the environmental quality domain on QoL in informal settlements of Port Harcourt Municipality. The study employed judgmental and simple random sampling techniques for data collection. Taro Yamane formula at 5% precision level was used to determine the size for the study in which three hundred and ninety-nine (399) respondents were determined and interviewed (see Table 1). Judgmentally, four (4) settlements were selected namely: Bundu, Nembe Waterside, Okrika and Rex Lawson waterfronts for the study which have the characteristics of an informal settlement in Port Harcourt Municipality. Consequently, to determine the sample size, the population of the settlements were projected for the study year (2022) using 1991 population census results with a 6.5% growth rate (National Population Commission (NPC), 1991; NPC, 2018). To achieve the sample size, an average of five (5) persons per household was used to determine the number of households in the selected settlements (National Bureau of Statistics (NBS), 2016). Hence, the Taro Yamane formula was used and proportionately distributed to the selected households across the settlements selected for the study. A simple random technique was employed to select respondents (household heads) that were

interviewed. Also, physical observations and photographs were used to characterise the environmental quality domain on QoL for the study area. Hence, for collation and analysis, 394 questionnaires were retrieved and valid for analysis.

Table 1: Determination of Sample Size for the Study

Sampled Settlements	1991 Population	2022 Population (6.5%)	Number of Households Size (5)	Sample Size
Bundu	16,266	114,513	22,903	69
Nembe Waterside	71,388	502,571	100,514	305
Okrika Waterfront	4,545	22,725	4,545	14
Rex-Lawson Waterfront	3,620	18,100	3,620	11
Total	**95,819**	**657,909**	**131,582**	**399**

Source: Researchers' Computation, 2022

Results and Discussion of Findings

Identified the Indicators to Build Environmental Quality Domain to Assess QoL in Informal Settlements of the Study Area

The study has identified five (5) indicators to build environment quality domain for the assessment of QoL informal settlement of the study area. The indicators selected for environmental quality domain assessment are domestic waste disposal, sewage disposal, availability of drainage, functionality of drainage and neighbourhood environmental condition. These indicators are crucial for assessing environmental quality which can be used to measure and assessment QoL of settlements especially in informal settlements. Thus, Eyenghe, Brown and Ibisiki (2022) has equally used these indicators in their study to measure and assess sanitary and environmental conditions of informal settlements which can be applied in this study to evaluate informal settlement dwellers QoL.

Also, Surajit (2017) and Eyenghe (2020), have also applied same indicators for in their respective studies to measure and assess QoL informal settlements in Nabadwip Town, West Bengal State, India and Yenagoa City, Bayelsa State, Nigeria, respectively. These indicators were able to measure environmental domain to assess QoL of individuals and the neighbourhoods that characterised informal settlement conditions.

Examined Environmental Quality Indicators on QoL of Informal Settlements in the Study Area

The examination of environmental quality domain using indicators such as domestic waste disposal methods, sewage disposal methods, availability of drainage, drainage condition and neighbourhood environmental condition were used for measure and assessment to analyse the QoL in the informal settlements selected for the study. In examination of the indicators, domestic waste disposal is essential to environment quality of settlements in all implications of quality liveability. Table 2 shows the percentage distribution domestic waste disposal methods in the study area. The study revealed that modal domestic waste disposal method adopted by residents of the informal settlements was dumping into waterbody accounted for 43% of the responses (see Figure 2). This occasioned the prevalent method for domestic waste disposal because of the proximity of the settlements to waterbodies which is abutting them. However, other domestic waste deposal methods mentioned by the residents were disposing wastes on authorised dumpsite, dumped on road side and house-to-house collection accounted for 21.3%, 20% and 9.6%, respectively. These methods are available to residents that their houses are closed to planned neighbourhoods that are services by the government agency in charge of waste collection in the Port Harcourt Municipality. Other unconventional domestic waste methods as mentioned by the residents were burning, bush paths, and dig hole and bury represented by 2.5%, 2.3% and 1%, respectively from the distribution in table 2. The data further explained that most of Nembe Waterside residents disposed their domestic wastes in waterbody accounted for 49.3%, while most residents of Rex Lawson and Okrika Waterfronts and Bundu settlements disposed their wastes on authorised dumpsite, accounted for 36.4%, 57.1% and 44%, respectively in their individual columns (see Table 2).

