Environmental Health Services and Environmental Quality in Ikwerre Local Government Area of Rivers State, Nigeria

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Abstract: This study is entitled Health Services and Environmental Quality in Ikwerre urban area of Rivers State'. The state which is one of the states in Nigeria endowed with petroleum resources, for a very long period has been exposed to environmental degradation and deterioration due to crude oil exploration and extraction activities. These activities go a long way to causing environmental pollution and its concomitant health problems in the local government areas and the whole state in general. For improved environmental health services to enhance Ikwerre urban environmental quality in the study area method of data collection in the field: random, sample data collection the questionnaires were administered to 400 respondents from eighteen communities in Ikwerre urban area. (y) And independent variables (x) for analysis, spatial presentation and descriptive statistics were used regression analysis were also used for analysis. The study found that there was low level environmental quality because of low level of environmental health services. Against the background of the result, a participatory environmental health management approach is recommended for improvement of environmental quality in Ikwerre local government area.

Key word: Environmental quality, Health services, Environmental Health Services, Ikwere, Rivers State,

I. INTRODUCTION

Health services are defined by the World Health Organization as those services that deal with environmental health policies through monitoring and control activities. They also include activities which promote the improvement of environmental parameters and encourage the use of environmentally friendly and healthy technologies and behaviours.

Failure to address environmental health issues tend to amplify the causes of diseases. One of the accompanying effects of increased levels of urbanisation in Nigeria is the rapid deterioration of the urban environment. Hence. Nigerian cities have been characterized by the proliferation of squatter, settlements, overcrowded dwellings, break down of waste disposal arrangements, air and water pollution, inadequate water and power supply, and squalid condition of environmental sanitation. These collectively relate to what [1] refers to as the problem of livability associated with Nigerian cities. The most visible and perhaps intractable urban environmental problem pertains to the generation and disposal of solid waste [2].

The situation in the pre-colonial Nigeria was not so serious because about 93% of the population lived in villages where responsibilities were shared among women and men who did sweeping and cleaning [3]. The colonial period experienced environmental problem after the amalgamation of the country in 1914 [1].

Environmental health officers working in the urban area have the responsibilities to inspect, all premises especially residential ones for the purpose of detecting the problems and providing sustainable environmental management.

1.2 Statement of the Problem

Government policy on environment since 1992 includes the employment of environmental health workers to provide defined services to Ikwerre Local Government Area to control degradation and enhance their environmental quality. This policy has neither been evaluated A nor its effects ever assessed. The problem of this study is to assess the activities of environmental health workers and their effects on the quality of the environment in Ikwerre local government area.

1.3 Aim and Objectives of the Study

The aim of this study is to assess the health services and environmental quality in lkwere Local Government Area of Rivers State with a view to proposing improved policies and administrative framework for environmental health services. The objectives of the study are as follows:

(a) to examine the types of environmental health services available in Ikwerre,
(b) to assess the urban environmental quality in Ikwerre,
(c) to determine the effects of environmental health services on urban environmental quality in Ikwerre,
(d) to propose strategies for improved environmental health services to enhance Ikwerre local government area environmental quality in the study area.

1.4 Research Questions

1. What are the available environmental health services within the study area?

2. What is the level of environmental quality within the study area?
3. How does environmental services provision affect environmental quality within the study area?
4. What are those factors hindering effective environmental services within the study area?

1.5 Significance of the Study

The study will reveal the nature of existing environmental services in the study area. It will establish the available challenges in relation to sustainability and efficiency. The State Government through the State Ministry of environment will benefit from the study. The Ministry of Health will derive some data on the level of access to basic environmental health services in the context of achieving the vision 20:20:20.

1.6 Research Hypotheses

The following hypotheses will guide the study:

Ho: There is no significant relationship between intensity/frequency/type of environmental health services and level of environmental quality.

Hi: There is a significant relationship between level of environmental services and level of environmental quality.

1.7 Scope of the Study

The study focuses basically on the environmental health services and environmental quality in Ikwerre local government Area of River State. Data collection were limited to household, and the relevant government agencies administering environmental services in the area.

II. STUDY AREA

2.1 Location of the Study Area

The Ikwerre Local Government Area is located along the coast of Southern Nigeria. It is one of the towns in the Niger Delta Region. Ikwerre Local Government area shares the northern border with Imo State and the south with Oba Local Government Area Rivers State. It is bounded in the West by Emuoha Local Government Area of Rivers State. The Area falls within the coastal belt dominated by low-lying coastal plain, which structurally belongs to the sedimentary formations of Niger Delta Region. Environmental services in Ikwerre local government area have taken account of the aspects of human health (including quality of life) that is determined by physical, chemical, biological, social and psychosocial factors in the environment. Environmental health services help in creating and maintaining good public health and environmental quality within the Ikwerre local government area, ensuring such basic health requirements as availability of clean water, clean air, safe food etc for the citizenry.
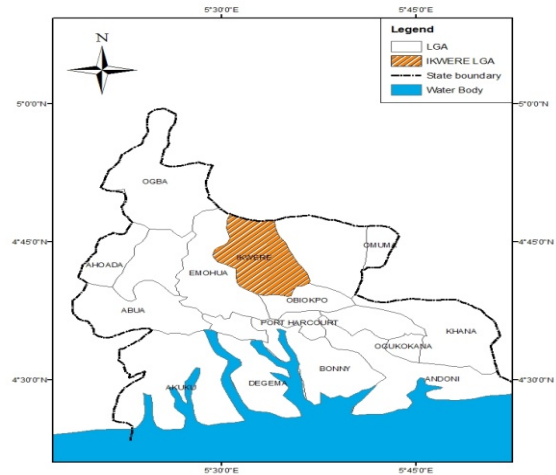

Fig. 1: Map of Rivers State showing the Location of Ikwere Local Government Area

2.2 Historical Background

lkwere people are one of the ethnic nationalities in Rivers State of Nigeria. The Ikwerre language is one of the accepted official dialects in Rivers State. The Ikwerre Local Government Council was established on December 15th 1976. lkwerre Local Government Area has its headquarters at Isiokpo.

