

Environmental Sanitation Practices in Sub-Sahara African Urban Centers: The Experience from Ondo, Nigeria

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ABSTRACT

This study examined environmental sanitation practices in Ondo, Nigeria. Data were collected having stratified the study area into the high, medium and low densities. Three political wards were randomly selected from each zone. There are 2222 buildings in the selected wards with 879 in the high; 725 in the medium and 618 in the low. Systematic sampling was used to select 10% of the buildings. A total of 222 copies of questionnaires were administered on household headsout of which 187 copies were retrieved and analyzed. Findings showed that majority (66.8%) of respondents were owners of the buildings while 33.2% were tenants. Finding revealed that 19.6% of waste storage facilities in the study area were covered refuse bins while plastic containers accounted for 9.2%. Results of the findings showed that 21.67% of waste storage facilities in the low density area were refuse bins. Findings showed that 22.9%, 21.2% and 33.3% of residents in the high, medium and low densities, respectively stored/disposed waste in less than 5 days. The predominant method of waste disposal in the high and medium density was burning, while the use of disposal site was prevalent in the low density. The study concluded on the adoption of revitalization strategy that involves community participation. This hinges on the understanding that community participation in sanitation practices is one of the most important and essential means for solving the sanitation problems at the present time.

Keywords: *Solid waste; Sanitation; Urban center, Ondo Nigeria*

INTRODUCTION

Access to proper sanitation will have improved living conditions, in terms of increased health and well-being and economic productivity (Elledge, 2003). Not only does proper sanitation reduce the burden of disease, but it provides secondary benefits such as increasing child school attendance, increasing economic productivity of communities, as well as assisting in the empowerment of women (WHO et al., 2004). However, despite its importance, inadequate sanitation impacts individuals and communities worldwide. Every 15 seconds a child dies from diseases largely due to poor water, sanitation and hygiene, with nearly 40% of the global population having no access to hygienic sanitation (WHO et al., 2004). Achieving targets towards improved sanitation coverage is a challenge for the global community and this must be addressed with urgency. The primary preventative method to address these issues is through the implementation of appropriate sanitation strategies and hygiene promotion. Better hygiene through hand washing and food protection can reduce the impact of diarrhoeal

diseases resulting from poor sanitation by 33% (Mooijman 2003). Implementation of latrines, providing safe excreta disposal options reduces diarrhoeal diseases by up to 36% (Mooijman 2003; Cairncross & Kolsky 2003). This dissertation aims to highlight the importance of these issues and examine the viability and details of available sanitation options.

In its modern concept, environment includes not only water, air and soil but also the social and economic conditions under which we live (Park, 2011). The key to man's health lies largely in his environment. In fact, much of man's ill-health can be traced to adverse environmental factors such as water, soil and air pollution, poor housing conditions, presence of animal reservoir and insect vectors of diseases which pose threats to man's health. Often, man is responsible for the pollution of his environment through urbanization, industrialization and other human activities. According to the National Sanitation Foundation of USA, the word sanitation is defined as a way of life that is expressed in the clean home, farm, business, neighborhoods and community (Park, 2011). Also, World Health

Organization (WHO) defines sanitation as the provision of facilities and services for the safe disposal of human urine and faeces (UNICEF 2012; WHO, 2012).

Hence, inadequate sanitation is a major cause of disease world-wide and improving sanitation is known to have a significant beneficial impact on health both in households and across communities. The word 'sanitation' also refers to the maintenance of hygienic conditions through services such as garbage collection and wastewater disposal. In addition, environmental sanitation according to World Health Organization is the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health and survival. It could also be seen as the principle and practice of effecting healthful and hygienic conditions in the environment to promote public health and welfare, improve quality of life and ensure a sustainable environment (Alabi, 2010). The essential components of environmental sanitation include: solid waste management; medical waste management; excreta and sewage management; food sanitation; sanitary inspection of premises; market and abattoir sanitation; adequate potable water supply; school sanitation; pest and vector control; management of urban drainage; control of reared and stray animals; disposal of the dead animals; weed and vegetation control; hygiene education and promotion.

