

Evaluation of Residents' View on Affordability of Public Housing in Awka and Onitsha, Nigeria

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Abstract

The perception of the occupants in public housing estates in Awka and Onitsha towns in Anambra State was evaluated using Adam's Equity Theory that hinges on balancing inputs and outputs. The thrust of this study lies on affordability. The survey of the study area revealed 2,805 occupants comprising mainly housewives and 2,805 house units. The sample size, derived from Taro Yamani technique was 842 and from this figure, stratified random sampling was adopted to arrive at the obtained data. Complete responses were 797 comprising 299 occupants in Awka and 498 occupants in Onitsha. A 21-item structured questionnaire on public housing (QPH) consisting of six (6) sections was developed, which consisted of 5-point Likert rating scale ranging from 1-5 in which respondents indicated the extent of their perception of 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. A pre-test on a sample of 30 respondents of one non-studied public housing estate was conducted. 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 using Z-test. The results of this study show that (1). The 49.3%, of occupants responding positively to affordability of public housing in Onitsha is greater than the 44.5%, responding positively to it in Awka. It can then be stated from this work that in planning a housing estate such checklists as affordability, should be included so as to satisfy the major stakeholders and the occupants.

Key terms: Evaluation, view, affordability (in terms of cost of housing), public housing, Nigeria.

INTRODUCTION/MILIEU

Ndubueze (2009) showed very high levels of housing affordability problems in Nigeria with about 3 out of every 5 urban households experiencing such difficulties. Significant housing affordability differences between socio-economic groups, housing tenure groups and states in Nigeria were also noted. Since public housing is housing for which the associated financial costs are at a level that does not threaten other basic needs and represents a reasonable proportion of an individual's overall income. The evaluation of these public housing estates in Awka and Onitsha in terms of housing affordability had become an issue. This study analyzed if the households in the public housing estates studied were experiencing affordability problems of expending more than the internationally and nationally prescribed 30% of a households' income on housing at this micro-level.

The current national housing policy (1991 as amended in 2006 and 2012) de-emphasised government participation in housing provision and this policy does not allow the country's full potential for tackling its serious affordability problems to be realised hence, the praiseworthy 'housing for all' target of the strategy has remained indefinable. Nigerian socio-economic realities insist far more dynamic government taking part in housing development, working with a more dedicated private sector, energised civil societies and empowered communities to tackle the vast housing problems of the country (Ndubueze, 2009 and Eni, 2014).

An attempt has been made here to also discuss the existing housing affordability concept and related literature in Nigeria. According to Whitehead, (1991) and Swartz and Miller, (2002) the term housing affordability has gained currency in the last two decades replacing 'housing need' at the centre of debate about the provision of adequate housing for all. If this is true, then all publications of 1970s' and 1980s' based on housing needs are therefore superseded and non-operational. According to Fallis (1993), this move could be attributed to the increasing adoption of more market-oriented reforms within the housing sector in many countries. According to Ndubueze (2009) the term (housing) affordability simply implies the ability to afford housing. Housing delivery is usually targeted at home-ownership or tenancy. Homeownership is regarded as the act of possessing both rights to occupy housing and also to own it, while tenancy is intended to provide temporary living accommodation (Buddenhagen, 2003). A tenant is therefore a person possessing the right to occupy land or housing but does not own it.

However, beyond this point, any attempt to specifically characterize and tackle the concept of affordability becomes slippery. A survey of literature revealed a lack of consensus among academics and housing development experts on how it should be defined and measured. This may be attributed to the fact that housing affordability is a contested issue in which dissimilar groups struggled to impress their own description and solution on the problem (Gabriel et al., 2005). The ambiguous nature of affordability was aptly captured by

Quigley and Raphael (2004) who stated “affordability...jumbles together in a single term a number of disparate issues”...

At the level of national policy, despite the common use of such terms as “affordable housing” and “housing provision at affordable costs” most governments have often been reluctant to unambiguously define affordability within a policy framework (Bramley, 1994). The major problem is to operationalise these definitions.

Major approaches of housing affordability include (1) the Housing Cost Approach, (2) the Non-Housing Cost Approach, (3) the Quality-Adjusted Approach and (4) the Affordability Mismatch / Gap Approach.

Housing Cost Approach

Housing cost approach as affordability indicator was adopted for this study because of its perceptive nature and its seeming simplicity in usage and uncomplicated outlook. Housing affordability indicator captured this concept better.

The housing cost approach popularly referred to as the housing ratio or expenditure-to-income approach is the most common measure of housing affordability. This approach has its origin early in the turn of 20th century in North America when mortgage lenders began to use it and later when private landlords adopted it as part of their assessment and selection criteria (Feins and Lane, 1981; Gilderbloom, 1985 and Hulchanski, 1995). This approach simply conceives housing affordability as the measure of the ratio between what households pay for their housing and what they earn. A ‘rule of thumb’ standard of no more than 25% (or sometimes 30% and higher) of household monthly income being spent on housing costs is deemed appropriate and affordable. Contrary to any technical or scientific justification, the 25% affordability bench-mark was gradually developed and accepted over time based on elements of social values and existing historical and institutional structures. In tracing the chronological review of its source, Feins and Lane (1981), observed that this tradition was entrenched in common wisdom and experience in America where by the end of the 1930s the perception was generally accepted as a way to describe actual family housing expenses and a standard for the maximum proportion of income that should be devoted to mortgage payments. There are two variants of expenditure-to income approach namely (a) price-to-income ratio (for assessing the housing affordability of homebuyers) and (b) Rent-to-Income (ratio for rental households).