2.3 Population Distribution and Density

The population of the study area was 177, 442 persons [4].

Table 4.3: Zones and Population Distribution

	Zone A	Population distribution
1	Omerelu	9,450
2	Apani	5,659
3	Ubima	10,800
4	Elele	40,000
	Zone B	
1	Umuanwa	9,250
2	Isiokpo	8,733
3	Ozuoha	14,100
4	Iguruta	22,200
	Zone C	
1	Omedeme	9,050
2	Omuagwa	9,500
3	Ipo	7.750
4	Aluu	10950
	Zone D	
1	Umuoji	4,300
2	Umuayemele	3,200
3	Umuope	3,300

4	Uturu	3,300
5	Uborum	3,200
6	Umudiala	2,200
	Total	177, 442

The population distribution and density pattern of settlement. The study area is densely populated and the settlement is predominantly cluster in nature. Similarly, [5] identified physical factors amongst social, political, historical and economic factors as the most significant in patterning settlements. There are provisions of socio-economic infrastructures that enhance modern living. These include roads, water and power supply lines, health and educational institutions, bank, markets and industries.

The population concentration is high at Elele, Iguruta, Ozuoha and Ubima because of historical and socio-cultural factors such as wrestling. Presently, Elele is highly populated with an influx of people from other local government areas and the neighbouring communities.

2.4 Residential Neighbourhoods

Ikwerre urban area is made up of Isiokpo as headquarters and eleven communities. Some of Ikwerre's popular and well-known residential areas are Elele Town, and Omerelu. The main Government Residential Area is located in Ubima nucleus estate.

III. RESEARCH METHODOLOGY

3.1 Research Design

This study was based on a survey design consisting of personal interview approach.

3.2 Data Required

(a) Dependant Variables

Y_1	Quality of streets paved/unpaved potholes (scores 1 to 3).
Y_2	Nuisance activities (scores 1 to 3).
Y_3	Home flowers and compound gardens (number).
Y_4	Public parks green and open spaces (number).
Y_5	Areas liable to flooding (number).
Y_6	Waste disposal sites/location (number).
Y_7	Land use quality (scores 1 to 3).
Y_8	Recreation centres (number).
Y_9	Incidence of water borne disease (number per week).
Y_{10}	Houses connected to pipe borne water (number).
Y_{11}	Housing quality/ ageing structure

(b) Independent variables (x)

X_1	Household dustbin (number)
X_2	Public waste collection bin (number)
X_3	Environmental health workers (number)
X_4	Sanitary inspector (number)
X_5	Frequency of public sanitation exercise per month (number)
X_6	Km of drainage (length in km)
X_8	Frequency of street sweeping (number per week)
X_9	Frequency of public open spaces and parks cleaning (number per week)
X_{10}	Frequency of drainage unblocking (number per month)
	Dependant variable (y)
Y_1	Quality of streets (paved, unpaved, potholes) (scores 1 to 5)
Y_2	Nuisance activities (number)
Y_3	Home flowers and compound gardens (number)
Y_4	Public parks, greens, and open spaces (number)
Y_5	Area liable to flooding (number)
Y_6	Waste disposal sites and locations (number)
Y_7	Proper urban land use (scores 1 to 5)
Y_8	Recreation centres (number)
Y_9	Housing quality/aging structures (scores 1 to 5)
Y_{10}	Incidence of water borne disease (number per week)
Y_{11}	Houses are connected with pipe-borne water (number per street)

3.3 Sources of Data

The Sources of Data are government records, households interviews and observation.

Data for this study were obtained from primary and secondary sources.

3.3.1 Primary Data

A carefully designed questionnaire was used for collecting data in the study, among respondents in the selected communities using the simple random sampling techniques, 400 copies of structured questionnaires were administered to the selected households.

3.3.2 Secondary Data

These consisted of sources such as journal articles, internet, paper presented at conferences and report from health services providers, as well as ministries, government agencies and environmental agencies. Population figure for the study area were obtained from the National Population Commission Rivers State, population estimates and sample size were statistically determined.

3.4 Population

The population of the study area was 177, 442 persons [4].

Table 3.4: Zones and Population Distribution

	Zone A	Population distribution
1	Omerelu	9,450
2	Apani	5,659
3	Ubima	10,800
4	Elele	40,000
	Zone B	
1	Umuanwa	9,250
2	Isiokpo	8,733
3	Ozuoha	14,100
4	Iguruta	22,200
	Zone C	
1	Omedeme	9,050
2	Omuagwa	9,500
3	Ipo	7.750
4	Aluu	10950
	Zone D	
1	Umuoji	4,300
2	Umuayemele	3,200
3	Umuope	3,300
4	Uturu	3,300
5	Uborum	3,200
6	Umudiala	2,200
	Total	177, 442

Source: Field Survey 2012

3.4.1 Sample Size and Sample Technique

A sample of 400 respondents was selected to represent the population (177, 442) of Ikwerre Area. This sample size was distributed within the 18 neighbourhoods in the study area. The following equation guided the procedure:

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

where n = sample size

N = finite population

e = level of significance

I = constant value

n=$\underline{177,442}$

$1+177442(0.05)^2$

n =$\underline{177442}$

$1+177442(0.05)^2$

n= $\underline{177442}$ = 400

442.605

n = 400

Table 3.4: Sample Size Distribution

	Zone A	Population	Sample
1	Omerelu	9,450	22
2	Apani	5,659	22
3	Ubima	10,800	22
4	Elele	40,000	22
	Zone B		
1	Umuanwa	9,250	23
2	Isiokpo	8,733	22
3	Ozuoha	14,100	22
4	Iguruta	22,200	23
	Zone C		
1	Omedeme	9,050	22
2	Omuagwa	9,500	22
3	Ipo	9,750	23
4	Aluu	9,500	23
	Zone D		
1	Umuoji	4,300	22
2	Umuayemele	3,200	22
3	Umuope	3,300	22
4	Uturu	3,300	22
5	Uborum	3,200	22
6	Umudiala	2,200	22
	Total	177,442	400

Source field survey (2012)

3.5 Data Collection procedure

The questionnaire was administered to the respondents with the help of trained research assistants.