In most developing countries, adequate environmental sanitation has not been strictly adhered to. For example in some parts of Nigeria, living with waste as part of the natural environment has become a way of life. Although there has been a remarkable improvement from what it used to be in the late eighties/early nineties, there is still much to be done as Lagos, our "Nigerian Centre of Excellence", was depicted a vast slum (Alabi, 2010). In the United States, slum is often used to refer to marginalized neighborhoods, but in developing countries it usually means a settlement built in or near a city by residents themselves, without official authorization or regulation. Such housing units are typically substandard, and the infrastructure and services range from non-existent to improvised.

Furthermore, environmental hazards are responsible for about a quarter of the total burden of diseases worldwide and as much as

30% in regions such as sub-Saharan Africa. As many as 13 million deaths can be prevented every year by making our environments healthier. These facts and figures highlight the impact of environmental factors on public health. More than 2.4 billion people in the world currently lack access to adequate sanitation and are forced to dispose of their excreta in unimproved and unsanitary conditions. Those who suffer from this, lack most basic human needs and also tend to be victims of poverty, ill health and an overall poor quality of life (WHO, 2013).

However, deposition of faecal matter near homes, contamination of sources of drinking water (sometimes caused by poorly designed or maintained sewage system), dumping of refuse and sweeping into the gutters, defecating and disposing of faeces by the street corners and waterways and selling of food stuffs and cooked food by the road side are all unwholesome practices that pose potential risk to the development of diseases. Water quantity is as important as water quality. Washing of hands after defecation and before preparing food is of particular importance in reducing disease transmission, as has been demonstrated by Nigeria's recent control over Ebola Viral Disease. Poor housing also contributes to poor environmental health and its consequent input in the health of the urban dwellers. Measures for the prevention of cholera mostly consist of providing clean water and proper sanitation to populations who do not yet have access to basic services. Health education and good food hygiene are equally important.

The environmental sanitation-related diseases exacerbate poverty by diminishing productivity and household income. In addition, the national cost of lost productivity, reduced educational potential and huge curative health costs constitute a major drain on the local and national economy. Besides, a dirty environment with its attendant health consequences, prevailing in most of our cities, can discourage tourists/investors and undermine the economic benefit of tourism to the country. Consequently, wide-ranging actions are required to solve Environmental Sanitation problems in order to reduce and avert their adverse health, economic and developmental effects. Therefore, this study evaluates the sanitation facilities and services available in the residential areas of Ondo, Nigeria with a view to identifying the different

environmental sanitation behaviors emanating from the level of adequacies of these amenities.

PREVIOUS STUDIES STUDY AREA

The residential area of any settlement is one of the points of reception, the hub of activities and the distribution of internal and external goods and services (Tanimiwo, 2001). These features of the residential areas aggravate the unwholesome living condition of the residents. Consequently, there are growing cases of water-borne and filth related diseases especially diarrhea, cholera and malaria (Roland et al, 2004). These contribute to loss of lives and man-hour which results to colossal loss to economic growth and development. Olayiwola and Omisore (2001) and Nwaka (2005) observed that such effects include poor accessibility, high occupancy ratio, and lack of proper drainage, inadequate infrastructure and social amenities, environmental pollution and poor sanitation. Nwaka (2005) noted that residential neighbourhoods in the residential are being developed without effective planning and adequate provision of basic services and facilities including transportation, health, employment, security and sanitation facilities.

Urban environmental management addresses environmental issues that exist in the urban areas. Sanitation is one of the most basic services in human life. Improving environmental sanitation is known to have a significant beneficial impact on health both in households and across communities. *However, the behaviour and attitude of the inhabitants towards sanitation do not augment this effort. People do not seem to care about good environmental sanitation practices and constantly litter indiscriminately without considering the future effects of these poor sanitation practices on their health. If appropriate efforts are not made to halt such practices, the city will continue to spend the greater part of her resources in an attempt to ensure good environmental sanitation without success.* Coupled with the high population growth is the lack of institutional capacity to formulate and adopt strategies to ensure proper environmental management in Ondo. Several authors have written on environmental sanitation practices (some of which include)