House Price-to-Income Ratio

House price-to-income ratio is a widely used affordability ratio, which specifies the level of the median free-market price of a dwelling unit relative to the median annual household income. As housing expenditure tends to rise with house prices, many analysts have relied directly on this ratio as a measure of housing affordability. This is generally based on the fact that house price is a key determinant of home ownership affordability. In this sense, the house price to income ratio seems to be particularly suited to advanced capitalist economies with developed financial mortgage markets, high levels of ownership and distinct effective policy support for it (Ndubeze 2009 and Eni 2014). Generally, home ownership affordability is difficult to measure and interpret due to the fact that the tax and investment elements of homeownership weaken the relationship between ongoing cash outlay and housing expense in a true economic sense.

Rent-to-Income Ratio

Similarly, rent-to-income ratio measures rental-housing affordability. It is the most conventional of all housing affordability indicators especially in those circumstances where the interest of the analyst or policymaker is in what might be termed the very limits of affordability (Ndubeze 2009 and Eni 2014). The model presupposes that affordable rental-housing should cost no more than a certain percentage (usually about 25-30%) of household's monthly income. Despite its seeming simplicity and uncomplicated outlook, there has been considerable debate about the exact formula that should be used in calculating the ratio (Hulchanski, 1995; Boelhouwer and Menkveld, 1996; Freeman et al., 1997; Landt and Bray, 1997). This has led to the development of many housing affordability indicators.

Basic Non-Housing Cost Approach

This is an alternative approach that conceives housing affordability from a basic non-housing consumption perspective. It has developed over the years with variants of different names, such as the ‘residual income-based’ approach, ‘shelter poverty’ approach, ‘after-housing poverty’ approach, and ‘market-basket’ approach (Ndubeze 2009 and Eni 2014). Initially, this approach was developed from debates and discussions around social security systems and household budget standards, which were essentially outside housing. It has ever since drawn the attention of many academic commentaries particularly in relation to merit goods discourse (Freeman et al., 1997 and (Ndubeze 2009).

Quality Adjusted Approach

Housing affordability is also essentially concerned with the quality of housing and its appropriateness to the households in it (King, 1994 and Karmel, 1995). In studying housing cost within an area, it is common to compare houses of similar conditions and amenities, size, numbers of bedrooms and location. It is also known that households looking for or moving to new housing are forced to make trade-offs between what they actually desire and what they can afford to pay (especially if they have limited income). This could at times lead to high ratio associated with households with strong preferences for housing (Ndubeze 2009 and Eni 2014).

Housing Affordability Gap / Mismatch Approach

This approach attempts to measure and highlight housing shortages, or mismatch or gaps within the housing market by comparing the number of a given group of housing consumers with the number of housing units they can afford. In considering both housing demand and supply of housing, the approach compares existing cost distribution with distribution of household incomes. In so doing, it identifies what the housing consumers can afford to pay not in relation to the housing they currently occupied but in relation to overall housing stock (Dolbeare, 1991; Lazere et al., 1991; Joint Centre for Housing Studies, 1992; Nelson, 1994; Bogdon and Can, 1997 and Ndubeze, 2009). To develop this ratio, households are classified into several relative categories based on their income and size. Housing units are also classified into different affordability categories, by assuming that households of a certain size would occupy the unit, paying no more than specified (30%) or determined amount of their income for rent. Thereafter, these categories are matched against the categories of housing units with the derived ratio taken as the housing units potentially affordable to households of a certain income to the number of households in that income range (Ndubeze 2009 and Eni 2014). A less than 1.0 ratio suggests that there are fewer housing units affordable to households in a given income group than there are households in that group. Given the fact that some units within a given group would likely be occupied by some higher-income households, a ratio of slightly more than 1.0, tends to indicate that those in such income group may have difficulty in finding adequate and affordable housing (Bogdon and Can, 1997).

Towards a Composite Approach

Given the complexity of the housing affordability concept, no single standard of housing affordability is accurate for all situations. As a result, a lot of efforts have been made by many researchers, academics and policy makers to develop housing affordability indicators and measures that capture this concept better. This has led to the development of many housing affordability indicators and measures emphasising different aspects of affordability with varying restrictions. This study adopted the housing cost approach because it captured this concept better than the rest. To tackle the assessment of these public housing provisioning attributes; affordable public housing is a welcome, relieves accommodation burden, enriches the well-placed further, is affordable to those that cannot build their own and to medium income group, is an avenue for acquisition of housing/land by connected people, is a means of extortion and entails minimal cost. A frame of reference that identified these areas were established inform of an aim and objectives.

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). determine the perception of the occupants of the housing estates in Awka and Onitsha on the affordability of their public housing.

A null hypothesis: There is no significant relationship between occupants' response on the affordability of public housing in terms of housing cost in the two locations.