All the neighbourhoods in the study area were included in the study. On entering a neighbourhood every n^{th} street was selected where n was 3, that mean that every third street was chosen, and along each street every 5th household was selected for interview. Administration of questionnaire stopped n equaled 22 as the case may be.

3.6 Data Analysis

Two types of data analyses were used in the study namely:

Spatial presentation and descriptive statistics for objective one, two and four.

Regression Analysis was used for objective three as follows:

$Y=a+b_1x_1+b_2x_2\text{------}b_nx_n$
Where y=environmental quality score

X = number, type, and frequency of environment health services

b = constant

IV. PRESENTATION OF DATA AND ANALYSIS OF FINGINGS

4.1   Socio-Economic Characteristics of the Respondents

The general characteristics of the respondents interviewed are presented in Tables 4.1 to 4.6.

Table 4.1: Sex

Sex	No of respondents	Percentages (%)
Males	210	52.5
Female	190	47.5
Total	400	100

Source: Field Survey (2012)

Table 4.1 shows that the proportion of male respondents in the study was 210 while that of female respondents was 190. This indicates that majority of the respondents in the study were male.

Table 4.2: Educational Qualification

Responses	No of respondents	Percentages (%)
FSLC	30	7.5
SSCE	15	3.7
NCE	15	3.7
B.Sc	10	2.5
Others	30	7.5
Total	400	100

Source: Field Survey (2012)

Table 4.2 shows that the percentage of the respondents who posses FSLC/SSCE was 11.2% those with SSCE was the largest among the respondents. These results indicate that majority of the respondents in this study possessed the SSCE and B.Sc as their hightest qualification.

Table 4.3: Marital Status.

Marital Status	No of respondents	Percentages (%)
Married	134	33.5
Single	105	26.3
Divorced	72	18.0
Widowed	89	22.3
Total	400	100

Source: Field Survey (2012).

Table 4.3 reveals that 33.5% of the respondents were married, while 26.3% of the respondents indicated that they were single. The respondents who were in the divorced category accounted for 18.0% and the widows interviewed accounted for 22.3% of the respondents.

Table 4.4: Occupation

Responses	No of respondents	Percentages (%)
Farmer	140	35
Pensioner	10	2.5
Trader	93	23.3
Others	157	39.3
Total	400	100

Source: Field Survey (2012)

Table 4.4 shows that 140 respondents, that is 35% of the sample were farmers. Pensioners accounted 23.3% of the respondents. Furthermore, others constituted 39.3% of the respondents. This class together with "Others" consisted of the government civil servants and artisans covered in the studied.

Table 4.5: Income of Respondents

Monthly income	No of respondents	Percentages (%)
0 – 10,000	75	18.8
11,000 – 20,000	132	33
21,000 – 30,000	88	22
31,000 – 40,000	45	11.3
41,000 – 50,000	37	92.5
Others	8	2
Total	400	100

Source: Field Survey (2012)

In Table 4.5 showing the income level of respondents, 18.8% (75) earn less than 0.10,000, between, 33% (132) earned 11,000 – 20,000, 22% (88) earned 21,000 – 30,000, 11.3% (45) earned 31,000 – 40,000, while 92.5% (37) earned 41,000 – 50,000 others (8) eared 2%.

Table 4.6: Age of Respondents

Age Group	No of respondents	Percentages (%)
20 – 30	180	45
30 – 40	112	28
50 – 60	75	18.8
60 above	33	82.5
Total	400	100

Source: Field Survey (2012)

The age distribution of the respondents (Table 4.6) showed 45% (20 – 30) below 28% (30 – 40) years of age 18.8 (50-60) while there are 82.5% of those aged 60 years and above.

Types of Environmental Health Services in the Study Area

The first objective of this study was to examine the types of environmental health services provided in the study area. This is presented in Table 4.7.

Table 4.7: Types and Number of Environmental Health Services

Community	Household dust bin	Public waste collection	Environmental sanitation workers	Sanitary inspection	Types of environmental service	Km of Paved Drainage	Types of house sanitation exercise	Types of street sweeping per week	Public open spaces and parks	Types of drainage unblocking	Total
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	$\sum X$
Apani	10	1	1	1	0	0	0	1	1	1	16
Omerelu	14	0	0	0	0	0	1	0	0	1	16
Ubima	8	0	1	1	1	0	1	1	1	0	14
Elele	8	1	0	1	0	0	1	1	1	0	13
Umuanwa	10	1	1	1	0	0	0	1	1	0	15
Isiokpo	12	1	0	1	1	0	0	1	1	0	17
Ozuola	10	0	1	1	0	0	1	1	1	1	16
Iguruta	16	1	1	0	0	0	1	1	1	0	21
Omedeme	9	0	0	1	0	0	0	1	1	0	12
Omuagwa	13	1	1	0	1	0	1	1	1	1	20
Ipo	10	0	1	0	1	0	1	1	0	0	14
Aluu	5	1	1	1	0	0	1	0	1	0	10
Umuoji	8	1	0	1	0	1	0	1	1	1	14
Umuayemele	10	1	1	0	1	0	1	0	0	1	15
Umuope	9	0	0	2	0	1	1	1	1	0	15
Uturu	5	1	1	1	0	1	0	1	1	0	11
Uborum	9	0	1	0	0	0	1	0	1	1	13
Umudiala	10	1	0	1	1	1	0	1	1	0	16
Total	176	11	11	13	6	4	11	14	15	7	268

Source: Field work 2012.

