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Occupants' Opinion on Adequacy of Environmental Factors of Public Housing in Awka and Onitsha, Anambra State, Nigeria

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Abstract
The aim of this study was to evaluate the occupants' perception of fourteen public housing estates in Awka and Onitsha towns in Anambra State. The following environmental factors of public housing were studied. Two research questions and one null hypothesis were formulated and tested. The theoretical basis of this study was hinged on Adam's Equity theory because it focused on determining whether the distribution of housing resources is fair to both relational partners (Occupants in Awka and Onitsha towns). Equity was measured by comparing the ratios or proportionality of contributions and benefits of each person within the relationship. The universe of study consisted of 2,805 respondents comprising mainly housewives, and secondly, 2,805 house units, comprising 1,032 in Awka town and 1,773 in Onitsha town. A stratified random sampling of these nine disparate public housing estates were studied: Iyiagu Housing Estate(28)3.32%, Real Housing Estate(27)3.20%, Udoka Housing Estate(150)17.81%, Ngozika Housing Estate(8)0.96%, Oganiru Housing Estate Phases 1&2(24)2.85%, AHOCOL (Inner City Layout) Housing Estate(2)0.24%, AHOCOL (Think Home) Housing Estate Phase 1 (or Ahocol 2(8)0.96%, AHOCOL (Think Home) Housing Estate Phase 2 (or Ahocol 3)(10)1.20% AHOCOL (Think Home) Housing Estate Phase 3 (or Ahocol 4)(52)6.20% in Awka town , while in Onitsha town, these five housing estates were studied: Niger Bridge-Head Housing Estate(166)19.71% and Federal (Site and Services) Housing Estate, Trans-Nkissi (or "33")(353)42.00%, Onitsha Federal Low Cost Housing(5)0.6%, Nkissi, Akpaka Housing(5)0.6% and Ahocol Housing Estate in GRA (3)0.35% making a total of fourteen housing estates in all. Samples of respondents were chosen from each estate in proportion to its population. A total of 842 respondents and 842 households were sampled representing 30% of the universe. Mostly Women were used as primary respondents in each household because they are more affected by inappropriate housing and environment and are much more identified with the home. A 12-item structured questionnaire on public housing (QPHEF) consisting of six (6) sections was developed. The questions consisted of 5-point Likert rating scale ranging from 1-5 in which respondents indicated the extent to which they considered the listed variables. The mid-point of 3 implied that any result significantly different from this mean value was assumed to be either positive or negative. This instrument was face and content validated. Cronbach Alpha Technique index was used for reliability test which gave a value of 0.90. This technique was pre-tested on a sample of 30 respondents/residents of one non-studied public housing estate. The research questions were processed using percentages, means, chi-square, Contingency Table Analysis (CTA) and one way Categorical data analysis of variance (CATANOVA), while the hypotheses were tested by proportion of difference using Z-test. These statistical tools fitted the analysis of the data available in this study because the data were discrete in nature and cross-classified by two classifying factors of towns and occupants' responses to listed variables (SA, AG, UN, DI and SD or VLH, LH, MH, BH and NH). The data were obtained by pulling all positive responses (SA and AG or VLH and LH) for each category of occupants (Awka or Onitsha) as positive responses and (DI and SD or BH and NH) as negative responses and their proportions obtained and filled below pooled observations (counts). Undecided responses were left as neutral. Complete responses were 797 comprising 299 occupants in Awka and 498 occupants in Onitsha. The major finding of the study was (1). The proportion of occupants responding positively to habitability of public housing in Onitsha is greater than the proportion responding positively to it in Awka. The differences between the two towns were discussed and explained. Strategies for ameliorating the sources of dissatisfaction, as well as policy implications were discussed.
Key terms: Occupants' Opinion, Adequacy of Environmental Factors, Public Housing and Anambra State.

Introduction

The best conservative United Nations estimate of 2013 is that of 2005 estimates which puts the number of homeless at 100million which translates to over 100million homeless people who are forced to live with no shelter at all and another 100million hidden homeless people bringing the conservative UN estimate of total population of homeless to 200 million and over 1 billion people worldwide who are inadequately housed (Cronley, 2010). A UN-Habitat (2009) estimate had indicated that more than one billion of the world's city residents live in low quality housing, mostly in the sprawling slums and squatter settlements in developing nations. In Lagos, many hidden homeless people live "*as homes*" under public bridges and flyovers on the high ways (Ehingbeti 2008). With a Nigerian population of over 174,507,539 persons (Nation Bureau of Statistics, July 2013), United Nations (2013) and Nigerian Demographic Profile (2013) studies put the overall Nigerian

housing deficit at 17 million units while Nigeria National Bureau of Statistics estimates were between 12 and 14 million housing units (National Bureau of Statistics, 2013). As of 2009, there was a deficit of 16 million housing units in Nigerian urban centres (Kolawale, 2009).

The above statistics were evidence of the difficulty governments have in guaranteeing access to housing for their citizens. However, as part of government's effort to provide suitable and adequate shelter for the citizenry, she went into public housing provision initiative (Akeju, 2007 and Obeng-Odoom, 2009). Public housing is usually owned and operated by the government although some public housing projects are managed by subcontracted private agencies. Public Housing is housing financed, constructed and allocated by the state, usually for persons in low income category (Sengupta and Sharma, 2008). It is indeed regrettable that in Nigeria despite the fact that the 1999 Constitution Section 16(3) (d) under "*Fundamental Objectives of State Policy*" compelled the Nigerian State "to provide suitable and adequate shelter for all citizens" (Federal Republic of Government, 1999). The attainment of such a goal is still unrealizable.

In many states of the Nigerian Federation different public housing schemes abound ranging from low-cost, middle-class and upper-class housing projects. These are meant to cushion the effect of dearth of housing (Obeng-Odoom, 2009 and Eni,2014). However, Muoghalu (1986 and 1989) stressed that government is attracted to public housing because of its visibility and the money accruing from contracts and politicians can point with pride at the highly visible, public-aided housing projects as a measure of their concern for people and their social accomplishment. A look at some public housing projects has revealed that a number of them has suffered from such weaknesses as ineffective waste disposal management and other forms of environmental degradation, such as poor public utilities and infrastructural back up, lack of social institutions such as health and educational institutions and other social amenities, prevalence of crime, destitution and prostitution (Arimoro et al, 2009). Conversely, a number of them have been built to high standard thereby making them highly competitive by prospective homeowners and tenants. According to and Aneze, (2009) and Muoghalu (2007 and 2011) there is poor quality housing resulting in urban slum and sometimes-squatter settlements, inadequate and inefficient refuse disposal systems resulting in psychological housing problems usually associated with urban development. Social services were poor and in most cases non-existent.

