



## Original Research Article

# FLEXIBLE HOUSING: IMPROVING SUSTAINABLE HOUSING DEVELOPMENT IN BENIN CITY, EDO STATE, NIGERIA

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### ABSTRACT

*The increasing challenge in Nigerian urban cities necessitates an alternative approach given paucity in housing supply caused by inadequate resources. With flexible housing, resources can be conserved in solving housing problems. This study investigates the housing issues that have not met flexibility standard in Benin City, Edo State, Nigeria in order to suggest ways of improving flexibility, thus fostering sustainability. In the study, 30 residential houses were sampled from each of the three prominent areas (Government Residential Area, Ekehuan and Okhoro) in the city. The result was obtained using physical observation and interview with the housing unit heads. The result was analyzed with the use of frequency counts and mean values. The study revealed low extent of flexibility on the properties surveyed. Most of the properties were built without consultation with qualified professionals neither were they approved by planning authorities. The study concluded that there is need to consider functional adaptability in housing design, mandate developers to adhere strictly to building codes and regulations and integrate housing estate into city planning. This will ultimately lead to sustainability and functional efficiency of both buildings and the built environment, thereby addressing housing issues and restore 'urban orderliness' to the City.*

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## 1. INTRODUCTION

The issue of housing is of paramount concern to governments across the globe. Since man has gone through a transition from the primitive to modern age, the issue of delivering a suitable shelter for him is of utmost importance. Ademiluyi and Raji, (2008), Aribigbola, (2006), Balchin and Rhoden, (2002), Charles, (2003), Kabir, (2004), Mtafu et al. (2011) and Onibokun, (1990), have reported that housing issues cannot be completely eliminated. Even

the developed countries have not been able to completely eliminate these housing issues as there are still pockets of homeless inhabitants without shelter.

In Nigeria, the issues of slums and squatter settlements, forced eviction and homelessness are frequent occurrences in major urban centers like Lagos, Kano, Port Harcourt, Federal Capital Territory, Kaduna, Ibadan, Owerri and Benin City. Furthermore, with a population of 177.5 million inhabitants as at 2014 of which 47% of these inhabitants resides in urban areas, the housing issue is only expected to become extremely cumbersome to handle (World Bank, 2016). Falade (2007) submitted that assuming a yearly population growth of 2.8% and all other issues being met, above 62% will be residing in city centers in Nigeria by year 2020. Habitually, the housing sector performance is one of the touchstones by which the well-being of a country is measured (Amdii, 1993; Angel, 2000; Blunt and Dawling, 2006; Charles, 2003; Kabir, 2004; Onibokun, 1990; Suleyman, 2000).

In order to achieve sustainable housing delivery in Nigeria, numerous housing strategies, programmes and policies have emerged from the colonial era to date. For example, the Nigerian housing policy was formulated to propose possible solutions to housing problems in Nigeria (Amdii, 1993). At its inception, the basic goal of the policy was to provide affordable housing to accommodate Nigerian households in livable environment. However, many city centers are still characterised by deficiency of housing quantitatively, slum abode, squalor, squatter neighborhoods, insufficient infrastructural facilities, congestion and generally poor living conditions (Ibimilua and Ibitoye, 2015).

Though, failure of policy instruments towards implementation of sustainable housing provision can be traced to inadequate finance base, insufficient follow up and other fiscal laxities, but beyond, a lot of improvement can be achieved by looking inward, beyond government aid and public housing to a change in orientation on the way the increasing housing stock is being built. Flexible housing will offer more adaptability to the increase in housing needs, thus facilitating efficient use of existing resources rather than spending more to increase them. Flexible housing as mentioned is the design of dwelling structures with an understanding of the potential development of the site and area where it is located (Bacova, 2011). This is in addition to life and communal situation, plus the probability of creating suitable modifications in the existing environment. Schneider and Till (2007) defined flexible housing as “housing that can adjust to changing needs and patterns, both social and technological”. The increasing need for adaptability has necessitated the use of flexibility to resolve problems which involves technique and form. Flexible housing which is also a dwelling adaptable to changing needs of user and contemporary trend of technology must meet some basic concept or principle of adequate housing (Nur & Ahsen, 1998). The term adequate housing goes beyond the availability of four walls, a roof and supporting facilities. There are some conditions that need to be met before certain types of housing can be regarded to constitute “adequate housing” (UN-Habitat, 2009). These criteria are location, accessibility, availability of amenities, habitability, affordability, security of tenure and cultural adequacy.