Theoretical Framework

The theoretical perspective of this study was hinged on the proposal of 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 Theory acknowledged 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 (Eni, 2014).

The system was composed inputs, throughputs and outputs, which illustrated a generic framework for affordability factors of public housing using Adam's equity theory.

This assessed the balance or imbalance that currently existed between the public housing occupant's inputs and outputs, as follows:

Outputs typically include: rewards (such as homeownership or rental) intangibles that typically include: recognition, reputation, sense of achievement, sense of advancement/growth and tenure security, while 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 (Eni, 2014).

Further 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.

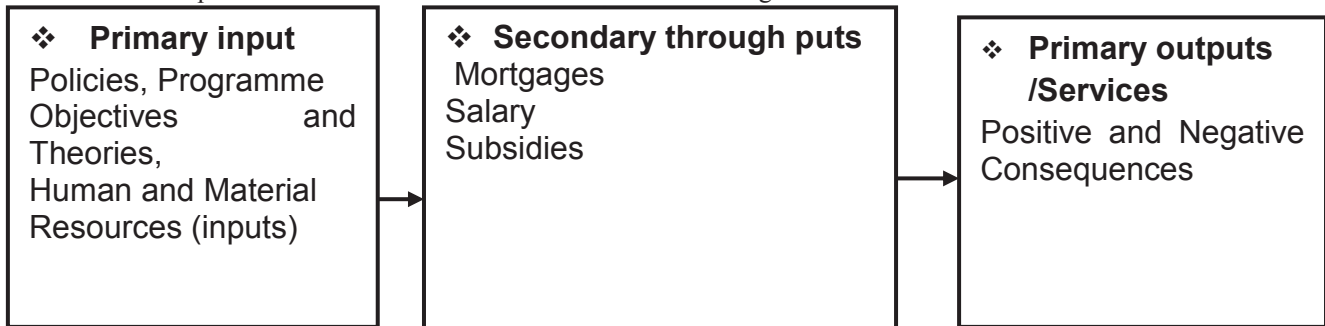


Fig. 1 Framework for Design and Construction of Public Housing

From fig. 1 above the various physical criteria, such as the design parameters and the construction quality served as inputs into public housing, throughputs, with the public housing viewed as human activities constituted processes that interplayed and exacerbated the physical parameters as positive and negative consequences (Eni, 2014).

Housing delivery strategies relate to activities, events, processes or functions engaged in the transformation of housing policies, programme objectives and theories, human and material resources (inputs) into housing units and services (outputs). These included different approaches used in realising programme objectives as well as the participants and resources involved in public housing provisioning. Participants in this milieu represent the organisational structure for public housing provision (Eni, 2014). They comprised public and private organizations involved in public housing provisioning whose actions influenced the input, process, output and outcomes of public housing activities. (Lusthaus et al., 1995; Lusthaus et al., 2002) indicated that organizational performance in product and service delivery was influenced by organisational capacity and the external environment. Therefore, organizational capacity described the ability of organizations to successfully use their skills and resources to provide goods and services and in this circumstance affordability of public housing. However the internal organizational (intervening) factors that influenced organizational capacity such as leadership style, human and material resource, finance, infrastructure, service management, and housing project process management were central in the assessment of organisational capacity.

In this regard, 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. Equity was measured by comparing the **ratios** of contributions and benefits of each person within the relationship. With regards to affordability, there is the basic cost of housing and non-basic housing cost. Low income households could be experiencing problems with housing affordability for two alternative reasons. The first was that these households, because of their low income, were finding many of the essentials for daily life to be unaffordable, including housing, food, and clothing. Thus, their income was low relative to the general cost of living in society and these households have an income problem rather than a specific housing problem. The second was that the cost of renting or owning a house was very high therefore unaffordable (Eni, 2014).

The Study Area

The study area, Awka and Onitsha cities, are located in Anambra State of Nigeria (See fig. 2.). 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. 2. Relative position of Nigeria in the world map.