Ondo is one of the major urban centres in Ondo state. The town is located on latitude 06°30'N and longitude 04°45'E. The town is bounded to the north by Oluji/Okeigbo local government,

Phoebe (2006) examined the Assessment of Appropriate Sanitation Technologies in a Development Context in Australia. The aim of his study was to highlight the vitality of sanitation issues and encompasses a broad investigation of the processes associated with water and sanitation international development sector and assess the viability of available sanitation technologies which can be applied in a development context. Acheampong (2010) examined the Environmental Sanitation in the Kumasi Metropolitan Area of Ghana. The study established that sanitation and good hygiene are fundamental to health, survival, growth and development. His main objective was to examine the causes of the environmental sanitation conditions in Kumasi Metropolitan Area and its effect on the health of the people.

Yani (1985) assessed the Environmental Sanitation Practices in Ikeja Local Government Area of Lagos State Nigeria. His thesis was primarily intended to highlight and stimulate the increasing role of Environmental sanitation in relation to diseases. Oweye (2013) and Adedeji (2013) examined Poverty, Sanitation and Public Health aimed at investigating the inter-relationship among poverty, environmental sanitation and public health, with a view to establish its implication on residential neighbourhoods of Akure urban centre. All these studies properly examined the sanitation practices in each town and city, *however, did not entirely provide a generalized environmental sanitation practice that could be applicable in other areas, available sanitary facilities, much emphasis was not laid on the resident's level of satisfaction and response to the inadequacies with the sanitary conditions and facilities as well as the indebted strategies to improve the people's health conditions in the environment*

The problems are worsened in developing countries like Nigeria, where there are inadequate health facilities to alleviate the problems (Nwaka, 2005). Of interest in this study is to provide answers to some research questions like: what are the sanitation facilities in the core areas? How do the residents respond to inadequacies in the provision of these facilities? What is the health implication of non-provision of these facilities?

STUDY AREA

on the east by Idanre local government, on the west and south by Odigbo local government. The population of the town stood at 113,900 during the 1991 population census. Ondo falls

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within the tropical wet and dry climate with a relatively small dry season. Consequently,

rainfall in Ondo is seasonal in character with well-marked wet and dry seasons.

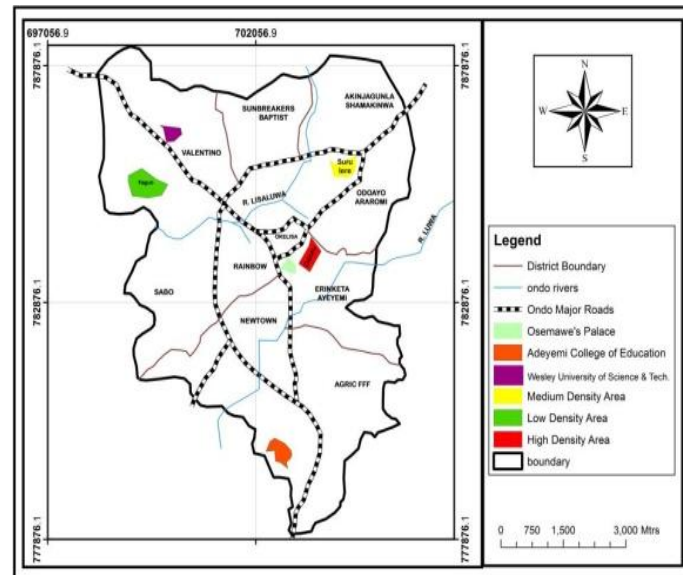


Figure 1. Map of Ondo City showing the Study Area

Source: Adapted from Google map, 2017

The dry period comes between November and February, while the wet season lasts for 8 months; from March to October; the mean annual rainfall is about 1561mm. the annual mean temperature is 27°C, with a maximum of 30°C. Ondo landscape is made up of generally undulating hills of granitic outcrop of igneous origin, and is marked by few dome-shaped hills. These hills are found to be developed over the basement complex of metamorphic rocks with their summits ranging between 250 and 500 meters above sea level (Akintola, 1982). The town has no major river; rather it is drained by several streams with fairly wide flood plains. The most important of these streams are Luwa, Lisaluwa, and Mode. The town falls within the most/wet lowland forest, i.e. it has thick forested vegetation, but due to human activities, most of these original forests have been replaced with secondary re-growth.