To attain sustainability in buildings, while incorporating the future element, housing construction and design should guarantee more than being adequate. Flexibility in housing will prevent built in obsolescence and take into consideration the future changes in preference and choices of users. Zivkovic and Jovanovic (2012) present some of the indices of flexibility in housing, which are orientation of housing unit, geometry of housing unit plan, structure and size of the space, number and disposition of the entrance, position of technical services and building structure.

In order to tackle housing and urbanization challenges as predominant in Benin City among other Nigerian urban centers using flexible housing, there is need to inquire into the status quo on building practices among housing development stakeholders and how flexible housing can fill the existing gaps. In the light of this, this study proposes to examine the techniques of housing development in Benin City, Edo State vis a vis flexibility indices, with a view to providing recommendations on improving it in tune to achieving a sustainable built environment.

## **2. METHODOLOGY**

### **2.1. Study Area**

Benin City is the capital of Edo State in southern Nigeria. It is located between Latitudes  $6^{\circ} 17'$  and  $6^{\circ} 26'$  north and longitudes  $5^{\circ} 35'$  and  $5^{\circ} 41'$  East. Benin City is a unique city, by reason of the fact that it is an intersecting city that links and connects Northern, Southern and Western parts of the country. It is a city in the region of 40 kilometers (25 mi) north of the Benin River and situated 320 kilometers (200 mi) by road east of Lagos. Benin City is under Oredo Local Government Area and is bounded by three Local Government Areas, which are Egor, Ovia South-West and Ikpoba-Okha.

Benin City is divided into four residential zones. These zones are Core Area, Intermediate Area, Suburban Area and Planned Settlement Area. For this study, three choice areas were chosen within the suburban area and the planned settlement area. The reason is that the core and intermediate areas housed the royal families and much information about the building is secret to the Bini culture and not readily available. The choice areas are the Government Reservation Area (GRA), Ekehuan and Okhoro.

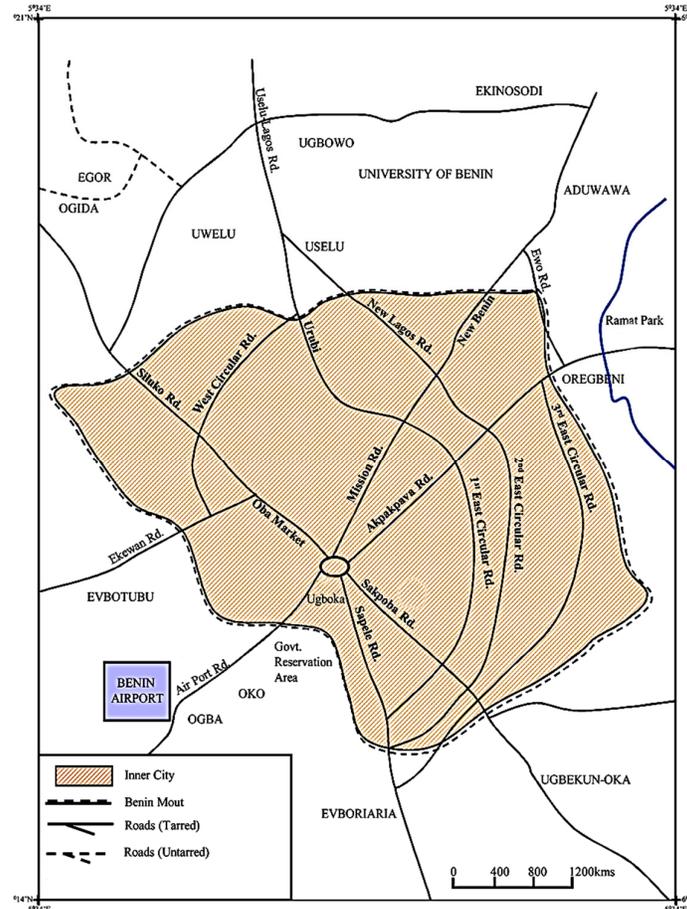


Figure 1: Map of Benin and some of its surrounding villages

## 2.2. Research Method

This study sampled the characteristics of housing units occupied by residents of three prominent areas in Benin City namely: Government Reservation Area (GRA), Ekehuan and Okhoro. Thirty (30) properties were sampled from each area. Thus, a total of 90 properties were surveyed. The selection was done to ensure reasonable spread among varying modes of construction, building sizes and housing types. Data for the study were collected using physical observation of the properties and personal interviews of heads of the housing units surveyed. Physical observation was used in evaluating the buildings vis a vis adequacy and flexibility indices. Personal interview was used in acquiring data that were not readily visible through physical observation especially features of the building portions that were not granted access to. The result of the study was analyzed using frequency count, percentages and mean values. In order to arrive at the mean values, weights (ranging from 1 to 5) were attached to the attributes surveyed, 5 representing “very flexible” (highest weight) and 1, “not flexible” (the least weight). The aggregate weight value (AWV) for each attribute was then obtained through the summation of the product of the number of responses for each rating to