The data presented in Table 4.7 were obtained from three sources – household interviews, local government records and observation. The table shows that there are 268 environmental health facilities/services in the study area. The spatial distribution (Fig 4.1) shows the largest concentration (7.8%) in Iguruta, Omuagwa (7.5%) and Isiopko (6.3%). while lowest concentration is at Uturu, Uborum, Aluu, Ubima, Elele, Umuorji, Omedeme, Umuayemele, Umudiala and Umuopo. The largest percentage of these facilities/services are located in the Iguruta, Omuagwa, Omerelu and Isokpo communities. The least serviced communities are Uborum, Aluu, and Uturu, . The distribution of environmental health facilities and services per capita, as well as the distribution of population per facility is shown in Table 4.8

Table 4:8: Distribution of facilities and services per capita and population per facilities/services

| Community	Facility/services per capita	Population per facility/service
Apani	0.02	59
Omerelu	0.01	185
Ubima	0.001	219
Elele	0.002	551
Umuanwa	0.001	226
Isiokpo	0.001	212
Ozuoha	0.001	214
Iguruta	0.04	244
Omedeme	0.006	151
Omuagwa	0.005	169
Ipo	0.009	106
Aluu	0.004	238
Umuoji	0.001	59
Umuayemele	0.001	185
Umuope	0.001	150
Uturu	0.001	211
Uborum	0.001	210
Umudiala	0.001	550

Source: Field work 2012
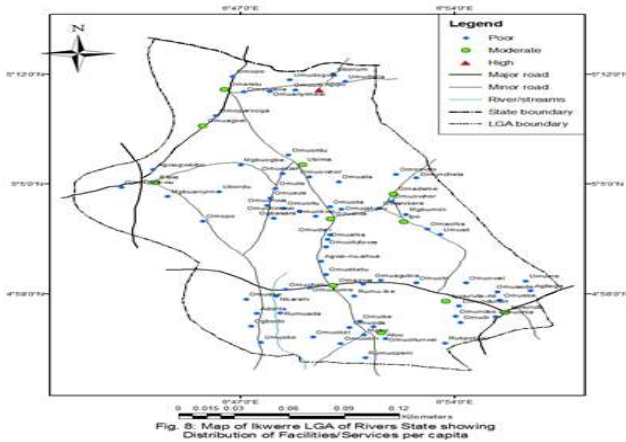
Fig. 4.1: Map of Ikwerre LGA of Rivers State showing Distribution of Facilities/Services per capita

It is observed from Table 4:8 that facility and service per person is very low in Umuorji. It is lowest in Ubima, Umuanwa, Isiokpo and Ozuoha communities. Even though Apani and Omerelu have slightly distribution of facility/service per individual, it is still inadequate by World Health standard [6] Population size appears as the clear determinant of population per facility/service. It can be observed that communities with very high population have higher ratio when we compare Apani with Elele, or Ipo with Iguruta.

The most available environmental health services in the study area consists of provision of household and compound dust bins, public waste collection bins and drainages. There are very few sanitary inspectors and low frequency of environmental sanitation exercises as well as parks and recreational facilities/services in most the communities in the study area.

Assessment of Environmental Quality

The second objective in this study was to assess environmental quality in Ikwere. This objective was carried out in two ways. The first summarised the assessment from the respondents' answers in the questionnaire. This is reported in Tables 4.9 to 4.22.

Table 4.9: Frequency of sanitation exercise at the household level

Responses	No. of respondents	Percentage (%)
Weekly	18	23
Monthly	92	4.5
Two times yearly	290	72.5
Total	400	100

Source: Field Survey (2012)

Table 4.9 shows the frequency of environmental sanitation exercise, 72.5% (290) twice yearly exercise, 23% (18) monthly exercise while 4.5% (92) for all of the weekly exercises.

Table 4.10: Availability of Drainage

Responses	No. of Respondents	Percentage (%)
	108	27
	292	73
Total	400	100

Source: Field Survey (2012)

From Table 4.10 number of street that had drainage system was 27% (108) while 73% (292) had none.

Table 4.11: Distance from house to your waste dump

Responses	No. of Respondents	Percentage (%)
Less than 1km	85	21
1 - 2km	165	42
More than 2km	150	37
Total	400	101.1%

Source: Field Survey (2012)

Out of 400 respondents, only 21% (85) have distance of less than 1 km from their houses to waste dump, (165) move from 1 to 2 km to the nearest waste dumps 37% (150) have over 2km to walk to public dust bins.

Table 4.12: Do you have environmental health worker in this community.

Responses	No. of Respondents	Percentage (%)
	102	25.5
	298	74.5
Total	400	100

Source: Field Survey (2012)

From Table 4.12 the largest proportion of the neighbourhoods do not have any environmental health worker.

Table 4.13: How efficient are these environmental health workers

Responses	No. of Respondents	Percentage (%)
Good	85	21
Fair	122	30.5
Bad	193	48
Total	400	100

Source: Field Survey (2012)

The result obtained in Table 4.13 shows that 21 (85) respondents agreed that the environmental health workers are efficient, 30.5% (122) and 48% (193) disagreed.

Table 4.13: Do the workers perform satisfactorily?

Responses	No. of Respondents	Percentage (%)
	89	24.5
	302	75.5
Total	400	100

Source: Field Survey (2012)

From the analysis, it is noticed that only 24.5% (98) have adequate number of sanitation workers and good quality of services, while 75.4% (302) do not have. This collaborates the findings in Table 4.13.

Table 4.14: Do you have a dust bin in your house?

Responses	No. of Respondents	Percentage (%)
	80	20
	320	80
Total	400	100

Source: Field Survey (2012)

The responses expressed in table 4.14 reveals that 320 respondents representing 80% of the respondents have no dust bins in their houses. Only 20% have ever had any household dust bins.