According to the United Nation's Centre on Human Settlements (UNCHS), there are some 600 million urban dwellers in the South living in overcrowded and poor quality housing - with inadequate provision of water, sanitation, drainage and garbage collection, putting their lives and health continually at risk; as do over one billion people living in rural areas. In Nigeria subsidized infrastructure such as water, sewerage, electricity, roads, surface drainage and social institutions (such as health, schools, and markets) are always either absent or in poor state of disrepair. According to Sani, (2002), the dearth of basic infrastructure, adds up to 30 percent of housing development costs as well as the high cost of building materials, which is a major challenge that needs to be addressed. Free market operation of the economy has made nonsense of low duties on imported building and housing-related materials. These problems have led to low home-ownership rate. Many writers had strongly promoted the idea of urban residents being given more room by government to organize housing provision for themselves (Nubi 2008). Therefore, government should move away from direct provision of services, and limit itself to setting the regulatory framework for private sector companies. Jiboye (2010) in his study employed a conceptual model in which he surveyed 1,232 (10%) households out of a total of 12,323 households in six randomly selected public housing estates in Lagos. The need to consider relevant factors of the environment, dwelling and management in housing design and development were highlighted. Jiboye (2008 and 2010) used correlation research design and found that standards used in Nigeria are imported. He therefore called for home grown standards that will take care of peculiarities of Nigerian families. Again, it was Muoghalu, (2011) who advocated the combination of objective indices and subjective indices in the determination of housing quality. He suggested the use of same in the evaluation of housing standards.

The problem of the study

Environment is an important component of housing, major public housing estates in Awka and Onitsha also seemed characterized by inadequate and deteriorating facilities such as access road networks, walkways, unregulated building patterns, poor sanitation as they lacked central sewage system but plot by plot biological filters, and un-evacuated garbage points, at times creating congestion, lack of recreational facilities as residents go to neighbouring recreation/ sports clubs for relaxation. There were also noticeable lack of government sponsored social institutions and where spaces were provided for them, these spaces like the estates' open spaces or vegetative belts have been given out to politicians and political appointees to build their own houses.

As the philosophical basis of this study is on equity and social justice in housing environment or built environment, this study surveyed the ratio of contributions (inputs) and rewards/benefits/ costs (output) of occupants at the various locations in Awka and Onitsha cities. It is acknowledged that there are subtle and variable major factors of public housing provisioning such as design and construction, affordability, habitability, environmental and social contents of public housing that affect an occupant's assessment and

perception of their relationship with their public housing estates and their housing providers. The idea was to have the rewards (outcomes) directly related with the quality and quantity of the occupants contributions (inputs) in the spirit of egalitarianism in the distribution of housing resources. If occupants of Awka and Onitsha public housing estates were possibly rewarded alike, it would help the occupants realize that the organizations were just, attentive, and appreciative.

Aim and Objectives

The aim of this study was to determine occupants' perception of public housing estates in Awka and Onitsha cities. The specific objectives were to:

I). Identify and describe the public housing estates in Awka and Onitsha cities,

II). examine the opinions of respondents on adequacy of environmental factors of public housing.

In other words, how adequate are the environmental factors of public housing in Awka and Onitsha as perceived by respondents?

Hypothesis

H_o: There is no significant association between locations of respondents and their perception of adequacy of environmental factors.

The Theoretical Framework

. A number of theories can be used to provide the framework on theory based perspective for this study such as Systems theory, Herzberg's Two-Factor Theory (Dual factor), Adams' Equity Theory, Expectancy Theory, McClelland's Need Theory, Social Exchange Theory, Predicted Outcome Value Theory and Vulnerability. Only Adam's equity theory was considered in this study because the main purpose of this evaluation was to validate or reject the underlying public housing programme assumptions such as that equity was guaranteed by the flexibility in design and construction of public housing estates as occupants are free to increase densities and have mix uses within affordable and habitable levels. This study's contribution to the theory was that it established orderly connections between observations and expected facts about public housing.

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The systems theory could not have been applied in this study because the study tested dependence and not interrelationship of housing provisioning factors adapted to the operation of affordability and habitability within an integrated framework. The systems theory was developed by Ludwig Von Bertalanffy (1956). According to Geddes (1968) McLaughlin used this systems concept extensively in environmental science as a method to maximize bounded rationality especially in spatial planning. According to Etzioni (1968) the systems approach involves:

> *a change in a part or component which in turn induces change in the other parts or components, which in turn causes change at the source of change.*

Also Grinker (1956) affirmed that a system is an entity composed of a number of parts, the relationship of these parts and their attributes of both the parts and the relationships. Hall and Fagen (1956) defined a system as a set of objects together with relationships between the objects and their attributes. Taking into account these definitions, the adequacy of systems theory for studying a phenomenon as complex as the affordability and habitability of public housing is in doubt as housing and houses are whole numbers and cannot be fractionalised and treated as parts of a whole.

The Two-factor theory (also known as **Herzberg's motivation-hygiene theory and Dual-Factor Theory**) states that there are certain factors in the workplace (public housing) that cause job satisfaction/housing satisfaction, while a separate set of factors cause dissatisfaction. It was developed by Frederick Herzeberg. Herzberg's book 'The Motivation to Work' written with research colleagues Bernard Mausner and Barbara Bloch Snyderman in 1959, first established his theories about motivation in the workplace and used in public housing assessment. The aim of the interview was to find out factors in the job (public housing estate) which were present when employee or occupant felt either exceptionally happy or unhappy. The result was a two factor hypothesis that in work / public housing environment, men have two different categories of need which are essentially called the extrinsic hygiene (dissatisfiers) factors who are concerned about their environment and those who are happy and motivated about their job/ public housing estate, the intrinsic motivation or maintenance factor which are independent of each other.

Herzberg's overall conclusions were clear and consistent; the statistics from Herzberg's study can be interpreted in many different ways in their finer details. Herzberg's research proved that people will strive to achieve

'hygiene' needs because they are unhappy without them, but once satisfied the effect soon wears off-satisfaction is temporary.