METHOD OF STUDY

Data for this study were from both primary and secondary sources. The primary data were collected through field observation and administration of questionnaire. The questionnaire administered on the residents addressed issues on residents' socioeconomic characteristics, level of their *participation*, *perception*, satisfaction and factors influencing residents' level of satisfaction with environmental sanitation practices in the study

area. Also, in-depth interview was conducted on heads of community development associations in the area.

The study population for this study were the residents' of Ondo town, spread across the twelve political wards, and subdivided into 3 basic densities; low, medium and high density residential areas. Therefore, Ondo town was categorized into three homogeneous groups (based on their residential densities); namely: high density residential (for the low income earners), medium density residential (for the medium income earners) and the low density residential (for the high income earners). Densities were therefore selected based on the 12 political wards in Ondo. For high density, the target was Odotu from ward 3, for medium density the target was Surulere from ward 10 and for low density, the target was Fagun from ward 11. In all, there are twelve political wards in the study area.

Out of these twelve, three which fall under high, low and medium density residential districts were properly examined. Systematic sampling technique was used in selecting residents to be sampled. The first building at the street entrance was selected, then subsequent unit of investigation was every 10th residential building in the area, representing 20% of all residential buildings in the selected wards of the study area.

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Based on the pilot study, there are 2,222 the selected areas. These comprised of 879 in Odotu; 725 in Surelere; and 618 in Fagun. The study administered structured questionnaire on the oldest resident in each of the sampled buildings.

The target person for the survey was the household head. This is because household head was able to provide information on urban renewal projects implementation in the study area. Using this procedure, a total of 222 copies

FINDINGS AND DISCUSSION

Unless where otherwise stated, the tables through which facts and findings are summarized are the products of the survey carried out by the authors and assisted by final year students of Urban and Regional Planning undergraduate programme of Wesley University, Ondo, Nigeria in 2017.

Socio-Economic and Demographic Characteristics of the Area

The socio-economic characteristics of respondents' discussed in this section include the gender of residents', their age, marital status, educational attainment and religious affiliation, among others. The gender distribution of the respondents across the selected cities is as contained in Table 2. The finding revealed that both genders were well represented across the study area as, 51.9% of the residents were males while 48.1% were females. This proportional representation of the two genders may influence the residents' response in the evaluation of environmental sanitation practices in the study area. Also, the study established that since the P value is greater than 0.05, therefore it can be deduced that the gender distribution of respondents in each density in the study area is insignificant that is, their gender does not affect where they live.

Table1. Socio-economic background of the respondents

Variable	High Density	Medium Density	Low Density	Total
Gender				
Male	56 (53.3)	26 (50.0)	15 (50.0)	97 (51.9)
Female	49 (47.7)	26(50.0)	15 (50.0)	98 (48.1)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Marital status				
Single	38 (36.2)	16 (30.8)	12 (40.0)	66 (35.3)
Married	50 (47.6)	26 (50.0)	13(43.3)	89 (47.6)
Divorced	11 (10.5)	6 (11.5)	3 (10.0)	20 (10.7)
Widow	3 (2.9)	2 (3.8)	1 (3.3)	6 (3.2)
Separated	3 (2.9)	2 (3.8)	1 (3.3)	6 (3.2)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)

residential buildings in the sampled wards of of questionnaires were administered out of which 187 copies were retrieved for the study. Secondary data collected include map of Nigeria, Ondo State, Ondo town gotten from Ministry of Physical Development, Ministry of Works, and number of residential buildings from National Population Commission (NPC).Data collected were analyzed using both the descriptive and inferential statistics based on the set objectives.

The summary of data collected and analyzed on marital status of the residents is as presented in Table 2. Marital status was categorized into five: single, married, divorced, widowed and separated. It is revealed that most (35.3%) of the residents were single, (47.6%) of the respondents' are married, (10.7%) were divorced, (3.2%) were both widowed and separated.