Table 4.15: How do you view the location of the facilities in terms of accessibility

Responses	No. of Respondents	Percentage (%)
Good	93	23
Fair	204	51.0
Bad	103	25.8
Total	400	100

Source: Field Survey (2012)

Table 4.15 shows that 204 respondents saw accessibility to environmental services as fair.

Table 4.16: What is your perception of environmental quality in your community?

Responses	No. of Respondents	Percentage (%)
Good	90	22.5
Fair	140	35
Poor/Bad	170	42.5
Total	400	100

Source: Field Survey (2012)

Majority of the respondents in the study perceive their environmental quality as bad and poor.

Table 4.17: Do you have any sanitary inspector that monitors and supervises the workers.

Responses	No. of Respondents	Percentage (%)
Yes	132	33
No	268	67
Total	400	100

Source: Field Survey (2012)

Table 4.17 shows that 67% (268) do not have sanitary inspectors that monitor and supervise the workers.

Table 4.18: Does the community have any law enforcement in respect of environmental sanitation?

Responses	No. of Respondents	Percentage (%)
Yes	87	21.8
No	313	78.2
Total	400	100

Source: Field Survey (2012)

Table 4.18 shows that over 78% of the response indicated that there is no environmental law enforcement in the study area.

Table 4.19: What are the methods used in this community in disposal of waste?

Responses	No. of Respondents	Percentage (%)
Burning	270	67.5
Public waste dumps	40	10
Other	90	22.51
Total	400	100

Source: Field Survey (2012)

Table 4.20 presents the results obtained from the survey. It reveals that 67.5% (270) dispose their household waste by burning, while the lowest proportion of the respondents use other methods besides the public waste dumps.

Table 4.20: Does the environmental workers carryout frequent waste dump evacuation exercise?

Responses	No. of Respondents	Percentage (%)
Yes	87	21.7
No	313	78.3
Total	400	100

Source: Field Survey (2012)

Table 4.22 shows that waste dump evacuation is not done frequently as indicated by over 78% of the respondents

Table 4.22: Are there open spaces, parks or public recreation centres in this community?

Responses	No. of Respondents	Percentage (%)
Yes	20	5
No	380	95
Total	400	100

Source: Field Survey (2012)

From the Table 4.21 it is obvious that almost all the respondents agree that there are very few or no recreational facilities in their neighbourhood.

Table 4.23: Summary of respondents reason/views for the status of environmental quality (% of respondents who gave the reasons)

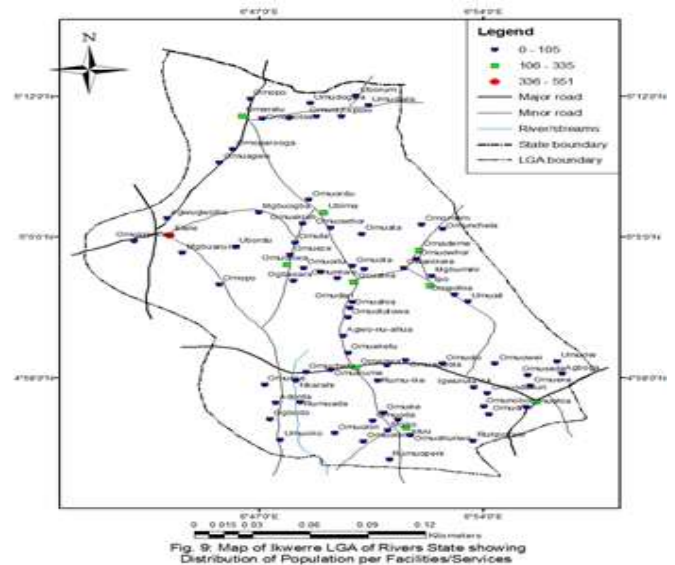| S/N	Reasons	Percentage Response
(i)	Few environmental health workers	82.2
(ii)	Low level environmental quality awareness campaign	69.7
(iii)	Low efficiency of environmental health workers	81.0
(iv)	Poor social infrastructure and services	70.9
(v)	Inadequate funding for environmental sanitation exercise	66.5
(vi)	No water supply for households	76.5
(vii)	Absence of environmental law enforcement at LGA	82.4
(viii)	Poor attitude of council to the environment	72.8

Source: Field Survey (2012)

The second approach in assessing the environmental quality was by using an ordinal scaling system (the likert scale). Respondent were asked to score these variables from a range of 1 for non-existence or the lowest quality to 5 for the highest environmental quality or availability in the best form.

The modified Likert scale had five levels or categories; therefore scores of 1 to 5 corresponded to the following: Strongly Agreed (SA)5, Agreed (A)4, No opinion (UD) 3, Disagree (DA) 2 and Strongly Disagree (SD) 1. With 3 as the computed mean, it means that according to the decision rule any score of 3.0 or above was regarded as positive and enhancing to quality while scores less than 3.0 were regarded as negative to environmental quality.

The scores for each variable by all the respondents in each neighbourhood were summed up and divided by number of respondents in the neighbourhood. The mean scores for each variable in each of the neighbourhood are presented in Table 4.23. The last row entries show the overall means of mean for each variable (y) while the columns show the overall means of mean for each nighbourhood. The mean score for environmental quality is highest in Apani, Omerelu, Ubrima and Umuanwa and lowest for Ipo, but moderate for Elele, Isiokpo, Aluu, Omedeme, Iguruta and Ozuoha.

Out of the eleven variables, five have environmental quality score of above 2.5 (which is 50% of the maximum score of 5) while 55% score less than 2.5 the study area has high environmental advantages with respect to "few areas as liable to flooding" and "nuisance activities". Those apart from the study area have very low and adverse environmental quality in terms of home flowers/gardens, incidence of water borne diseases, waste disposal sites, open spaces, parks and housing quality.