an attribute and the respective weight value. The total weight value was then divided by the summation of respondents to the ratings. This can be expressed mathematically as:

$$mean = \frac{AWV}{\sum_{i=1}^5 R_i} \quad (1)$$

AWV represents aggregate weight value and R represents the number of responses.

### 3. RESULTS AND DISCUSSION

The results from the survey are presented in Tables 1 to 4. The results detailed information on the extent of flexibility based on the indices described in literature, as observed in the three areas surveyed. It focused particularly on the locational variation and attempts to provide explanations for the observed difference on the features evaluated in the three locations.

#### 3.1. Extent of Flexibility on Buildings Located in the GRA

Table 1 presents the result of the survey as observed in GRA. As can be seen in the table, flexibility features related to “Orientation of Housing units”, “Geometry of plan” and “Structure and size of the spaces” were most prominent on buildings located in GRA, with mean values of 3.77, 3.70 and 3.67 respectively showing that they were adequately flexible.

**Table 1:** Degree of flexibility on buildings Surveyed in GRA

	Not Flexible	Slightly flexible	Averagely flexible	Adequately flexible	Very flexible	Total	Mean values	Rank
Orientation of housing units	1	2	5	17	5	30	3.77	1
Geometry of plan	2	2	5	16	5	30	3.70	2
Structure and size of the spaces	2	3	4	15	6	30	3.67	3
Number and disposition of the entrance	1	3	7	15	4	30	3.60	4
Building structure	3	2	6	17	2	30	3.50	5
Position of technical services	3	4	6	13	4	30	3.36	6

The relative prevalence of these elements is traceable to the fact that GRA is predominantly occupied by middle/high income earners who can afford the high land and rental value of the area. This category of occupants have better taste which in many cases are in line with modern and innovative building standards incorporating these flexibility elements. Flexibility on “Number and disposition of the entrance”, “Building structure” and “Position of technical services”, in this order, ranked lowest. From the table, it is also apparent that the mean values of most features were above 3.5. This indicates that most of the buildings show at least, some elements of flexibility. Information obtained from personal interview with the household heads reveal that most of the buildings were designed by qualified professionals and they were approved by the planning authority. Existence of flexibility elements on the buildings can thus be traced to good planning and monitoring of the building projects. From these

results, it is apparent that socio economic characteristics of the inhabitants and the efficacy of the planning system influenced flexibility in buildings.

### 3.2. Extent of Flexibility on Buildings Located In Ekehuan

Table 2 shows the result of the survey in Ekehuan area. From the table, it is revealed that flexibility features relating to “Geometry of plan”, “Structure and size of the spaces” and “Building Structure” were more prevalent on the buildings surveyed. Two of these features: “Geometry of plan” and “structure and size of the spaces” were also among the most prevalent on buildings in GRA despite the locational variation. Mean values of the features observed were however lower than those observed in GRA as none of the mean values were up to 3 indicating that none were up to average as 3 represents averagely flexible.

**Table 2:** Extent of flexibility on Buildings surveyed in Ekehuan

	Not Flexible	Slightly flexible	Averagely flexible	Adequately flexible	Very flexible	Total	Mean	Rank
Geometry of plan	2	10	14	2	2	30	2.73	1
Structure and size of the spaces	5	10	8	4	3	30	2.67	2
Building structure	3	12	9	5	1	30	2.63	3
Number and disposition of the entrance	2	13	10	4	1	30	2.63	4
Orientation of housing units	3	11	12	3	1	30	2.60	5
Position of technical services	5	11	6	7	1	30	2.60	6

The features ranking least in this location include “Number and disposition of the entrance”, “Orientation of housing units” and “Position of technical services”. Most of these features (Number and disposition of the entrance and Position of technical services) also ranked lowest in G.R.A. There is therefore need to consider more innovative design and installation means that will address flexibility, especially on these features. Information derived from the personal interview with the household heads revealed that many of the buildings were constructed without consultation with qualified professionals as a result of high professional fees. The lower mean value observed in this area can therefore be explained by incompetent execution or interpretation of the architectural designs by quacks and local builders.