It was deduced from the study that P value is also greater than 0.05, hence it can therefore be deduced that the marital status of respondents spread across the three residential densities is insignificant, that is, their marital status does not affect the residential density. Analysis of data collected on the educational attainment of residents as presented in Table 2 revealed that (24.6%) of the residents have acquired primary education, (35.8%) have secondary education and (39.6%) are having tertiary education. This proportional representation of respondents' with tertiary education may influence the residents' response in the evaluation of the sanitation practices in the study area. This is because education tends to create awareness. There is every tendency to believe that a well-educated person may perceive his immediate environment differently from a less educated fellow and this is reflected in the result of the analysis.

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Education qualification of Respondents				
Primary	30 (28.6)	12 (23.1)	4 (13.3)	46 (24.6)
Secondary	38 (36.2)	19 (36.5)	10 (33.3)	67 (35.8)
Tertiary	37 (35.2)	21 (40.4)	16 (53.3)	74 (39.6)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Income distribution of respondents				
Low	56 (53.3)	3 (5.8)	3 (10.0)	62 (33.2)
Medium	43 (41.0)	29 (55.8)	12 (40.0)	84 (44.9)
High	6 (5.7)	20 (38.5)	15 (50.0)	41 (21.9)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Respondents' Age distribution				
20-30	14 (13.3)	7 (13.5)	4 (13.3)	25 (13.4)
31-40	23 (21.9)	11 (21.2)	7 (23.3)	41 (21.9)
41-50	26 (24.8)	12 (23.1)	8 (26.7)	46 (24.6)
51-60	30 (28.6)	15 (28.8)	8 (26.7)	53 (28.3)
61-70	12 (11.4)	7 (13.5)	3 (10.0)	22 (11.8)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Occupation distribution of respondents				
Civil Servant	7 (6.7)	13 (25.0)	8 (26.7)	28 (15.0)
Business & trading	22 (21.0)	14 (26.9)	9 (30.0)	45 (24.1)
Artisans	46 (43.8)	15 (28.8)	5 (16.7)	66 (35.5)
Professionals	13 (12.4)	6 (11.5)	6 (20.0)	25 (13.4)
Farming	17 (16.2)	4 (7.7)	2 (6.7)	23 (12.3)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Type of House				
Bungalow	10 (9.5)	16 (30.8)	11 (36.7)	37 (19.8)
Storey Bungalow	47 (44.8)	6 (11.5)	4 (13.3)	57 (30.5)
Flat	12 (11.4)	18 (34.6)	8 (26.7)	38 (20.8)
Storey Flat	3 (2.9)	10 (19.2)	6 (20.0)	19 (10.2)
Duplex	25 (23.8)	2 (3.8)	1 (3.3)	28 (15.0)
Traditional	8 (7.6)	0 (0)	0 (0)	8 (4.3)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Length of Stay				
Short Stay	6 (5.7)	29 (55.8)	15 (50.0)	50 (26.7)
Average Stay	43 (41.0)	3 (5.8)	12 (40.0)	58 (31.1)
Long Stay	56 (53.3)	20 (38.5)	3 (10.0)	79 (42.2)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Household Size				
Small	56 (53.3)	29 (55.8)	15 (50.0)	100 (53.5)
Medium	6 (5.7)	20 (38.5)	12 (40.0)	38 (20.3)
Large	43 (41.0)	3 (5.8)	3 (10.0)	49 (26.2)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Type of Toilet				
Water System	25 23.8	28 53.8	25 83.3	78 41.7
Covered Pit Latrine	37 35.2	17 32.7	5 16.7	59 31.6
Uncovered Pit Latrine	18 (17.1)	5 (9.6)	0 (0)	(23 12.3)
Pale/ Bucket System	17 (16.2)	2 (3.8)	0 (0)	(19 10.2)
VIP Latrine	8 (7.6)	0 (0)	0 (0)	(8 4.3)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)
Type of Occupancy				
Ownership	72 (68.6)	32 (61.5)	21 (70.0)	125 (66.8)
Tenancy	33 (31.4)	20 (38.5)	9 (30.0)	62 (33.2)
Total	105 (56.2)	52 (27.8)	30 (16.0)	187 (100.0)

The study revealed that 15% of the respondents' are civil servants, 24% are business men and women, 35.0% are artisans, 13% are professionals and 12.3% are farmers in the study area.