Fig. 9: Map of Ikwerre LGA of Rivers State showing Distribution of Population per Facilities/Services

The environmental health facilities and service towns are the household, dust bin, public waste collection and environmental sanitation workers.

Table 4.24: Distribution of facilities and services per capita and population per facilities/services

No	Community	Facility/services per capita	Population per facilities/services
1	Apain	0.02	59
2	Omerelu	0.01	185
3	Ubima	0.001	219
4	Elele	0.002	551
5	Umuanwa	0.001	226
6	Isiokpo	0.001	212
7	Ozuoha	0.001	214
8	Iguruta	0.04	244
9	Omedeme	0.006	151
10	Omuagwa	0.005	169
11	Ipo	0.009	106
12	Aluu	0.004	238
13	Umuijo	0.001	59
14	Umuayemde	0.001	185
15	Umuope	0.001	150
16	Uturu	0.001	211
17	Uborum	0.001	210
18	Umudiala	0.001	550

Sources: Field work 2012.

4.25 Effects of Environmental Health Services on Level of Environmental Quality

The third objective of this study was to determine the effects of environmental health services on the level of environmental

quality observed. A regression model was used to test this hypothesis. The null hypothesis states that there is no significant relationship between intensity frequency and type of environmental health services and level of environmental quality.

$$Y = a + b_1x_1 + b_2x_2 \ldots b_nx_n$$

Where y = environmental quality score

X = number type and frequency of environmental health services

b = constant

a = constant

Data presented on Table 4.7 and Tables 4.23 and 4.25 were used in this analysis. The results are presented in Table 4.26.

Table 4.25: Distribution of dependent variables

Neigbourhood	Y_1 Quality of streets paved/ unpaved potholes	Y_2 Nuisance activities	Y_3 Home flowers and compound gardens	Y_4 Public parks green and open spaces	Y_5 Area liable to flooding	Y_6 Waste disposal sites/location	Y_7 Urban land use	Y_8 Availability of slums	Y_9 Housing quality/ age of building	Y_{10} Incidence of water borne disease	Y_{11} Houses connected to pipe-borne water	$\sum yn$ Total	⁻xy Mean score for neighbourrhood
Apani	4	4	1	2	3	3	3	5	4	4	4	35	3.2
Omerelu	3	3	2	2	3	2	3	3	2	3	1	27	2.5
Ubima	2	5	3	2	4	4	3	3	2	3	2	33	3.0
Elele	2	3	1	2	2	3	2	3	3	3	1	25	2.3
Umuanwa	2	2	2	3	2	3	2	4	3	3	2	28	2.5
Isiokpo	4	3	2	2	2	2	2	2	2	2	1	22	2.0
Ozuola	2	2	2	2	2	2	2	2	2	2	1	21	1.9
Iguruta	1	2	1	2	2	2	2	2	2	2	2	20	1.9
Omedeme	1	2	1	2	2	1	2	2	2	2	2	19	1.8
Omuagwa	2	1	2	1	5	5	1	3	1	4	1	26	2.4
Ipo	2	3	3	1	5	3	2	2	2	5	4	32	2.9
Aluu	1	2	1	1	2	2	2	2	2	1	2	18	1.7
Total	26	33	21	22	36	32	28	32	29	32	23		
⁻ x for variable scores	22	29	18	1.8	30	1.7	23	1.7	2.0	1.7	1.9		

Source: Field work 2011

Table 4.26 Correlations of Y and X variables

	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}	Y_{11}	Y_{12}
X_1	-0.013	0.019	-0.021	0.228	-0.157	0.367	0.442	0.396	0.437	-0.601	-0.499	-0.38
X_2	0.610	0.096	-0.019	0.092	-0.114	0.456	0.434	0.396	0.481	-0.622	-0.409	-0.38
X_3	-0.032	0.540	-0.021	0.345	-0.627	0.408	0.505	0.366	-0.612	0.508	-0039	0.489
X_4	0.445	0.280	-0.057	0.244	-0.366	0.259	0.513	0.368	0.043	-0.514	-0.235	0.542
X_5	-0.525	-0.508	-0.062	0.392	0.707	0.663	0.493	-0.731	0.665	-0.540	-0.463	0.638
X_6	0.464	-0.025	-0.448	-0.382	0.662	-0.653	0.545	-0.396	-0.512	-0.388	-0.385	0.597
X_7	-0.571	-0.392	-0.017	-0.616	0.444	-0.388	0.406	-0.333	0.523	-0.419	-0.517	0.512
X_8	-0631	0.080	-0.393	-0.655	0.546	-0.384	0.411	0.436	0.666	0.459	-0.319	0.314
X_9	-0.367	0.499	0.721	-0.399	0.616	0.655	0.512	0.346	0.623	0.403	-0.695	0.518
X_{10}	0.563	0.384	-0.596	-0.397	0.583	0.581	0.634	0.555	0.566	0.501	-0.375	0.488

Source: Calculated from variables on Table 4.7 and 4.23

The different between table 4.23 and 4.26 it is that there are very few sanitary inspectors and low frequency of environmental sanitation exercises in 4.23 while 4.26 qualities of streets is negatively related to public waste collection, frequency of public sanitation exercise frequency of compound sanitation inspection and frequency of street sweeping.

There is no significat relationship between distribution of population per facilities/services and intensity frequency and type of environmental health services and level of environmental quality in the study area.

From the correlation analysis (Table 4.26) quality of streets is negatively related to public waste collection, frequency of public sanitation exercise, frequency of compound sanitation inspection and frequency of street sweeping. Nuisance activities are negatively related to the number of environmental health workers, frequency of public environmental sanitation exercises and frequency of sanitary inspection. The higher the number of houses with compound parks, flowers and gardens, the higher the existence of public parks and open spaces. Areas liable to urban flooding are found more in areas with low frequency of drainage unblocking, proper urban land use appear strongly and positively correlated with public waste collection. Slums and low house quality generally are positively related. Low frequency of public sanitation exercise, sanitary inspection low number of environmental health workers and low frequency of drainage unblocking seem to be positively associated with incidence of water-borne diseases and housing quality and those which have not been connected with pipe-borne water.