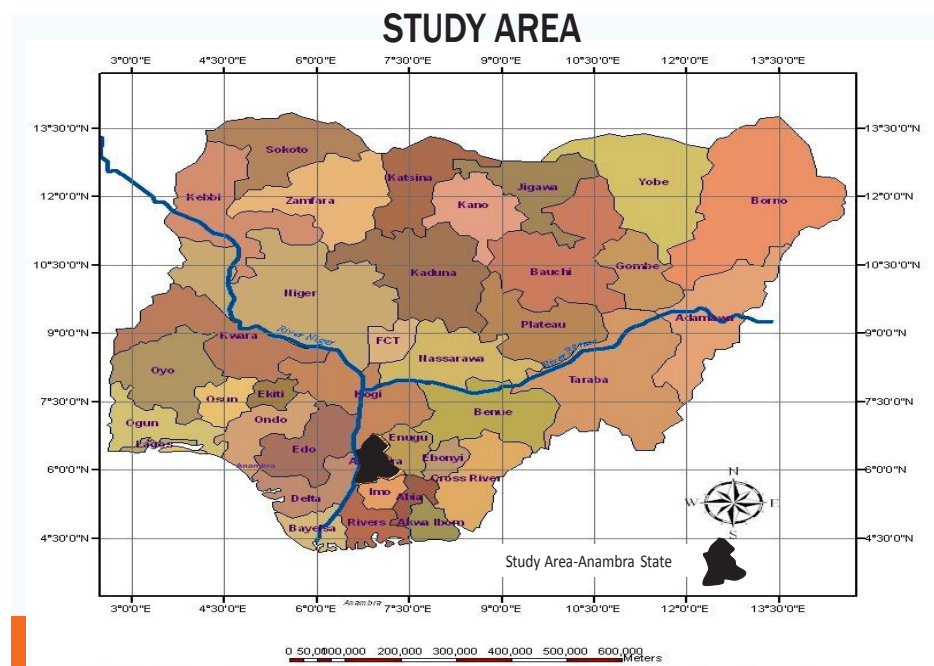


Figure 3.1 Map of Nigeria, showing Anambra State (Study Area)
 Source: National Space Research and Development Agency

Anambra State of Nigeria is the second most densely populated state in Nigeria after Lagos State. It has a 2006 population of **4,182,032** with a density of 860 persons per square kilometres (km²) and is ranked 10th out of the 36 states in Nigeria in terms of total population (National Population Commission, 2006 and National Bureau of Statistics, 2008). It is located between Lat. 9°4'N and Long. 7°29'E and Lat. 9.067°N and Long. 7.483°. According to UN Habitat (2009), it has a total land area of 4,865km² (1,870.3sq m) ranking 35th out of the 36 states in Nigeria in land area. With an annual population growth rate of 2.21 per cent, Anambra State had over 60% of its people living in urban areas, making it one of the most urbanized places in Nigeria (UN Habitat, 2009). According to UN Habitat (2009), it had Gross Domestic Product (GDP) of \$6.76 billion and a per capita of \$1,585 by 2007. Male and female components of the population of Anambra State are 2,174,641 and 2,007,391 respectively, totaling **4,182,032**.

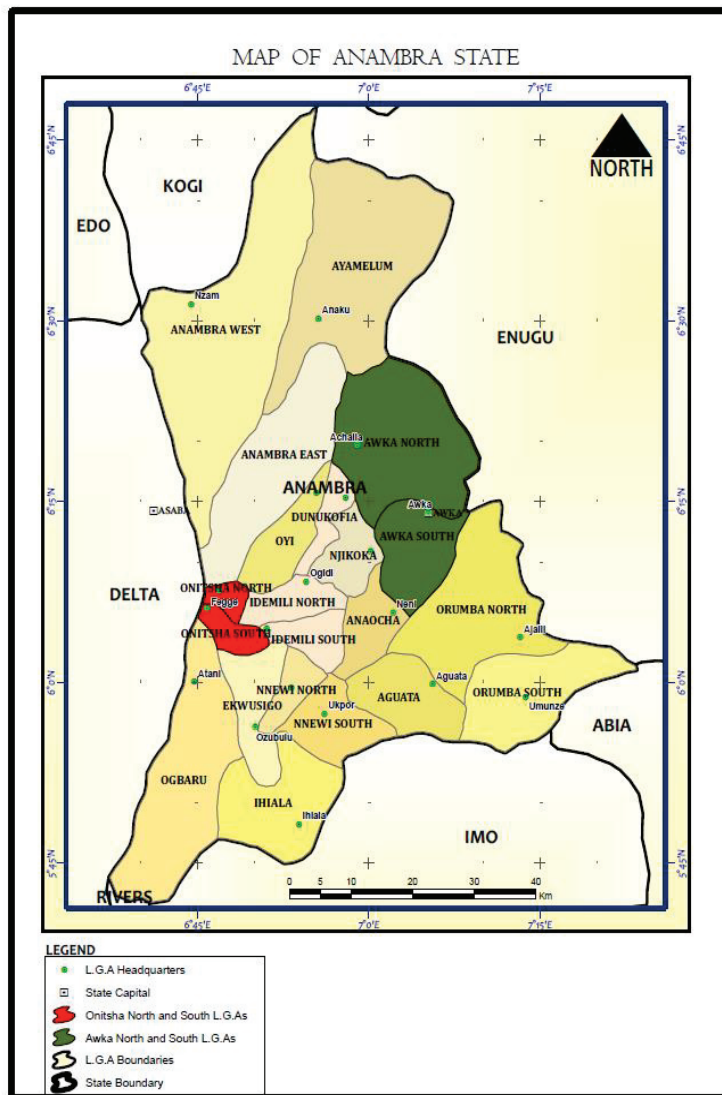


Fig. 3.2: Map of Anambra State Showing the Study Area.

Source: Adapted from Nwabu, (2010) Google Maps.

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. 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 city at approximately 90,573 for the year ended 2007 and **375, 000** persons in 2010.