The P value is exactly 0.05, therefore it can be deduced that the occupation of respondents is directly proportional to their residential densities, that is, high density residential area for low income earners, medium density

residential for medium income earners and low density residential for high income earners, hence it is significant. The tenure of the respondents defines the type of house occupancy as presented in Table 4.6 below. The sturdy reveals that 66.8%, enjoy ownership, while 33.2% are tenants. Just as mentioned above, based on the P value of 0.626, it can therefore be deduced from the table above that the type of occupancy does not affect the residential density for the respondents, hence it is insignificant.

The summary of the type of houses occupied by the residents across the residential zones are presented in Table 2. Findings revealed that 19.8% of the residents live in bungalow buildings, 30.5% live in storey buildings, 20.3% live in flats, 10.2% live in storey flat, 15.0% live in duplexes and 4.3% live in traditional houses. All these indicate that there is variation in the type of houses the residents occupy across the selected zones of the study area. The Chi-square tests results ($\chi^2 = 70.348$ and $p < 0.001$) established that there was a significant association between the residential zones and the type of houses occupied by the residents in the study area.

Data on residents' age distribution were grouped into five. It is revealed in Table 3 that (13%) of the respondents were from ages 20 to 30, (21.9%) were from ages 31 to 40, (24.6%) were from ages 41 to 50, (28.3%) were from ages 51 to 60 and (11.8%) were from ages 61 to 70. This proportional representation of the older residents' may influence the residents' response in the evaluation of the environmental sanitation practices because of their past experiences and their level of exposure in the study area.

For the ease of analysis, residents were grouped into three based on the length of stay. These are residents with short (< 5 years), average (6 to 10 years), long (> 10 years) stay. The study reveals that 26.7% of the respondents have the short stay, 31.1% have the average stay and 42.2% have the long stay.

For the purpose of this study, three household groups were determined. These are household with 6 members and below, household that contains 7 to 10 members and household with more than 10 members. These were respectively regarded as the small, medium and large size household group. Income was grouped into low, medium and high income group. The numerical monthly income of the groups was less than ₦60000, ₦61000 to ₦150000 and above

₦150000 respectively. For low, the respondents were 33.2%, 44.9% for medium, and 21.9% for high. The types of toilets in the study area were divided into six groups based on table 4.12 below. Findings revealed that 41.7% of respondents use the water system/flush toilet, 31.6% use covered latrines, 12.3% use uncovered latrines, 10.2% use the pail/bucker system and 4.3% of the residents use VIP latrines.

Sanitation Practices

Sanitation issues examined in this study include various sources of water, cooking items, building facilities, waste storage and waste disposal. In order to examine these, respondents were to express their opinion using one of the three Likert scales of 'Regularly' ; 'Sometimes' (I) and 'Never' for sources of water, 'adequacy'; 'inadequacy' and 'not available for building facilities, "often", "not often", "very rare' for waste disposal methods. To arrive at "Rating value", a weighted eight value of 3, 2 and 1 were respectively attached. The rating value was arrived at by dividing the Summation of Rating Value (SRV) by the total number of responses. The SRV for each factor was obtained through the addition of the product of the number of responses to each factor and the respective weight value attached to each rating. This is mathematically expressed as:

$$SRV = \sum_{i=1}^3 x_i y_i \tag{1}$$

Where:

SRV= Summation of Rating value;

x_i = number of respondents rating i ;

y_i = the weight assigned to a value ($i=1, 2, 3$).

The index for each thus takes a value of between 3 and 1.

$$Rating = \frac{SRV}{\sum_{i=1}^3 x_i} \tag{2}$$

Therefore, the details of the findings are summarized below.

The summary presented in Table 2 showed that there were various cooking facilities utilized in the area. These include kerosene stove, electric

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stove, gas cooker, firewood, sawdust and charcoal. Information collected revealed that kerosene stove is used more regularly than the other methods. This is followed by the regular use of gas cooker, while the use of electric stove ranked third. Few of the respondents also use firewood and charcoal regularly. None of them use sawdust on a regular basis. The findings could be linked to the popularity of the methods

and availability of their components. It is a general fact that the use of kerosene stove is common in most western parts of the country due to the level of civilization. In cities like Lagos, the use of gas cooker and electric stove are also common. Firewood and charcoal are often used during festivals and ceremonies due to the large number of persons to be served. Thus they are not used regularly.