2. 1.1 ADAMS' EQUITY THEORY (Balancing Inputs and Outputs)

Adams' Equity Theory is named after John Stacey Adams, a workplace and behavioural psychologist, who developed this job motivation theory in 1963. Much like many of the more prevalent theories of motivation (such as Maslow's Hierarchy of Needs and Herzberg's Two Factor Theory), Adams' Equity Theory acknowledges that subtle and variable factors affect an employee's or an occupant's assessment and perception of their relationship with their work/ public housing estate and their employer/housing provider. Equity theory proposes that individuals who perceive themselves as either under-rewarded or over-rewarded will experience distress, and that this distress leads to efforts to restore equity within the relationship. It focuses on determining whether the distribution of resources is fair to both relational partners. Equity is measured by comparing the ratios of contributions and benefits of each person within the relationship.

Equity theory consists of four propositions:

1. Individuals seek to maximize their outcomes (where outcomes are defined as rewards minus costs (Carrel and Dittrich, 1978).
2. Groups can maximize collective rewards by developing accepted systems for equitably apportioning rewards and costs among members. Systems of equity will evolve within groups, and members will attempt to induce other members to accept and adhere to these systems. The only way groups can induce members to equitably behave is by making it more profitable to behave equitably than inequitably. Thus, groups will generally reward members who treat others equitably and generally punish (increase the cost for) members who treat others inequitably.
3. When individuals find themselves participating in inequitable relationships, they become distressed. The more inequitable the relationship, the more distress individuals feel. According to equity theory, both the person who gets "too much" and the person who gets "too little" feel distressed. The person who gets too much may feel guilt or shame. The person who gets too little may feel angry or humiliated.
4. Individuals who perceive that they are in an inequitable relationship attempt to eliminate their distress by restoring equity. The greater the inequity, the more distress people feel and the more they try to restore equity. (Walster, Traupmann and Walster, 1978)

To do this, consider the balance or imbalance that currently exists between the public housing occupant's inputs and outputs, as follows:

Outputs typically include:

- Affordable and habitable housing rewards (such as homeownership or rental) intangibles that typically include:
    - Recognition
    - Reputation
    - Sense of Achievement
    - Sense of Advancement/Growth
    - Tenure Security
- The inputs that a participant contributes to a relationship can be either assets – entitling him/her to rewards – or liabilities - entitling him/her to costs. The entitlement to rewards or costs ascribed to each input varies depending on the relational setting.
- Outputs are defined as the positive and negative consequences that an individual perceives a participant has incurred as a consequence of his/her relationship with another. When the ratio of inputs to outcomes is close, then the occupant should have much satisfaction with their housing.

This is similar to Frederick Herzberg's Motivation/ Hygiene Theory. While Adams' Equity Theory obviously has a strong element of truth in it, it's probably fair to say that Herzberg's Motivation/Hygiene Theory has greater motivational significance. The idea behind Adams' Equity Theory is to strike a healthy balance with outputs on one side of the scale and inputs on the other – both weighing in a way that seems reasonably equal.

If the balance lies too far in favour of the housing provider or public housing in one location, some occupants may work to bring balance between inputs and outputs on their own, by asking for more compensation or facilities. Others will be dissatisfied, and still others will seek alternative housing.

An individual will consider that he is treated fairly if he perceives the ratio of his inputs to his outcomes to be equivalent to those around him. The idea is to have the rewards (outcomes) directly related with the quality and quantity of the occupants contributions (inputs). If both occupants were perhaps rewarded alike, it would help the occupants realize that the organization is fair, observant, and appreciative.

The environmental constituent comprised such attributes as quality and character of public housing, environmental content and performance, subsidized infrastructure, sanitary facilities such as sewage and waste disposal, landscaping, security, fences, drainage and roads, building layout and spaces.

Adam's equity theory made research findings meaningful and generalizable. It also established orderly connections between observations and facts. In terms of the usage of Adam's equity theory in this study, it can be seen that as a research tool, this framework has some merits. First, it incorporated both theoretical and philosophical perspectives into the investigatory process, and thus, linked all aspects of research including problem statement, aim, objectives, literature review, methodology, data collection and analysis as well as the interpretation of findings. Secondly, the framework lent itself to the use of both quantitative and qualitative research strategies as well as multiple data gathering instruments. Thirdly, the framework allowed for the investigation of the input, process, output and outcome of some components of public housing programmes. Where multiple public housing estates delivery was used in a programme, it also assisted in assessing and comparing the outcomes of the different estates.

Study Area: The study area, Awka and Onitsha cities are located in Anambra State of Nigeria. Anambra State was created on 27th August, 1991. Its name is derived from 'Oma Mbala' now known as Anambra River, a tributary of the famous River Niger.

Fig. 1 Relative position of Nigeria in the world map
Source: Wikipedia, the Free Encyclopedia, 2014.

Fig. 2: Location of Anambra State in Nigeria.
Source: Adapted from Wikipedia, the Free Encyclopaedia, 2014.