Table 2: Domestic Waste Disposal Methods

Domestic Waste Disposal Methods	Rex Lawson Waterfront		Okrika Waterfront		Bundu		Nembe-Waterside		Aggregate	
	No.	%	No.	%	No.	%	No.	%	No.	%
Authorised dumpsite	4	36.4	8	57.1	28	40.6	44	14.7	84	21.3
House-to-house collection	1	9.1	1	7.1	18	26.1	18	6	38	9.6
Dig hole and bury	0	0	1	7.1	2	2.9	1	0.3	4	1
Burning	0	0	0	0	2	2.9	8	2.7	10	2.5
Bush paths	0	0	0	0	0	0	9	3.0	9	2.3
Dump into waterbody	5	45.5	1	7.1	15	21.7	148	49.3	169	43
Dump on road side	1	9.1	2	14.3	4	5.8	72	24.0	79	20
Not ascertained	0	0	1	7.1	0	0	0	0	1	0.3
Total	**11**	**100**	**14**	**100**	**69**	**100**	**300**	**100**	**394**	**100**

Source: Researchers' Survey, 2022

Figure 2: Waste Disposal on Waterbodies in Nembe Waterside

Researchers' Survey, January 2022

Furthermore, table 3 shows the percentage distribution of sewage disposal methods in the informal settlements studied. The data revealed that modal sewage disposal methods found in the study area is pit toilet accounted for 40.4% of residents' responses, followed by pour and flush and open defecation methods accounted for 16.7% and 16.2%, respectively in the distribution of residents' responses. Other sewage disposal methods recorded in the studied settlements were pier latrine, and water closet which accounted for 13.2% and 12.2%, respectively (see Figure 3). The unhealthy and unsafe methods that are unsustainable and affects public health and sanitary conditions of residents accounted for 69.8% of the responses. These unhealthy and unsafe methods in term of public health and sanitation are prevalent in Nembe Waterside and Bundu settlements while Okrika Waterfront has better sewage disposal method compared to the other informal settlements studied as 85.7% of the residents uses water closet and pour and flush methods (see Table 3).

Table 3: Sewage Disposal Methods

Sewage Disposal Methods	Rex Lawson Waterfront		Okrika Waterfront		Bundu		Nembe-Waterside		Aggregate	
	No.	%	No.	%	No.	%	No.	%	No.	%
Pier latrine	0	0	2	14.3	8	11.6	42	14	52	13.2
Open defecation	0	0	0	0	11	15.9	53	17.7	64	16.2
Pit toilet	3	23.1	0	0	6	8.7	150	50	159	40.4
Water closet	7	53.8	10	71.4	26	37.7	5	1.7	48	12.2
Pour and flush	1	7.7	2	14.3	18	26.1	45	15	66	16.7
Not ascertained	0	0	0	0	0	0	5	1.6	5	1.3
Total	**11**	**100**	**14**	**100**	**69**	**100**	**300**	**100**	**394**	**100**

Source: Researchers' Survey, 2022

Figure 3: Pier Latrine and Open Defecation in Rex Lawson Waterfront

Researchers' Survey, January 2022

Figure 4 shows the percentage distribution of availability of drainage in the informal settlements of the study area. The data revealed from residents of Okrika Waterfront there are drainages as all respondents affirmed the present of drainage in the settlement. Other settlements such as Bundu and Rex Lawson residents confirmed that there are drainages in their settlements accounted for 75.4% and 72.7%, respectively in their individual charts while Nembe Waterside has the lowest in availability of drainage in their settlement from the respondents accounted for 61% of the responses of the settlement. Generally, these results indicated that there are drainages in the settlements. The study further probed the functionality of the available drainages in the settlements. The results in figure 5 showed that Okrika Waterfront and Bundu settlements affirmed that the available drainages are functional accounted for 85.7% and 84.1%, respectively while the Nembe-Waterside and Rex Lawson