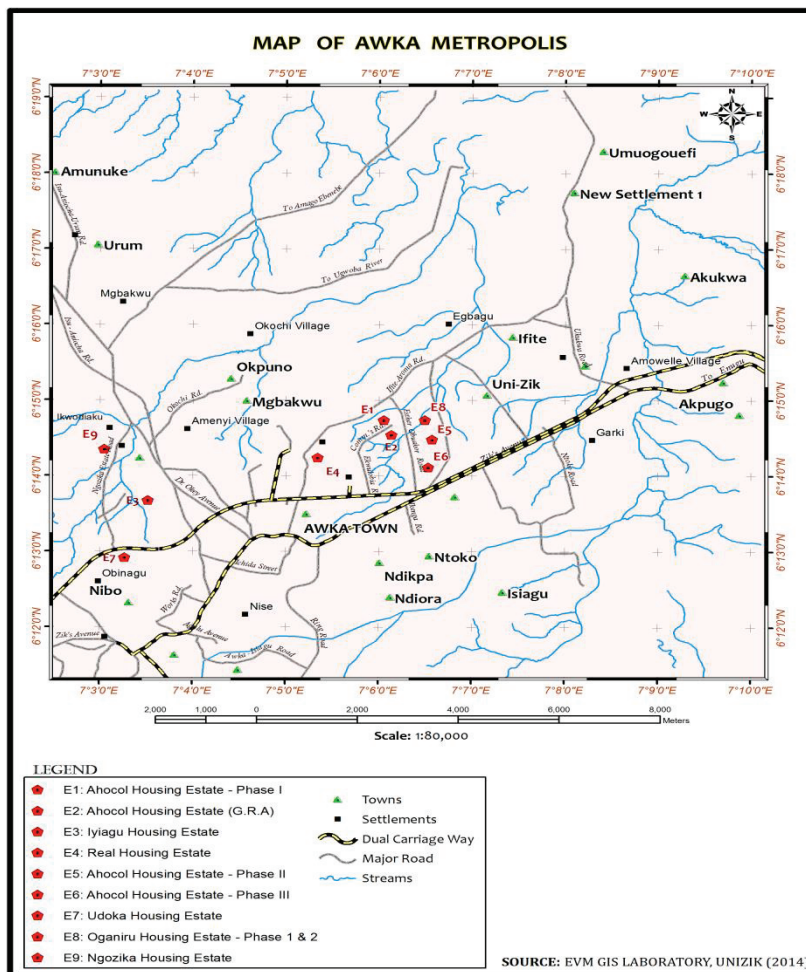


Fig. 3.3: Street Map of Awka Metropolis viewing Public Housing Estates.
 Source: Environmental Mgt GIS Lab NAU, 2014.

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 and 7°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(See fig. 3.6). 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).

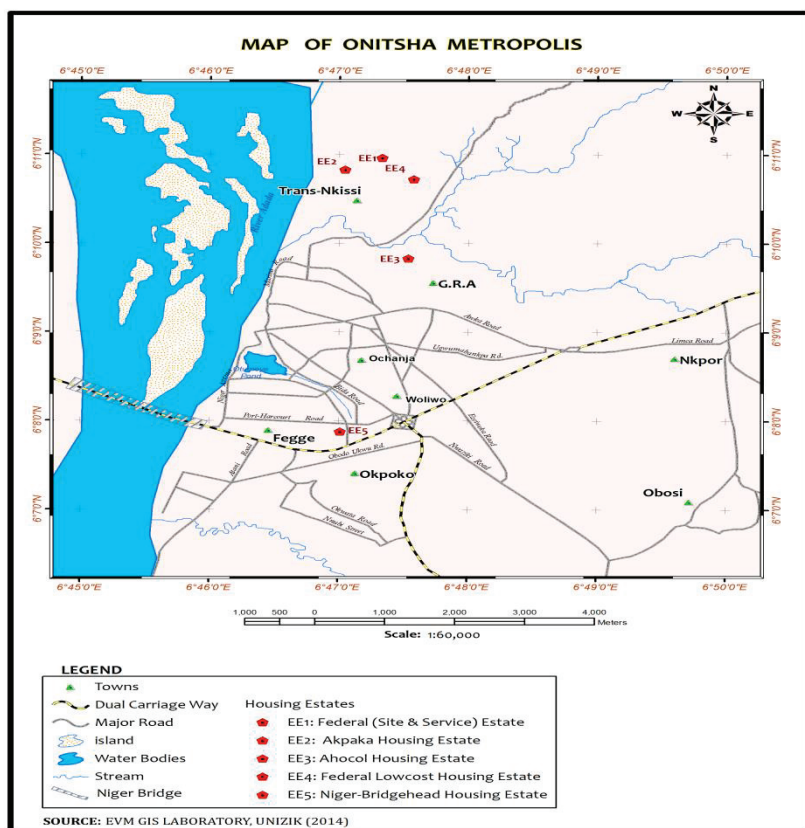


Fig. 3.4: Map of Onitsha City Showing Locations of the Public housing Estates
 Source: EVM GIS Laboratory, Unizik, (2014).