### 3.3. Extent of Flexibility on Buildings Located In Okhoro

The results of the survey in Okhoro are presented in Table 3. From the table, it is revealed that flexibility features relating to “Geometry of plan”, “Structure and size of the spaces” and “Building Structure” were more prevalent on the buildings surveyed.

**Table 3:** Extent of flexibility on buildings located in Okhoro Environs

	Not Flexible	Slightly flexible	Averagely flexible	Adequately flexible	Very flexible	Total	Mean values	Rank
Geometry of plan	6	15	7	2	0	30	2.17	1
Structure and size of the spaces	5	20	3	1	1	30	2.10	2
Orientation of housing units	7	16	5	1	1	30	2.10	3
Building structure	4	23	1	1	1	30	2.07	4
Number and disposition of the entrance	11	13	4	2	0	30	1.90	5
Position of technical services	9	17	2	2	0	30	1.90	6

Flexibility features relating to “Number and disposition of the entrance” and “Position of technical services” ranked lowest in this location. It is observed that these two features ranked low in the three locations, hence the need to focus on flexible solutions on these features. The rank ordering in Okhoro almost followed that of Ekehuan environs. However, the mean values (ranging from 1.90 to 2.17) are the lowest among the three locations. This indicates very low extent of flexibility in the buildings observed. Information obtained from personal interview of the residents also revealed that most of the buildings were constructed without consultation with qualified building professionals. Also, majority of the building plans did not meet approval standards, neither were they approved by the planning authority.

### 3.4. Extent of Flexibility on Buildings Located in the Locations

The results as presented in Tables 1 to 3 were summarized into one table (Table 4). This was to enhance presentation of the overall picture of flexibility in buildings in the city at single glance. From the table, it is shown that flexibility features relating to “geometry of plan”, “Orientation of housing units” and “structure and size of the spaces” were the most prevalent on the buildings surveyed.

**Table 4:** Extent of flexibility on buildings in the locations

	Not Flexible	Slightly flexible	Averagely flexible	Adequately flexible	Very flexible	Total	Mean values	Rank
Geometry of plan	9	27	26	21	7	90	2.87	1
Orientation of housing units	11	29	22	21	7	90	2.82	2
Structure and size of the spaces	12	33	15	20	10	90	2.81	3
Building structure	10	37	16	23	4	90	2.73	4
Number and disposition of the entrance	14	29	21	21	5	90	2.71	5
Position of technical services	17	32	14	22	5	90	2.62	6

Features relating to “Building Structure”, “Number and disposition of the entrance” and “Position of technical services” were least flexible in the study area. Thus, efforts should be tailored more towards enhancing flexibility in features relating to position of technical services and other features that rank low as observed in the Table 4. Also apparent from Table 4 is the fact that none of the mean values was up to 3 (Averagely flexible). The mean ranging from 2.62 to 2.87 observed in the features indicates only a slight extent of flexibility on the buildings. Thus there exists ample gaps to be filled in making buildings more flexible. Furthermore, sustainability in buildings can largely be achieved if these gaps can be filled.

#### 4. CONCLUSION

From this study, it has been shown that in the Government reserved area (GRA), the mean value of the flexibility features were the highest with a range of 3.36 to 3.77, closely followed by Ekehuan where the values were lower with a mean value range of 2.60 to 2.73 and Okhoro recording the least values with a mean value range of 1.90 to 2.17. These values are indications of the extent of flexibility inherent in the buildings in the study area. From a range of 1 to 5 where 5 represents “very flexible” (highest weight) and 1, “not flexible” (the least weight) it is apparent that Benin City is yet to fully take advantage of the inherent benefits of incorporating flexibility in its housing system because as seen in this study one (GRA) out of the three surveyed areas was adequately flexible while the other two (Ekehuan and Okhoro) were averagely and slightly flexible at their best. In order to address this, adequate attention has to be paid to the approval of building plans and monitoring of building execution by the relevant agencies. In addition to this, there is a need for government and private sector intervention in various housing areas of the city in form of redesigning or upgrading them to meet the changing needs of its inhabitants will promote functional efficiency and also make its buildings more socially, economically and environmentally sustainable. All stake holder in the built environment especially the professionals have to work closely with government to formulate policies, strategies and regulations that will ensure that new housing developments are being monitored to promote ‘flexibility’ in housing development.

#### 5. CONFLICT OF INTEREST

There is no conflict of interest associated with this work.

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