Waterfront settlement affirmed the available drainages are not functional accounted for 88% and 72.7%, respectively from residents' responses. These responses showed that 2 settlements each have opposite conditions in term of drainage functionality in the study area.
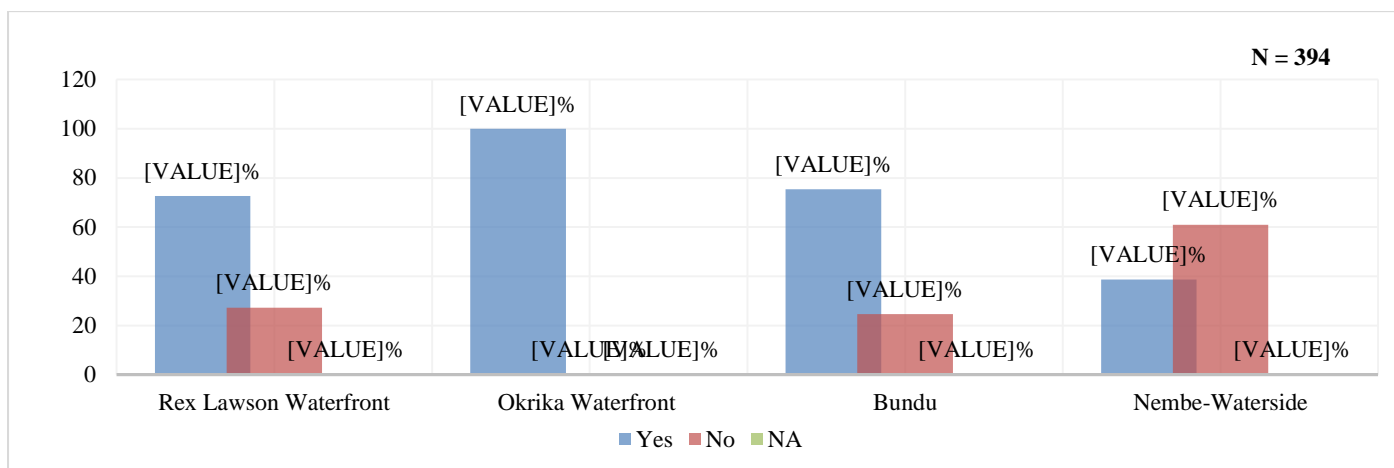

Figure 4: Availability of Drainag
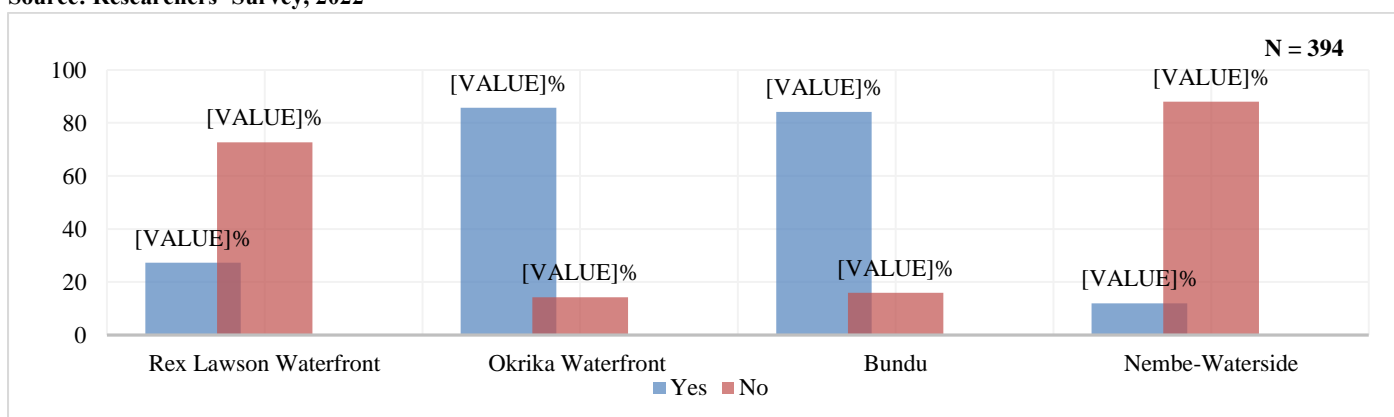**Source: Researchers' Survey, 2022**