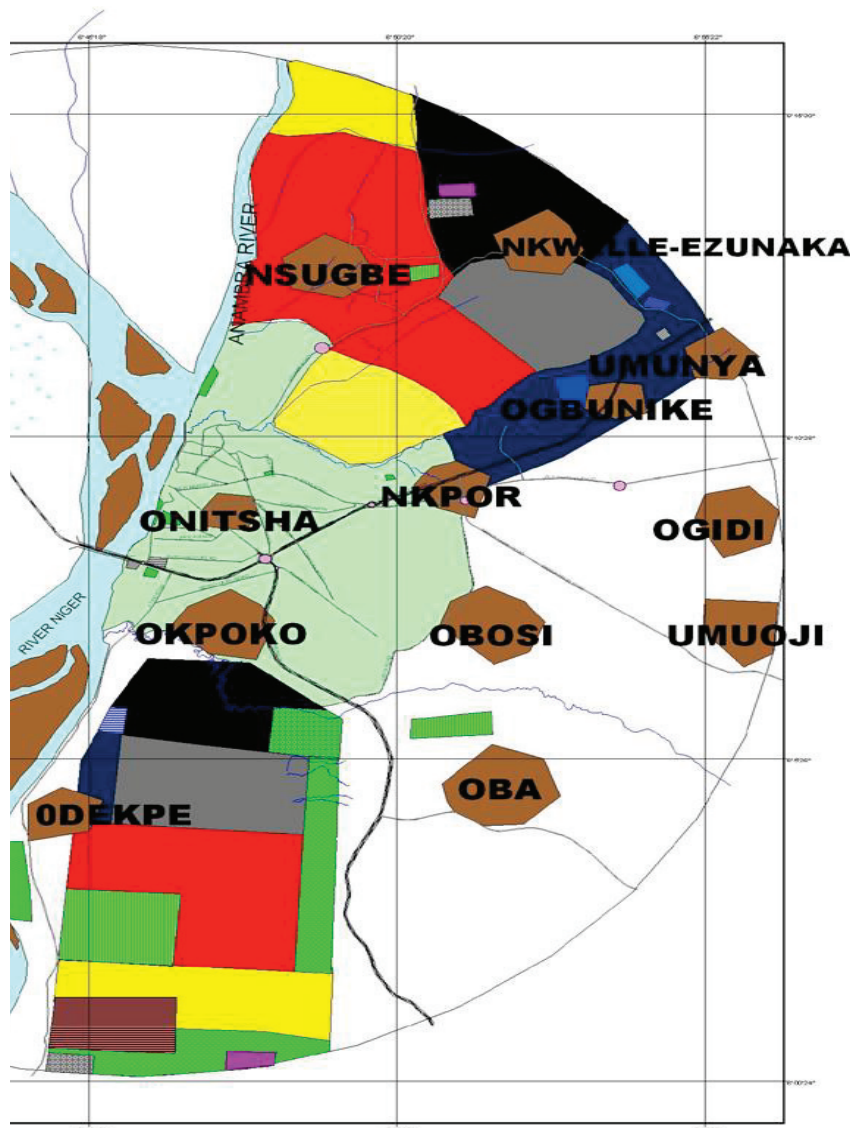


Fig.3.5: Map of Onitsha City Showing Neighbouring Communities.
 Source: Adapted from Google Map, 2011.

Method of Data Collection

A 20-item structured questionnaire on affordability was developed. Section A had open-ended questions or unstructured responses which were used to elicit from respondents why they chose a particular scale which tapped preliminary / personal information such as data bordering on demographics 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 units in the 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 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 housewives, and secondly, 2,805 house types, comprising 1,032 in Awka town and 1,773 in Onitsha town. 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 non studied housing estate. Out of a total of 842 respondents, 797 responded representing 94.7% complete responses. A stratified random sampling of these disparate public housing estates was studied as shown in the distribution table below;

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

Parameters	Name of Estate									Housing Units
	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%

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

Parameters	Name of Estate					Housing Units
	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%

Samples of respondents were chosen from each estate in proportion to its population.

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). The scaling was as follows; SA = Strongly Agree =5 points, AG = Agree =4 points, UN = Undecided =3 points, ID = Disagree =2 points, SD= Strongly Disagree = 1 point.

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.

Two 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.

Table 3: Contingency Table Analysis (CTA) Data format

Levels of First Variable of Classification	Levels of second variable of classification					Total n _{i.}
	1	2	3	...j...	C	
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.}
:	:	:	:	:	:	:
Y	D _{Y1}	D _{Y2}	D _{Y3}	...n _{Yj...}	n _{Yc}	n _{Y.}
Totals n _j	n _{.1}	n _{.2}	n _{.3}	...n _{.j...}	n _{.c}	n _{...}

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 n_{i.} (i=1, 2...Y) 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.

Under the number hypothesis of independence,

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

The corresponding expected frequency, e_{ij} , under the null hypothesis, H_0 , is then obtained by multiplying P_{ij} by the total frequency n_{ij} that is 1.

$$e_{ij} = n p_{ij} \times n_{oo} = \left(\frac{n_{i.}}{n} \times \frac{n_{.j}}{n \dots} \right)$$

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

If we represent observed counts (frequency) by O_{ij} such that $O_{ji} = n_{ij}$, other entries unaltered, the test statistics

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

follows chi-square distribution with $(r - 1) (c - 1)$ 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 $\chi^2_1 \alpha, (r - 1) (c - 1)$, the null hypothesis of independence is rejected at the α level of significance; otherwise the null hypothesis is accepted.