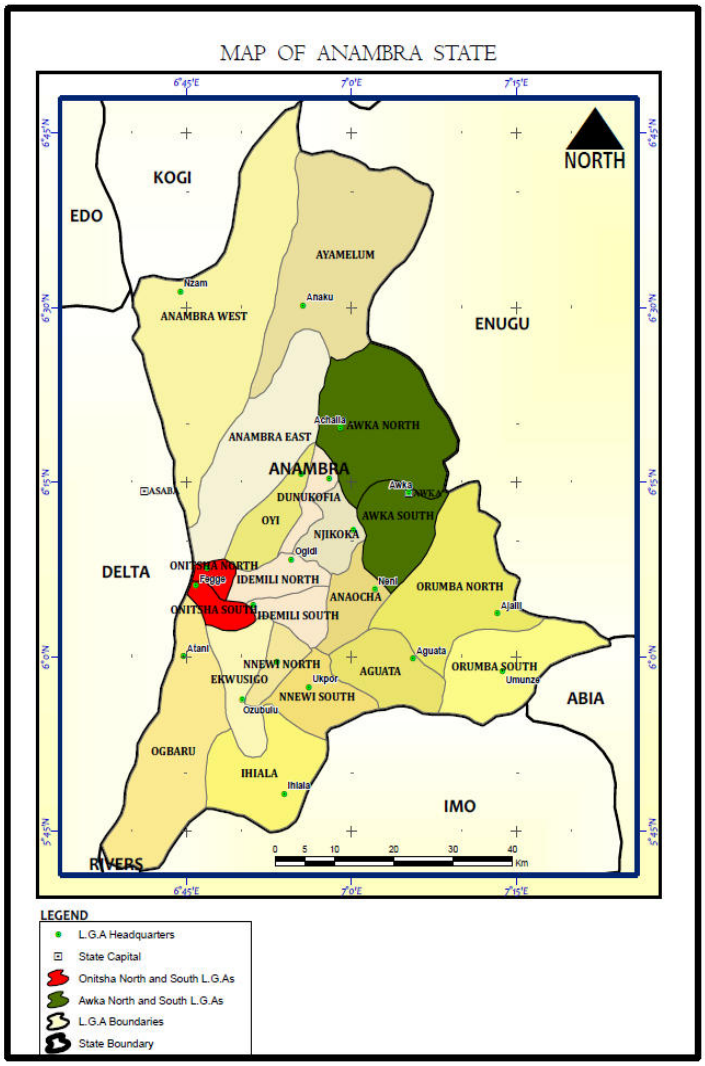

Fig. 3: Map of Anambra State Showing the Study Area.
Source: Adapted from Nwabu, (2010) Google Maps.

Awka City

Awka became the capital of Anambra state after it was carved out of the old Anambra State in 1991. Awka South had a population of 189,045 persons and Awka North 112 had 6,080 persons (National Population Commission, 2006). This figure is considered doubtful because Awka town had grown from a population of 11,243 in 1953, 40,725 in 1963, and 70,568 in 1978 to 141,262 in 1983. The surprise is that the population of Awka town as at the National Census conducted in 1991 stood at 58, 225. This is made up of 28,335 males and 29,890 females (National Population Commission, 1991). However, the extrapolation of census figures of 1953, 1963, 1978, 1983 and 2006 put the population of Awka town at approximately 90,573 for the year ended 2007 and **375, 000** persons in 2010.

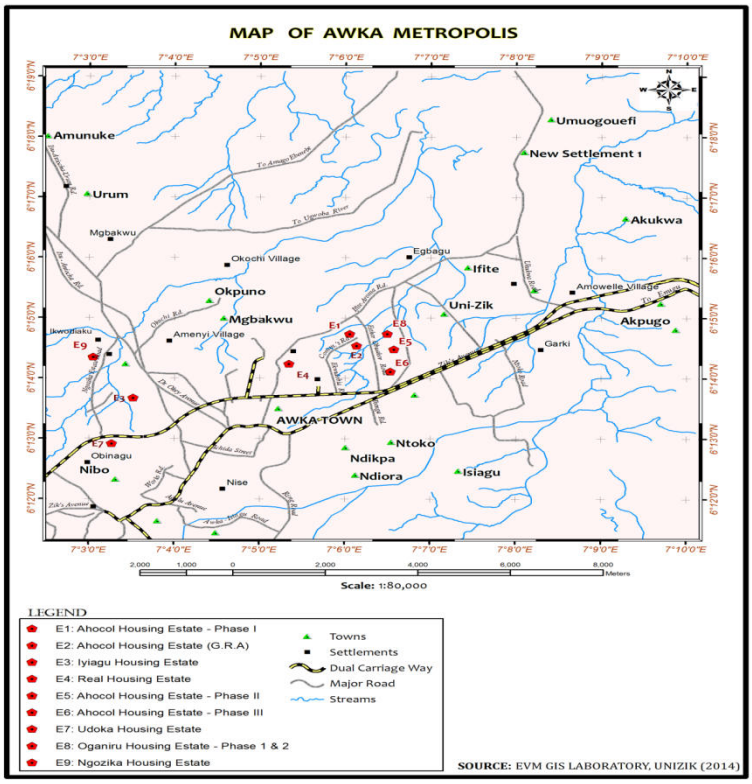

Fig .4: Street Map of Awka Metropolis viewing Public Housing Estates.
Source: Environmental Mgt GIS Lab NAU, 2014.

Onitsha City:

Onitsha is located on the western part of the State and on the eastern bank of the River Niger and situated between Latitudes 6°.09' N and7.03'N and Longitudes 6°.45' E and 6°.50'E with an estimated land area of 104sq.km (Onitsha Town Planning Authority, 1998). It has nine (9) residential wards or quarters such, Otu, Fegge, Okpoko, GRA, Woliwo, Odakpu, Awada, Inland Town, Omagba and its peri-urban communities. Onitsha had an estimated population of 511,000 with a metropolitan population of 1,003,000 (Minahan, 2002). The population of Onitsha is not well reflected in the Nigerian census figures because the traders migrated to their bases, neighbouring villages and states during census events reducing the official figures. Even the population of the town 623,274 in 2006 is contested (National Population Commission, 2006). This includes the population of the legal city of Onitsha and its peri-urban communities. However, the United Nations' Habitat has rated Onitsha among the world's fastest growing cities (*Daily Sun*, 2010, p 5). In terms of geology, relief and drainage, Onitsha lies on the Niger Anambra flood plain underlain by Nanka sands. The relief shows a general westward trend towards the River Niger; although local variations of relief exist in some parts of the town (Orajiaka, 1975 and Ofomata, 1975). According to Azikiwe, (1930), Igbos call it N'Idu Ado N'Idu. The city was founded in 1550. The indigenous people of Onitsha are primarily of Igbo ethnicity. Anioma people (an Igbo subgroup), and settlers from the Kingdom of Benin are believed to have settled in Onitsha in the 16th century, which was originally called Ado N'Idu (Azikiwe, 1930). It soon became capital of an Igbo Kingdom (Nipost Postcode Map, 2009). Eze Aroli was the first Obi of Onitsha, the monarch of the city (Azikiwe, 1930). In 1884, Onitsha became part of a British protectorate. The British colonial government and Christian missionaries penetrated most of Igboland to set up their administration, schools and churches through the river port at Onitsha.