The population size factor has been used in several studies to seek for an explanation for environmental quality [3]. Using the Spearman Rank correlation between population size and environmental quality, the present study observed a weak relationship between population size and indices of environmental quality because only 4.4% of the low environmental quality in the study area was accounted for the population size. When this test was repeated for population density, the relationship increased to 52.2%. In this study, population density was more relevant as an explanation for low environmental quality in Ikwerre.

The eleven dependent variables were regressed on the ten independent variables using step wise regression statistics. Step wise regression was considered most appropriate for selecting fewer independent variables which could highly affect the dependent variables. Table 4.27 shows the result of this analysis.

Table 4.27: Summary of the most significant environmental health services affecting environmental quality.

Regression Model	R	R square	R square%
1	0.563	0.316	31.6
2	0.674	0.454	45.4
3	0.688	0.473	47.3
4	0.725	0.526	52.6

Significant Model Predictors

1. Frequency of public space cleaning, (x_9), Frequency of sanitary inspection (x_7).

2. $(x_9) + (x_7)$ + Frequency of Public waste collection (x_2)
   + Number of Environmental Health workers (x_3)

3. $(x_9) + (x_7) + (x_2) + (x_3)$
   + Frequency of street sweeping (x8)
   + Km of drainage (x6)

4. $(x_9) + (x_7) + (x_2) + (x_3)$
   + Frequency of drainage unblocking(x10)
   + Availability of Household dustbin(x1)

The regression model shows that four models can adequately explain the effects of environmental health services on level environmental quality.

A combination of public space cleaning and housing sanitation inspection explained 31.6% of the level of environmental quality.

A combination of public space cleaning, house sanitation inspection with public waste collection and the number of environmental health workers explained 45.4% of the effects of environmental health services on level environmental quality.

A combination of frequency of street sweeping, kilometer of drainage, frequency of public space cleaning, frequency of house sanitary inspection with frequency of street sweeping, kilometer of drainage, number of environmental workers and frequency of public waste collection yielded 47.3% of the effects of environmental services on level environmental quality.

All the six variables in model 4 plus frequency of drainage unblocking and provision of household dust bins explained 52.6% of the level of environmental quality.

Even though more than half of the environmental quality profile of the study area is affected by the selected ten environmental health services, the conclusion in this study is that a very substantial proportion (47.4%) not explained by variables used in this study could be accounted for, by other issues not included in this study. These could include quality of governance, environmental management policy, programme and implementation, strategies and funding of environmental health services. Others may include cultural issues, level of participatory planning, and effectiveness of town planning activities.

4.28 Proposal and Strategies for Enhancing Environmental Quality

The fourth objective in this study concerned proposal and strategies for enhancing environmental quality.

A meaningful proposal for improving environmental quality in Ikwerre must begin with a clear definition of the goals and objectives of environmental management for quality enhancement. As the population and human activities increase and assume greater complexities, the need for advance determination of the use of each unit of space and the rearrangement of old activities in order to ensure efficient, healthful and beautiful environment and life for the people

becomes more pressing. This precisely is the rationale for environmental management for quality enhancement.

With an estimated population of about 180,000 Ikwerre cannot continue to turn deaf ears to environmental health activities planning. The following physical, economic and social conditions must be taken into account, therefore, in proposing any framework for environmental quality management in Ikwerre.

1. Need assessment for environmental health services.

2. The large population and the large variations in ethnicity, language, culture and other population attributes.
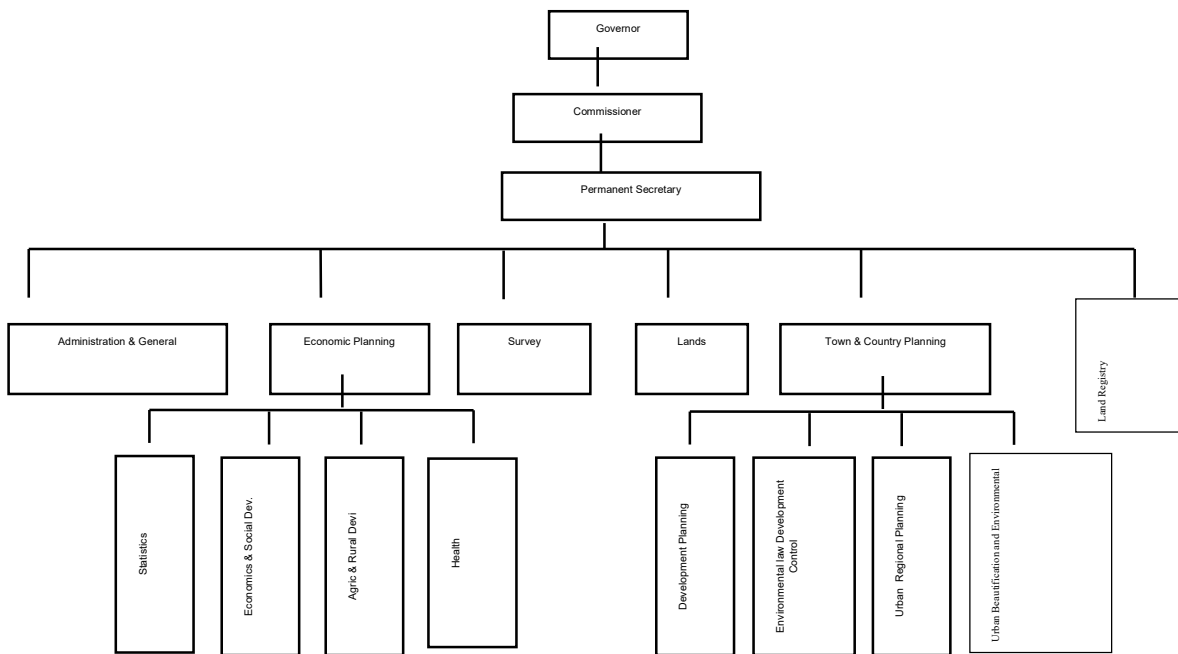