Source: (Oyeka, 1996:361-362).

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

$$\chi^2_{1-\alpha, (I-1)(J-1)} \text{ and the null hypothesis is rejected is } \chi^2_{\text{cal}} \leq \chi^2_{\text{tab}}$$

$$RSS = \sum \frac{n_{ij}^2}{n_j} - \frac{n_{ij}^2}{n}$$

$$= C_j - C_i$$

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

$$= n - C_i$$

$$WSS = TSS - RSS = n - C_j$$

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

Test of Difference between Two Population Proportions

To test the null hypothesis, H_0 , 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. λ_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.

$$i p_1 - p_2 = \frac{\lambda_1 \sqrt{1-\lambda_1}}{n_1} + \frac{\lambda_2 \sqrt{1-\lambda_2}}{n_2}$$

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

$$i p_1 - p_2 = \frac{\sqrt{P_1(1-P_1)}}{n_1} + \frac{P_2(1-P_2)}{n_2}$$

Therefore,

$$\frac{(p_1 - p_2) - (\lambda_1 - \lambda_2)}{\sqrt{\frac{P_1(1-P_1)}{n_1} + \frac{P_2(1-P_2)}{n_2}}}$$

which has approximately unit normal distribution. For a one-sided test H_0 : is rejected at the α level of significance, if $|Z| > Z_{1-\alpha}$

Data Analyses, Presentation and Discussion

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% (348).
- 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.

The following research questions were answered;

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

List of Public Housing Estates

Nine public housing estates were acknowledged and described in Awka city provided by both the Federal and State governments while five such public housing estates provided by the same governments were identified and described.

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

II). determine the perception of the occupants of the housing estates in Awka and Onitsha on the affordability of their public housing in terms of housing cost?

and hypothesis 1. H_0 : There is no relationship between occupants' response on the affordability of public housing (in terms of housing cost) were answered below.

Evaluation of Occupants' Response on the Affordability of Public Housing in One Location compared with Opinions of the other.

To answer this research question, Chi square test was performed.

Table 7: Observed Frequency for Occupants' Response on the Affordability of Public Housing

Serial No.	Responses	χ^2 cal	DF	P-Value	Level of Significance(α)	Decision
13.	Affordable Public Housing is a Welcome Development	215.659	4	0.00	0.050	Reject
14.	Public Housing relieves Accommodation Burden	88.814	4	0.00	0.05	Reject
15.	Public Housing Projects enrich the Well-placed further	235.557	4	0.00	0.05	Reject
16.	Public Housing is affordable to those that cannot build their Own	171.141	4	0.00	0.05	Reject
17.	Public Housing is affordable to Medium Income Group	243.365	4	0.00	0.05	Reject
18.	Public Housing is an avenue for acquisition of Housing/Land by Connected People	89.781	4	0.00	0.05	Reject
19.	Public Housing is a means of Extortion	117.485	4	0.00	0.05	Reject
20.	Public Housing entails Minimal Cost	174.197	4	0.00	0.05	Reject

Significant at 0.05 level of confidence

From Table 7, the null hypothesis- that there is no dependence on the occupants’ response on the affordability of public housing in terms of housing cost in one location than the occupants’ opinion in the other is rejected, because P-value was less than the Level of significance(α). The conclusion then was that a significant relationship existed between respondents’ location (Awka or Onitsha) and the respondents’ opinion on whether building of public housing was affordable. Therefore the inference was that the occupants in one location were more in support of building affordable public housing.

Response of Occupants on Affordability

In order to investigate average responses of occupants on affordability, the data were obtained by the mean responses in questionnaire items 13 to 20. The analytical tool used was analysis of variance for categorical data (CATANOVA).

Table 8: Occupants Location and Perception on Affordability of Public Housing

Location	SA	AG	UN	ID	SA	Total
Awka	52	81	43	78	45	299
Onitsha	157	109	42	76	114	498
Total	209	190	85	154	159	797

TSS = 373.656
 RSS = 18.585
 WSS = 355.071
 $\chi^2_{cal} = 33.593$
 $\chi^2_{0.95,4} = 9.488$

Ho is rejected: There is no relationship between occupants’ response on the affordability of public housing (in terms of housing cost) and location of respondents because χ^2_{cal} (33.593) is greater than the table value $\chi^2_{0.95,4}$ (9.488). The conclusion was that occupants’ response (perception) was dependent on location (Awka or Onitsha). Public housing was more affordable than at another place.

Test of Difference between Proportions

The data on affordability were similarly obtained by pooling positive responses (SA and AG) for each category of occupants (Awka and Onitsha) as positive responses and all negative responses (ID and SD) as negative responses. Their proportions were obtained and filled below as pooled counts and undecided responses were left as neutral.