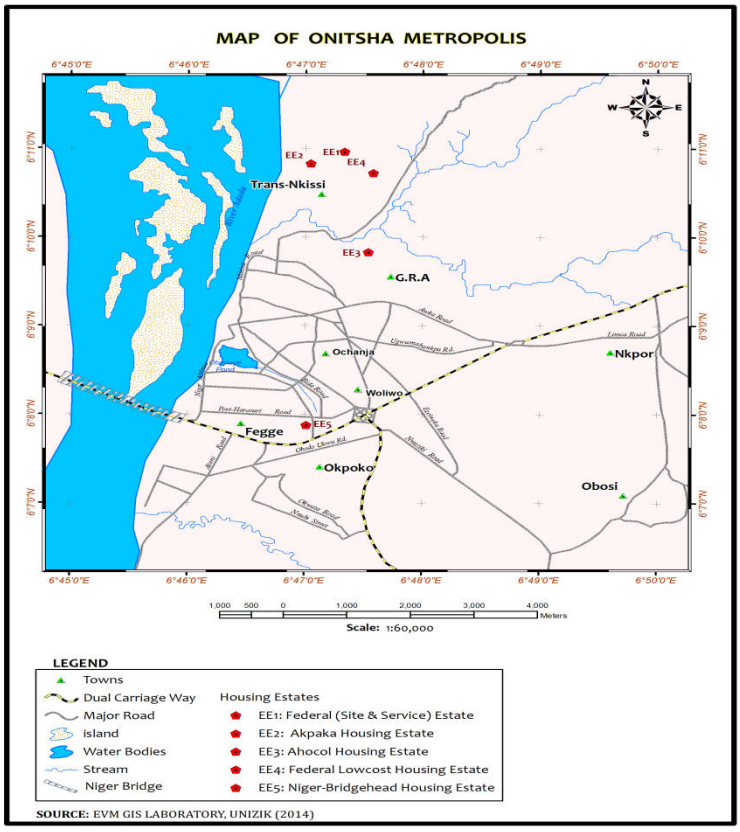

Fig. 5: Map of Onitsha Metropolis Showing Public Housing Estates
Source: EVM GIS Laboratory, Unizik, (2014).

The United Nations' Habitat has conversely rated Onitsha among the world's fastest growing cities (*Daily Sun*, 2010, p 5). In terms of geology, relief and drainage, Onitsha lies on the Niger Anambra flood plain underlain by Nanka sands. The relief shows a general westward trend towards the River Niger; although local variations of relief exist in some parts of the town (Orajiaka, 1975 and Ofomata, 1975). According to Azikiwe, (1930), Igbos call it N'Idu Ado N'Idu. The city was founded in 1550. The indigenous people of Onitsha are primarily of Igbo ethnicity. Anioma people (an Igbo subgroup), and settlers from the Kingdom of Benin are believed to have settled in Onitsha in the 16th century, which was originally called Ado N'Idu (Azikiwe, 1930).

The British colonial government and Christian missionaries penetrated most of Igboland to set up their administration, schools and churches through the river port at Onitsha. In the mid 1850s, Onitsha became an important trading port for the Royal Niger Company following the abolition of slavery and with the development of the steam engine when Europeans were able to move into the hinterland. Trade in palm kernels and palm oil which was going on along the coast of the Bight of Biafra since the 12th century was now moved upwards and other cash crops also boomed around this river port in the 1800s. Migrants from the hinterland of Igboland were drawn to the emerging town as did the British traders who settled there in Onitsha, and coordinated the palm oil and cash crops trade. In 1965, the River Niger Bridge was built across the Niger River to replace the ferry crossing. Onitsha is a commercial centre and a river port on the eastern bank of the Niger River in Anambra State, southeastern Nigeria (Muoghalu, 1983).

Method of Data Collection

A 20-item structured questionnaire on design and construction of public housing (QPH) was developed. Section A had open-ended questions or unstructured responses on demographics which elicited from respondents why they chose a particular scale, it tapped preliminary / personal information on respondents' and was analysed using percentages such as gender, age, occupation, marital status, educational qualifications of respondents and section B which focused on design/ construction of public housing estates and had multiple-choice structured 5-point Likert Scale questions of possible responses from which respondents chose as appropriate. This represented a 5-point Likert rating scale in which respondents indicated the extent to which they considered the listed variables in the buildings affordable and habitable for occupants. The mid-point was 3 and this implied that any result significantly different from this mean value was assumed to be either positive or negative. The universe of study consisted of 2,805 respondents comprising mainly households, and secondly, 2,805 house

units, comprising 1,032 in Awka town and 1,773 in Onitsha town. The sample size of 30% consisted of 842 housewives. Women were used as primary respondents in each household because they interact with the housing environment more than men. A stratified random sampling of these fourteen disparate public housing estates was studied. This instrument was face and content validated. Cronbach Alpha Technique index was used for reliability test which gave a value of 0.90. This technique was pre-tested on a sample of 30 respondents/residents of another housing estate. Out of a total of 842 respondents, 797 responded representing 94.7% complete responses. A stratified random sampling of these public housing estates, were studied as shown in Tables 1 and 2 below: A simple random sampling was then drawn from housing units in each stratum.

Table 1: Distribution of Public Housing Population and Sample Size in Awka

	Name of Estate									**Housing Units**
Parameters	**Iyiagu**	**Real**	**Udoka**	**Ngozika**	**Ahocol(GRA)**	**Ahocol(1)**	**Ahocol(2)**	**Ahocol (3)**	**Oganiru**	**Total**
Population	**94**	**90**	**500**	**25**	**8**	**27**	**34**	**174**	**80**	**1032**
Sample size	**28**	**27**	**150**	**8**	**2**	**8**	**10**	**52**	**24**	**310**
Awka town percentage	**9.03%**	**8.70%**	**48.40%**	**2.60%**	**0.65%**	**2.60%**	**3.22%**	**16.80%**	**7.75%**	**100%**
Overall percentage	**3.32%**	**3.20%**	**17.81%**	**0.95%**	**0.24%**	**0.95%**	**1.88%**	**6.18%**	**2.85%**	**36.82%**

In order to achieve the stated objectives and to test the hypotheses of the study, the hypotheses were tested at 0.05 level of significance using Chi Square because it fitted the analysis of the data available in this study for these clear reasons: 1. the data were discrete in nature and 2. The data were cross-classified by two classifying factors: Town (Awka and Onitsha) and responses (SA, AG, UN, DI and SD or VLH, LH, MH, BH and NH).

Table 2: Distribution of Public Housing Population and Sample Size in Onitsha

	Name of Estate					**Housing Units**
Parameters	**Fed. Trans Nkissi**	**Niger Bridge**	**Fed. Low Cost**	**Akpaka**	**Ahocol(GRA)**	**Total**
Population	**1177**	**554**	**15**	**17**	**10**	**1773**
Sample size	**353**	**166**	**5**	**5**	**3**	**532**
Onitsha town percentage	**66.35%**	**31.20%**	**0.94%**	**0.94%**	**0.56%**	**100%**
Overall Percentage	**41.92%**	**19.71%**	**0.60%**	**0.60%**	**0.36%**	**100%**

Finally appropriate statistical tools were used to completely analyse the data for this research, which met the scope and nature of data and still were able to answer the research questions. Six research questions and one null hypothesis were formulated and tested. The research questions were processed using percentages, means, chi-square, Contingency Table Analysis (CTA) and one way Categorical data analysis of variance (CATANOVA), while the hypotheses were tested by proportion of difference using Z-test.