Figure 5: Functionality of Drainage
Source: Researchers' Survey, 2022

Table 4 shows the percentage distribution of ratings of neighbourhood environmental condition of settlements in the study area. The study reveals from the environmental quality indicators used for the measurement and assessment, the residents rated the settlements as bad accounting for the highest responses in rating represented by 47.2% in the distribution. This was followed by residents that rated the neighbourhood environmental condition as very bad accounted for 26.6% of the responses. Other residents rated the environmental condition as good, fair and very good represented by 11.2%, 11.2% and 3.8%, respectively in the distribution. The study revealed that majority of the residents rated their neighbourhood environmental condition bad and very bad accounted for 73.8% of the responses. These ratings were common in Nembe Waterside, Rex Lawson and Waterfront and Bundu settlements from the data in table 4 (see Figure 6).

Table 4: Rating of Neighbourhood Environmental Condition

Environmental Condition	Rex Lawson Waterfront		Okrika Waterfront		Bundu		Nembe Waterside		Aggregate	
	No.	%	No.	%	No.	%	No.	%	No.	%
Very good	0	0	4	28.6	5	7.2	6	2	15	3.8
Good	1	9.1	4	28.6	30	43.5	9	3	44	11.2
fair	5	45.5	4	28.6	18	26.1	17	5.7	44	11.2
Bad	3	27.3	2	14.3	14	20.3	167	55.7	186	47.2
Very bad	2	18.2	0	0	2	2.9	101	33.7	105	26.6
Total	**11**	**100**	**14**	**100**	**69**	**100**	**300**	**100**	**394**	**100**

Figure 6: Environmental Condition in Rex Lawson Waterfront
Researchers' Survey, January 2022

Measures Suggested by Respondents to Improve Environmental Quality to Enhance QoL in Informal Settlements in the Study Area

There are several measures suggested by respondents to improve environmental quality to enhance QoL of residents in the study area. The respondents suggested that an authorised dumping site should be placed at central areas, drainages should be constructed and repaired, sanitation equipments should be made available to the inhabitants, sanitation bodies should be invited on a monthly basis to help free the blocked drainages and restrictions orders should be given on coastal area. These suggestions cover all 5 indicators used for the measurement and assessment environmental quality domain and will improve QoL of residents in informal settlements of the study area.

Conclusion

Environmental quality domain and indicators have become critical and valuable assessment tool for exploring to measure and assess QoL by governments, researchers and urban communities in informal settlements that are characterised by poor environmental and sanitary conditions in urban areas. The study was undertaken to explore the environmental quality domain to assess QoL in informal settlements of Port Harcourt Municipality specifically using informal settlements in waterfront area including Rex Lawson Waterfront, Okrika Waterfront, Bundu and Nembe Waterside settlements to obtain residents perceptions of their QoL in reference to environmental issues. The study has developed indicators which includes domestic waste disposal method, sewage disposal method, availability of drainage, functionality of drainage and neighbourhood environmental condition to examine environmental quality on QoL of informal settlements for the study. The study found the prevalent domestic waste disposal and sewage waste methods adopted in the settlements were dump into waterbody, and pit toilet and open defecation, respectively which are unsustainable and threat to public health. The study further found that all settlements studied have drainages but their functionality is questionable from residents. Though, Okrika Waterfront and Bundu have higher level of functional. These indicators translated the neighbourhood environmental condition of the settlements from residents' ratings to be bad and very bad. Therefore, based on these findings, environmental quality domain and indicators should be explored to improve QoL in informal settlements to enhance residents living conditions, wellbeing and environment. This can be achieved through the following recommendations.

Recommendations

i. Rivers State Government should extent sustainable waste disposal service to the informal settlements which is a critical aspect of environmental quality to improve QoL of residents;

ii. The government should collaborate with leadership of the informal settlements to setup Environmental Sanitation Committees (ESCs) to clean drainages on a monthly basis and also educate the residents on the importance of public health and basic sanitation as a condition for healthy living and environment;

iii. Government should encourage residents to dispose all domestic waste generated in authorised dumpsites close to their settlements to avoid dumping wastes into waterbodies; and

iv. Government should collaboration with international development organisations such as UN-Habitat, UNEP, AfDB and World Bank and other local organisations to provide basic environmental infrastructure and facilities such as public toilets and drainages that will improve environmental quality and living conditions of residents in the informal settlements of the study area.

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