Table2. Sources of water and cooking item

High Density		Medium Density		Low density		The three Densities	
Sources	Rating	Sources	Rating	Sources	Rating	Sources	Rating
Rain	2.49	Well	2.50	Borehole	2.50	Well	2.48
Purchase	2.43	Borehole	2.41	Well	2.43	Rain	2.44
Well	2.28	Rain	2.24	Purchase	2.33	Purchase	2.28
Stream	1.93	Stream	1.94	Stream	1.96	Stream	1.94
Borehole	1.80	Purchase	1.79	Rain	1.80	Borehole	1.80
Pipe born	1.60	Pipe born	1.58	Pipe born	1.56	Pipe born	1.59
Cooking item							
Fire wood/ Charcoal	2.51	Kerosene Stove	2.52	Gas cooker	2.43	Kerosene stove	2.50
Kerosene stove	2.21	Fire wood/ Charcoal	2.24	Electric stove	2.33	Gas cooker	2.24
Electric stove	2.06	Electric stove	2.07	Kerosene Stove	2.13	Electric stove	2.07
Gas cooker	2.00	Gas cooker	2.01	Fire wood/ Charcoal	2.03	Fire wood/ Charcoal	2.01

From the summary presented in Table 3, findings showed that the most adequate building facilities in the study area were toilet facility. The adequacy rating computed was 2.54. Next to this was kitchen facility with adequacy rating of 2.45. The least in adequacy was septic tank (1.59) and next to this was drainage facility (1.80). Respondents were of the opinion that bathroom and soak away pit were moderately available or adequate. Adequacy of building facilities somehow varies from one density area to the other. From the analysis presented in

Table 3, while the most adequate facility in the high density zone was bathroom, findings showed that it was toilet and Kitchen, respectively in the medium and low density residential areas. However, findings revealed septic tank as the least adequate in the high, medium and low densities. Similarly, drainage was rated second to the least adequate in these three residential densities. Furthermore, soak away pit was placed third in the least adequate in these three residential densities.

Table3. Adequacy of building facilities

High Density		Medium Density		Low density		Ondo Town	
Sources	Rating	Sources	Rating	Sources	Rating	Sources	Rating
Bathroom	2.54	Toilet	2.46	Kitchen	2.52	Kitchen	2.45
Kitchen	2.47	Bathroom	2.42	Toilet	2.46	Toilet	2.54
Toilet	2.34	Kitchen	2.20	Bathroom	2.20	Bathroom	2.28
Soak away pit	1.95	Soak away pit	1.97	Soak away pit	1.91	Soak away pit	1.94
Drainage	1.80	Drainage	1.81	Drainage	1.81	Drainage	1.80
Septic tank	1.57	Septic tank	1.54	Septic tank	1.60	Septic tank	1.59

Table4. Waste Storage

Materials	High		Medium		Low		Total	
	No	Percent	No	Percent	No	Percent	No	Percent
RD1	39	19.12	20	19.23	13	21.67	72	19.6
RD2	23	11.27	13	12.50	8	13.33	44	12.0
RD3	19	9.31	10	9.62	5	8.33	34	9.2

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RD4	24	11.76	12	11.54	6	10.00	42	11.4
RD5	38	18.63	19	18.27	11	18.33	68	18.5
RD6	31	15.20	14	13.46	7	11.67	52	14.1
RD7	30	14.71	16	15.38	10	16.67	56	15.2
Total	**204	100.00	**104	100.00	**60	100.00	368	100.0

Note: **Higher than total respondents because of multiple responses

Where: RDI= Covered refuse bin, RD2= Metal container, RD3= Plastic container, RD4= Jerry can, RD5= bucket, RD6= Paper cartons, RD7= Nylon/polythene bag