A two –way (r- c) contingency was used. Consider the r x c table below where r = number of rows and c = number of columns.

n_{ij} is the observed counts or frequency of objects/subjects/elements/items etc cross-classified by the ith level of the first variable of classification and the jth level of the second variable of classification ni. (i=1, 2…Ɣ) is the marginal total of all the elements classified by the first variable of classification = n_j is the marginal total of all the elements in the jth level of the second variable of classification . Finally n… is the total of all the elements in the table.

Table 3: Contingency Table Analysis (CTA) Data format

Levels of First Variable of Classification	Levels of second variable of classification					
	1	**2**	**3**	**…j…**	**C**	**Total $n_{i..}$**
1	n_{11}	n_{12}	n_{13}	…n_{1j}…	n_{1c}	n_1
2	n_{21}	n_{22}	n_{23}	…n_{2j}…	n_{2c}	$n_{2.}$
3	n_{31}	n_{32}	n_{33}	…n_{3j}…	n_{3c}	$n_{3.}$
:	:	:	:	:	:	:
I	n_{i1}	n_{i2}	n_{i3}	n_y	n_{ic}	n_i
:	:	:	:	:	:	:
ϒ	$D_{ϒ1}$	$D_{ϒ2}$	$D_{ϒ3}$	…$n_{ϒj}$...	$n_{ϒc}$	$n_ϒ$
Totals n_j	$n._1$	$n._2$	$n._3$	…$n._{j...}$	n.c	n…

Under the number hypothesis of independence,

$P_{ij} = P_{ij} \times P_j = \frac{n_{i.}}{n} \times \frac{n_j}{n...}$

The corresponding expected frequency, e_{ij}, under the null hypothesis, H_O, is then obtained by multiplying P_{ij} by the total frequency n.ij that is 1.

$e_{ij} = np_{ij} \times n_{oo} = \left(\frac{n_{i.}}{n} \times \frac{n_j}{n...}\right)$

$\therefore e_{ij} = \frac{n_{i.}}{n} \times \frac{P_{.j}}{n...}$

If we represent observed counts (frequency) by Oij such that Oji= nij, other entries unaltered, the test statistics

$\chi^2 = \sum_{ij} \frac{(O_{ij}-e_{ij})^2}{e_{ij}}$

follows chi-square distribution with (ϒ -1) (c – 1) degrees of freedom when the null hypothesis of independence is true.

If the calculated χ^2 is equal to, or greater than, the tabulated critical value then χ^2_1 α, (r -1) (c – 1), the null hypothesis of independence is rejected at the α level of significance; otherwise the null hypothesis is accepted. Source: (Oyeka, 1996; pp. 361-362).

Table 4: Catanova Data Format

Factor level of Classes	Responses				
	1	2		J	n_i
1	n_{11}	n_{12}	▪▪▪	n_{1j}	n_i
2	n_{21}	n_{22}	▪▪▪	n_{2j}	n_2
. . .	. . .	. . .	... … …	. . .	. . .
J	n_{j1}	n_{j2}	▪▪▪	n_{ij}	n_i
n.j	$n._1$	$n._2$		$n._j$	n..

Table 5: One way CATANOVA

SV	Df	SS	T-statistic
Row or factor level	I-1	RSS	$\chi^2 = \frac{RSS(n-1)(I-1)}{TSS}$
Within Row	n-I	WSS	
Total	n-1	TSS	

If the null hypothesis of independence is true, the test statistics follows χ^2 1- α, (I-1) (J-1) and the null hypothesis is rejected is $\chi^2_{cal} \leq \chi^2_{tab}$

$RSS = \sum \frac{nij^2}{nj} - \frac{nij^2}{n}$

$= Cj - C_i$

TSS $= n - \sum \frac{n^2}{n}$

$= n - C_i$

WSS = TSS - RSS = $n - C_{\bar{Y}}$

*Source: (Arua *et al*, 2000; pp. 406 – 411).

Assumptions of CATANOVA

1. Independence: The level or class acts independently. That is nij and n_2j are statistically independent ∀i ≠ j[1]
2. Distribution : The response, n_{ij}, is approximately distributed as binomial with mean equal to n_{ij} and variance equal to $n\lambda_{ij}$ and if we consider n_{ij} to be fixed (non – random) $n_{ij} = \sum$
3. (n_{ij}, n_{2j},…, n_{ij}) is approximately distributed as multi-nomial with parameter ($\lambda_{ij}, \lambda_{ij}, ..., \lambda_{ij}$) and $n_{.j.}$

   TSS = WSS + RSS

   With respective degrees of freedom

   n-1 = n-1 + I - 1

TSS (SSt) = Total sum of square

WSS (SSw) = sum of squares, within Group

RSS (SSb) =Row sum of squares or sum of squares, between Group.

Test of Difference between Two Population Proportions

To test the null hypothesis, Ho, that two population proportions λ_1 and λ_2 are equal against and of the alternatives. They are not equal, one is less than or greater than the other. $\lambda_{1\ is}$ the population proportion for group 1 and λ_2 is the population proportion for group II. If P_1 and P_2 are sample proportion for group 1 and II respectively, P_1-P_2 is approximately normally distributed with $\mu p_1 - p_2 = \lambda_1 - \lambda_2$ and standard deviation.

$$¡p_1 - p_2 = \frac{\lambda 1\sqrt{1-\lambda 1}}{n1} + \frac{\lambda 2(1-\lambda 2)}{n2}$$

But λ_1 and λ_2 are often unknown. Thus, they are estimated by P_1 and P_2 such that

$$¡p_1 - p_2 = \frac{\sqrt{p_1(1-p_1)}}{n_1} + \frac{p_2(1-p_2)}{n_2}$$

Therefore,
$$\frac{(p_1 - p_2) - (\lambda_1 - \lambda_2)}{\frac{\sqrt{p_1(1-p_1)}}{n_1} + \frac{p_2(1-p_2)}{n_2}}$$

which has approximately unit normal distribution. For a one-sided test Ho: is rejected at the ∝ level of significance, if /-Z / > Z, - α