Fig 5.1 Physical Planning for enhanced Environmental Quality

One of the main observations from this study is institutional failure. The widely held view that government should handle all urban development activities is another big problem. This idea persists, even in the face of the obvious weaknesses of public institutions in Nigeria, it is often said that, if only government agencies had more money, they would perform much better. This ignores world-wide lessons about the limitations of public sector management. Experience shows that competitive markets, mainly involving private sectors are the most efficient ways to supply goods and services and most accountable to users' needs. The coming of MTN, GLO Vidacom and others in the ICT business is an example, also, the scope of activity in which government intervention is required is narrower than previously believed. Usually, it can be limited to policy-making, regulation, ownership or financing leaving actual investment, operation and maintenance to non-Governmental entities.

4.29 Participatory Environmental Health Management.

Local Government in Ikwerre cannot continue with "business as usual" if it hopes to be successful in tackling urban environmental problems. It must adopt a participatory strategy. These new approaches acknowledge that lack of resources; insufficient institutional capacity and persistent corruption often greatly circumscribe the problem-solving abilities of local governments. In light of these limitation, it is crucial that appropriate frameworks and strategies for cooperation be developed among government, civil society and the private sector. The challenge is to adopt an approach of interconnected, complementary ways in all aspects of urban environmental quality management.

4.30 Participatory Problem Solution

Environmental quality enhancement and management problem should be participatory for example:

1 Issues	2 Possible solutions	3 Possible actors	4 Inputs by actors	5 Resources required for inputs
Inadequate waste management system	Provisions of effective waste management system	Local & State Government, private sectors and the communities, NGOs, traditional rulers	Provides lands, funding of the projects, and mobilization of people for government programmes.	Adequate equipment, project coordinating staff, funding of projects
Inadequate infrastructure	Provision of more infrastructure facilities by the Government & the people	Local & State Governments, Donor agencies, private	Provide land, policy direction in urban developments, and provision of urban services.	Funding of projects. Coordination of projects, create more job opportunities.
High cost of maintaining sanitary facilities	Price control legislation/policy	Local/State Government.	Local/State guidelines/ policies from State or Federal Government, implementation of policies, enabling laws.	Funding, provision of facilities, and cleaning materials.
Lack of training institutions for environmental education	Provision of training centres/ institutions	Traditional leaders, local & state government, private sector, NGOs.	Acquisition of land, coordination of environmental training projects.	Technical equipment. Technical/ operational staff and funding of the projects. Create job opportunities.
Government not responsive to the basic needs of the people for packs, open spaces.	Community participation in governance.	Traditional rulers, local/ state government, private sector, communities.	Adequate response to the problems of the people.	Provide open space pack projects monitoring units/ staff for effective beautification and open space cleaning/greening.
Overstretched facilities as a result of increasing	Expansion of services	Local, State and Federal Governments and Private	More facilities, more equipment.	Resources required: more human resources, more facilities etc.
Inadequate drainage	Adequate physical planning to include street naming cleaning and drainage.	Local/ State Governments, traditional rulers.	Issues development guidelines to land owners, sensitization/ mobilization of people for government programmes.	Funding of projects. Coordination of policies, provide technical staff.

VI. CONCLUSION

This study identified and analysed ten factors affecting environmental health services and environmental quality in Ikwerre local government area of rivers state. The results of the satisfaction factors are the major determining factors of environmental health services and environmental quality in Ikwerre local government area. There exists a significant relationship between environmental health services and environmental quality satisfaction and household in Ikwerre area. In concrete terms, there is a shortfall in the environmental health services satisfaction and the environmental quality in Ikwerre local government area. The environmental health services satisfaction level affects significantly the environmental quality in Ikwerre area.

This will help to provide sustainable remedy to the problem of environmental health services and environmental quality satisfaction that has bedeviled the Ikwerre Local Government area in the past (vision 2020)

VII. RECOMMENDATION

Having identified the planning need-gaps of various environmental health services and environmental quality in Ikwerre Local Government Area of Rivers State, the following recommendations are made:

1. The provision of adequate environmental health services and environmental quality in the study area is necessary and there should be possible solutions and provision for advice on the proper location in order to ensure better accessibility.

2. Public participation in the environmental sanitation sector should be encouraged, the people have the right and duty to participate individually and collectively in the planning and implementation of their sanitation services systems.

3. Government should be responsible for the sanitation exercise of her people which can be fulfilled only by the provision of adequate maintenance and social facilities as well as the provision of adequate waste bins and manpower in each centre.

4. Implementation of project for environmental health services and environmental quality in the study area should be based on the local government and state.

5. The environmental related measures should involve direct improvement in environmental quality through a re-structured component and participatory management in housing facilities.

6. The interest groups should be educated on different techniques of tackling environmental problems in the study area.

REFERENCES

[1] Arimah, B.C, (1992) An Empirical Analysis of the Demand for Housing Attributes in a Third World city land *Journal of Economics* 68,366-379.

[2] Abumere, S.I (1983) City Surface Solid Waste in Nigerian cities. *International journal of environmental studies* 6(3):138-145.

[3] Adedibu, A. A (2006)Environmental Sanitation Management in Nigeria. Trend and Issues. Enugu: Growth Dimension. Page 50-59.

[4] National Population Commission,(2006), 'Enumerators manual', March.

[5] Mandu, I. A. (2005) Population and settlement constraints to sustainable agricultural land use in southern Nigerian. In okoko E (ed) environmental sustainability and conservation in Nigerian. Akure ECRT FUTA.

[6] World Health Organisation (2006) Presentments. Geneva: WHO Feb.