Table 9: Test of Difference between Proportions on Affordability

Location/Response	Positive	Neutral	Negative	Total
Awka	133	43	123	299
Proportion (Awka)	0.445	0.144	0.411	1
Onitsha	266	42	190	498
	0.493	0.156	0.352	1

Ho: = $\lambda_1 \leq \lambda_2$
 H1: = $\lambda_1 > \lambda_2$
 $|Z_{cal}| = 1.472$
 $Z_{\alpha} = 1.64$

Again Ho: That the proportion responding positively in Awka is at most equal to the proportion responding positive in Onitsha is accepted because $|Z_{cal}|$ (1.472) is less than Z_{α} (1.64). It was concluded that the proportion of positive response in Awka was higher than the proportion of positive response in Onitsha. The decision became that public housing was more affordable to occupants in Awka. In Awka public housing estates,

affordability model which recognised the dynamic relationships among income and income distribution, family size, housing consumption of various income groups, cost of, and access to credit was used. For example Iyiagu Estate in Awka is divided into three namely; Members of the State House of Assembly area, high level Civil servants quarter and low income section. Consequently, public housing estates of different categories were built and targeted at different income groups. High-brow areas for high level income earners are also carved such as Udoka Estate, Ahocol Estates 2 and 3 etc. Also this underscored the importance of spatial aspects of effective targeting of housing provision, coupled with the provision of serviced plots and sites for prospective homeowners. All these contributed in making public housing in Awka more affordable than in Onitsha.

Discussion

From respondents' comments, public housing have relieved accommodation burden of the cities studied especially the older estates such as Bridge-Head at Onitsha and Iyiagu, Real Estate, Ahocol estates 1 and 2 in Awka. The beneficiaries of this relief were the renters who cannot build their own houses however some respondents felt that policy should be revisited in order to eliminate politicisation of housing and other problems associated with allocative mechanism in order to make public housing more affordable.

Their perception on friends and relatives in the data set on issues of policy, projects politics explained the moderate influence of well placed government officials who indulge in land speculation. This introduced the element of corruption in the affordability of public housing through fraudulent allocation to political party loyalists, government officials, cronies and relatives who have no business with housing (Eni, 2014). The respondents argued that this politicisation of allocation of housing was an important issue in developing more affordable public housing.

From the demographics, greater percentage of the respondents seemed satisfied with extent of public housing affordability. The distribution of the respondents on the percentage of income spent on housing alone showed that more than 90% of the respondents were satisfied with the rent / accommodation expenditure, while the rest seemed to be dissatisfied with their housing expenditure.

Most respondents agreed that housing was affordable; this result was in consonance with the findings on research question 2. There was also a progressive trend of basic housing affordability which favoured the high income cadre. Generally, home ownership affordability was difficult to measure. However, there were also some advantages in the use of this housing cost approach, which have sustained its popularity over the years. The house price- to-income ratio was easy to calculate and understand. The data required for calculating the ratio were also readily available from official sources in many countries even in Nigeria with weak data base resources. According to Ndubeze (2009), the ratio was also amenable to use in comparative studies across different areas and over different periods.

Affordability is very much an environmental management issue as it is an indicator of poverty and deals with the exclusion of the poor in housing. It is a justice and human rights issue. Again affordability is an indicator of sustainability as it deals with access to resources especially housing resources. It therefore demands to be discussed in order to facilitate the provision of public housing of different categories targeted at different income groups.

Housing cost method showed whether respondents' expenditure on public housing alone exceeded international and local benchmarks of 30%. In other words, it showed whether the respondents were having problem with public housing or not.

The perception of respondents was sought on their rental/ accommodation expenditure in terms of satisfactory levels. Fifty nine respondents (7.40%) were very satisfied, 315 respondents (39.52%) were satisfied, 399 respondents (50.06%) were fairly satisfied, while 15 respondents (1.88%) reported being dissatisfied and 9 (1.22%) were very dissatisfied. It then means that 772 or 93% out of 839 respondents were satisfied with the amount they spent on housing, while 68 (8%) were dissatisfied with their housing Eni, 2014.

Contrary to assumptions of Onyike (2007), that only civil servants on Salary Grade 13 and above in the federal service and, on Salary Grade 16 and above in the Imo State Civil Service, (using the 2007 17-point salary scale) can afford the cheapest bungalow at 6% interest repayment rate in Owerri. The studied public housing estates were affordable because the occupants were not expending the both international and national benchmark of 30%. One may not correctly judge with this assertion because most of the respondents in this study were not mortgage payers.

Feins and Lane (1981), Guiderbloom (1985) and Hulchanski (1995) and Gans, 2003) posited that not more than 30% of household monthly income should be spent as housing cost. Guided by this stipulation and its application and considering housing problem alone, then there is no housing affordability problem in both Awka and Onitsha though the level of affordability differed.

Table 9: Comparison of Price to Income and Rent to Income and Income Spent on Other Household Needs.

Serial No. (a)	Percentage(b)	Price to Income and Rent to Income(c)	Percentage of Respondents(d)	Income Spent on Other Household Needs(e)	Percentage of Respondents(f)
1.	0-20%	175	21.96%	217	27.22%
2.	21-30%	368	46.17%	278	34.89%
3.	31-40%	254	31.87%	248	31.11%
4.	41-50%	Nil	0.00%	54	6.78%
5.	Above 50%	Nil	0.00%	Nil	0.00%
	Total	797	100	797	100

From Table 9 it is clear that 543 or 64.72% of the sampled respondents have affordable housing by the applicable benchmark of 30% of income while 254 or 31.87% respondents spent about 30% on non-housing needs.

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