The findings from the survey showed that various storage receptacles were utilized in the study area. These include covered refuse bin/RD1, metal container/drum/RD2, plastic container/RD3, jerry can/RD4, abandoned buckets/RD5, paper cartons/RD6 and nylon/polythene bag/RD7. Information contained in the Table above showed that the waste storage receptacle mostly used in the area is the covered refuse bins representing 19.6%, 12.0% for metal drum, 9.2% for plastic container, 11.4% for jerry can, 18.5% for abandoned bucket, 14.1% for paper cartons and 15.2% for nylon polythene bag. The use of covered bins would reduce the pollution and health risk attached to waste storage systems. Flies and other harmful insects are often attracted to waste bins if they are not covered.

The frequency of waste collection is very important to the safety of the environment. Results showed that 22.9%, 21.2% and 33.3% of residents in the high, medium and low densities respectively stored/disposed waste in less than 5 days interval. Information contained in Table 5 showed that the most prominent duration of waste storage before disposal is between 5-7 days. This could be linked to the fact that the waste disposal operators do collect waste items on a weekly basis. Respondents who claimed to store and dispose their waste items at a longer duration could be those who do not generate much waste items or those that are not always available during their visits. The predominant method of waste disposal in the high and medium density was burning, while the use of disposal site was prevalent in the low density.

Table5. Duration of Waste Storage before Collection/Disposal

Duration	High	Medium	Low	Total
Less than 5 days	24	11	10	45
	22.9%	21.2%	33.3%	24.1%
5-7 days	29	12	15	56
	27.6%	23.1%	50.0%	29.9%
2 weeks	18	11	2	31
	17.1%	21.2%	6.7%	16.6%
3 weeks	22	11	3	36
	21.0%	21.2%	10.0%	19.3%
above 3 weeks	9	6	0	15
	8.6%	11.5%	.0%	8.0%
Total	105	52	30	187
	100.0%	100.0%	100.0%	100.0%
Pearson Chi-Square	Value		Df	Asymp. Sig. (2-sided)
	14.554 ^a		10	.149

Table6. Methods of Waste Disposal

High Density		Medium Density		Low density		Ondo Town	
Sources	Rating	Sources	Rating	Sources	Rating	Sources	Rating
Burning	4.54	Burning	4.46	Disposal site	4.52	Burning	4.46
Dumping	4.47	Burring	4.45	Burring	4.46	Dumping	3.54
Burring	4.34	Disposal site	3.21	Burning	3.21	Disposal site	3.29
Disposal site	3.95	Dumping	2.97	Dumping	2.91	Burring	2.95
Water bodies	2.80	Local Government	1.81	Local Government	2.85	Local Government	1.82
Local Government	2.57	Barrow Pusher	1.54	Barrow Pusher	1.60	Water bodies	1.59
Barrow Pusher	1.65	Water bodies	1.02	Water bodies	1.14	Barrow Pusher	1.23

Source: Field Survey, 2017

**CONCLUSION AND RECOMMENDATION
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As a way of improving the living conditions of residents in the neighbourhood, the research emphasizes the adoption of revitalization strategy that involves community participation. This hinges on the understanding that community participation in sanitation practices is one of the most important and essential means for solving the sanitation problem at the present time, since the people are acquainted with their actual needs, their abilities and resources. Moreover, when there is the expression of willingness on the part of the residents to contribute in kind and cash towards the upgrading of their residential neighbourhood there will be improvement in the environment.

The study has shown that sanitation facilities were not adequately provided in the area. This has affected the environmental sanitation practices of residents in the area. The result has been the sanitation-related health problems reported in the area. To reduce correct this situation, the following points are recommended:

- The monthly environmental sanitation exercise should be made participatory through enlightenment programmes on its importance
- The activities of private sector participation in solid waste collection and disposal should be further intensified.
- Residents who fail to cooperate with the basic sanitation conditions should be sanctioned through a competent court of law
- Government should provide drainage facilities along the road networks
- Government should provide enabling environment for private sector participation in environmental sanitation and awareness programme for the residents in the area.
- Households without basic sanitation facilities should be encouraged to do so through subsidies
- There should be adequate provision of the basic infrastructural facilities to enhance the health condition of the residents.

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