Data Presentation and Analyses

The analyses of the preliminary or background information yielded the following findings:

- 97.5% (777) of the respondents are females, while only 2.5% are males.
- the ages of most of the respondents is as follows ; 40.02%(319) aged 20-30 years , 7.41%(59) were between 31 and 40 years of age, 49.44%(313) were between 41-50 years , while 3.13% (25) of the respondents were above 50.
- that civil servants constituted 56.33% (449) of all respondents, while non-civil service respondents made up of traders, self-employed professionals and artisans constituted 43.67% (3 48).
- out of the 797 respondents, 90.58 %(722) were married, 5.27 %(42) were unmarried, while 4.15% (33) did not disclose their marital status.
- 3.13 %(25) of the respondents had School Certificate, 9.41 %(75) had National Diploma, 57.34% (457) possessed HND/ B. Sc. / B.A, 26.86 %(214) had M. Sc. / M. A. / Post Graduate Diploma, while only 3.26 %(26) had Ph. D degrees.

While answering the research questions in Section B produced the following findings;

1. To identify and describe public housing in Awka and Onitsha cities.

A total of fourteen public housing estates were identified. Awka has nine while Onitsha boasts of five major public housing estates; the Niger Bridge-Head Housing Estate along Port Harcourt Road, Fegge owned by Anambra State and the Federal (Sites and Services) Housing Estate at Trans-Nkissi popularly known as "3-3".There is also Akpaka Housing Estate, Onitsha, State-owned housing at 3-3 spontaneously and linearly developing along Abatete Drive and Presidential Drive beside the Federal (Sites and Services) Housing Estate.

Federal Low Cost Housing Estate, Trans- Nkissi, Onitsha built in1990 and Ahocol Housing Estate Niger Drive GRA, Onitsha. It must be recalled that Awka and Onitsha cities are selected for this study out of the seven urban areas recognized by the Anambra State Government namely; Awka, Onitsha, Nnewi, Ihiala, Ekwulobia, Otuocha and Ogidi. Only these two cities (Onitsha and Awka) have developed public housing estates.
Below is the enumeration of public housing estates in the state with the dates of commencement:

Table 6: Showing Public Housing Estates in Awka and Onitsha Cities

AWKA CITY		
S/No	Names and Descriptions of Studied Public Housing Estates	Year of Establishment
1.	AHOCOL (Inner City Layout) Housing Estate (otherwise called the GRA), Amaenyi, Awka.	1990
2.	AHOCOL (Think Home) Housing Estate Phase 1 (or Ahocol 1), Awka	(1991)
3.	Iyiagu Housing Estate, Awka	1992
4.	Real Housing Estate, Awka	1992
5.	AHOCOL (Think Home) Housing Estate Phase 1 Extension (or Ahocol 2), Awka.	1993
6.	AHOCOL (Think Home) Housing Estate Phase 2 (or Ahocol 3), Awka	1995-2014
7.	Udoka Housing Estate, Obinagu, Awka	1996
8.	Oganiru Housing Estate Phases1&2 Awka	2005
9.	Ngozika Housing Estate, Ikwodiaku, Awka	2006
ONITSHA CITY		
S/No	Names and Descriptions of Studied Public Housing Estates	Year of Establishment
10.	Niger Bridge-head Housing Estate, Fegge, Onitsha	1980.
11.	Federal Low Cost Housing Estate, Trans- Nkissi Onitsha	1985
12.	AHOCOL Housing Estate, Niger Drive, GRA, Onitsha	1990
13.	. Federal (Site and Services) Housing Estate, Trans-Nkissi (or 33), Onitsha	1992.
14.	Akpaka Housing Estate, Onitsha	2008

The research questions on the following; spacious rooms, window, burglary protections, door burglary protections, roofing pattern, poor block work, nature of materials and attractive of building design were answered below.

Table 7 shows that the null hypothesis Ho was rejected because there is relationship between location and response. This is because P-value is less than α at 4 df and 0.05 level of significance (α) thus the conclusion is that there is difference in their response pattern, either Awka or Onitsha occupants responded more positively or negatively to design and construction of public housing. As chi-square does not show the direction of the difference analyses of mean of occupants' responses on design and construction of public housing are analysed using CATANOVA in order to show direction.

Data Presentation and Analyses

To assess the adequacy of environmental attributes of public housing, Chi-square test was adopted.

Table 7: Respondents' Opinion on Adequacy of Environmental Factors and Their Locations

Serial No.	Responses	χ^2 cal	DF	P-Value	Level of Significance(α)	Decision
40.	Landscaping of the Estate	84.443	4	0.00	0.05	Reject
41.	Layout of the Buildings	114.026	4	0.00	0.05	Reject
42.	Sewage Disposal	204.629	4	0.00	0.05	Reject
43.	Refuse Disposal	45.996	4	0.00	0.05	Reject
44.	Proper Fencing	139.947	4	0.00	0.05	Reject
45.	Drainage Channels	255.408	4	0.00	0.05	Reject
46.	Accessible Roads	207.835	4	0.00	0.05	Reject

Significant at 0.05 level of confidence

From Table 7 significant association exists between occupants' responses and their location except in the refuse disposal technique thus we reject the Ho: there is no association between respondents' opinion on adequacy of environmental factors and their locations because probability values (P-values) were less than their level of significance α. We therefore inferred that occupants' in one location (Awka or Onitsha) were more of the opinion that environmental attributes of the public housing estates were adequate.

Analysis of Average Response of Occupants on Adequacy of Environmental Factors

To analyse the mean response the respondents, the data required were obtained by averaging the responses to questions 40 to 46 in the QPH. CATAVONA was used as an analytical tool.

Table 8: Respondents' Observation on Adequacy of Environmental Factors of Public Housing and Occupants' Location

Location	SA	AG	UN	ID	SD	Total
Awka	51	96	28	48	76	299
Onitsha	71	222	0	68	136	498
Total	**122**	**318**	**28**	**116**	**212**	**797**

TSS = 384.887
RSS = 7.134
WSS = 377.753
χ^2_{cal} = 15. 533
$\chi^2_{0.95,4}$ = 9.488

The null hypothesis Ho is rejected because χ^2_{cal} (15. 533) is greater than $\chi^2_{0.95,4}$ (9.488). There is no association between location of respondents and their perception on adequacy of environmental factors. It is affirmed that significant association existed between occupants' perception of adequacy of environmental factors and their location. Therefore, the environmental factors were more adequate at one location than the other.

Test of Difference between Proportions

The data on adequacy of environmental factors was also as a result of pooling similar classes of data. Positive and negative responses were identified and classified with their proportions, while neutral response was treated as neutral. Positive responses are SA and Ah; neutral response was UN and negative responses were ID and SD.

Table 9: Test of Difference between Proportions on Adequacy of Environmental Factors

Locations	Positive	Neutral	Negative	Total
Awka	147	28	124	299
Proportion (Awka)	0.4916	0.0936	0.4147	1
Onitsha	293	0	204	498
Proportion (Onitsha)	0.5574	0.0481	0.3926	1

Significant at 0.05 level of confidence

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/Zcal/ = 1.804
$z_{0.005}$ = 1.64
Ho: = $\lambda_1 \leq \lambda_2$ Vs H1: $\lambda_1 \leq \lambda_2$

We reject the hypothesis that the proportion of occupants in Awka responding positively to adequacy of environmental factors is at most equal to the proportion responding positively in Onitsha because /Zcal/ (1.804) is greater than $z_{0.005}$ (1.64). We therefore, concluded that the proportion of occupants responding positively to adequacy of environmental factors in Awka was higher than the proportion in Onitsha. We inferred thus, that environmental factors in Awka were more adequate than in Onitsha.

Most governmental agencies, the Anambra State Waste and Management Agency (ASWAMA) charged with the waste management and the sanitation of these estates, the Federal Road Maintenance Agency (FERMA) and the Anambra State Road Maintenance Agency (ASRMA) have their headquarters and effective operational bases in Awka and seemed not to have given Awka more attention than Onitsha.

Respondents' observations generally showed environmental upkeep inadequate. The respondents both at Awka and Onitsha seem to have reservations on variables such as landscaping of the estates, refuse disposal, drainage provision and access roads which imply that the public housing estates studied lacked functional landscaping, efficient refuse disposal system, drainage and accessible roads

Landscaping of the estates could be considered adequate in the sense that the estates have master-plans which zoned land use and the appropriate and applicable standard building regulations with proper building lines and layout designs were employed. However there are distortions occasioned by flagrant disregard of the intendments of the document, more especially in community spaces such as green belts and recreational facilities which have been built upon.

Refuse disposal facilities are actually provided but the problem lies in the collection, transportation and disposal. Mountains of refuse can be seen dotting strategic locations of these estates, Federal housing Trans-Nkissi, and Bridge-Head at Onitsha, but the collection of refuse from most estates in Awka is also anything but prompt.

In perimeter fencing of the Estates, most estates can be said to have proper fencing except Udoka, Ngozika and all Ahocol estates. Nearby neighbourhoods encroach illegally on the estate lands. In most cases, it is difficult to differentiate between the actual estates and their immediate neighbours. In newly developed Ahocol estates namely Ahocol 3 and 4 there is no perimeter fence at all.

Drainage channels were provided in older estates but are almost completely clogged up with building debris, used and disused polythene bags of sachet water and assorted packages. There is evidence of lack of clearing and cleaning of the gutters and storm water lines by the government agency or by the residents themselves even on the so called environmental sanitation days. Cases of flooding abound especially in Niger-Bridge estate and Ahocol 3 and 4 that lack planned drainage channels.

Access roads are provided but are ill-maintained and in most cases non-existent. Most of estates have roads characterised by seasonal and un-tarred roads such as Federal Housing Trans-Nkissi, Akpaka in Onitsha and Oganiru, Ahocol estates 3 and 4 in Awka.

It could be concluded that the respondents perceived the environmental attributes of public housing in the area of study as undesirable but slightly better in Awka than in Onitsha.

They are reflective of respondents' perception on adequacy of environmental attributes of public housing. Various agencies such as ASWAMA, FERMA, ASERMA and even the Ministry of Environment contribute to occasional and seasonal environmental deficiency in the various estates studied in particular and Anambra State in general. This lapse is perceived by respondents as the precursor of environmental inadequacy.

Discussion

The above analysis deals essentially with the quality of infrastructural amenities within housing neighbourhoods. The quality of infrastructural amenities within public housing neighbourhoods, according to Hammer, Booth and Lovell (2000) must include spatial adequacy, sewage and waste disposal, air pollution and ease of movement, and landscaping, noise and pollution control as well as security, among many others as relevant quality determinants in the environment of housing. The result of this study with reference to research question four indicates that the various respondents agree that the environmental attributes did not meet their expectations and yearnings. It will be recalled that the report of UN-Habitat (2002) stated that the major cities in Anambra state are marked by poor and worsening road networks, walkways, unregulated building patterns, poor hygiene. Aneze (2009) also reported that there are inadequate and inefficient refuse disposal systems in Nigeria. He also stated that subsidized infrastructure such as water, sewage, electric supply, roads, surface drainage and social institutions are always either absent or in poor state of disrepair. These public housing estates are well designed and planned and could be seen as model with pre-occupancy built facilities to deal with these environmental deficiencies. The servicing of these estates has been the greatest undoing. From the respondents' free comments it does appear that perhaps, ASHDC/AHOCOL would be excused from some of the problems in that the governments (Federal and State) may have failed to provide the requisite sites and services promised at the outset of these projects as in Federal Housing, Trans-Nkissi.

Again, governmental agency, the Anambra State Waste and Management Agency (ASWAMA) charged with waste management and the sanitation of these estates may have been everything but efficient. In terms of roads, the Federal Road Maintenance Agency (FERMA) and the Anambra State Road Maintenance Agency (ASRMA) have an uphill task maintaining the existing roads. According to respondents' comments there is a crying need to remove waste as often as possible by Anambra State Waste and Management Agency (ASWAMA) and on time. The findings of this study suggest that respondents agree that the environmental amenities in their various estates were deficient because of poor management of the various public housing estates. These findings agree with the findings of UN-habitat (2002) and Aneze (2009) that most cities in Anambra State are environmentally insufficient and inadequate. Onibukun, (1973) and Muoghalu, (1989) maintain that there is an always and almost environmental deficiency in most housing estates and ranked satisfaction with the various dimensions of housing. Various agencies such as, ASWAMA, FERMA, ASERMA and even Federal and State Ministries of Environment should share in this poor environmental performance in the various estates studied.

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