

## ASSESSMENT OF HOUSING DESIGN DECISIONS IN INFORMAL HOUSING SCHEMES IN URBAN AREAS OF SELECTED CITIES IN NORTH CENTRAL NIGERIA

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### Abstract

*The rapid urbanisation of cities in developing countries has witnessed a growth in the volume of housing construction in the urban areas. The demand for housing and the inability of government to meet this demand has encouraged the growth of informal housing. The concept of healthy buildings is of great importance, considering the amount of time spent inside a building. Little attention is placed on the healthy nature of the building with respect to the provision of adequate natural ventilation within the building and the use of plants to ensure a more natural environment. The aim of this paper is examine the design decisions taken by house owners that affect the healthiness of their houses. The research method adopted was the descriptive survey method using an observation schedule and questionnaire. Six cities in north central Nigeria were selected and residential communities were selected and studied. The research showed that 87% of the urban dwellers in these cities usually spend more time within the building interior when they are at home and that 22% of the respondents made consideration made for outdoor activities. The paper concludes that there are options for improving the current housing provision in order to make them healthy. The paper recommends design considerations that housing providers in informal housing sector of urban areas should consider in order to ensure that healthy houses are provided.*

**Key Words:** *building, design, healthy, housing, urbanisation*

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### Introduction

The challenges of growing cities and urban centres for both the government and the inhabitants are of great concern as it affects their performance within the city. The people work and live within the city and the challenges of good and adequate mode of transportation and housing are key to their survival. The European Union Regional Policy (2011), stated that energy consumption in the urban areas are mostly

in the transport and housing aspects of the city and it is responsible for the high amount of carbon dioxide generated. This situation is readily observable in Nigeria where there is rapid urbanisation and little attention is placed on the problems that are related to it. Hann (2011), opined that there is need for policy makers in cities to be aware of the possible future impacts of range of trends that make a city vulnerable. The impact of this awareness is that is

allows for planning and ability to respond to the challenges when they arrive if they were not avoided. The urban growth in Africa as projected by the UN-Habitat report of 2013, showed that by year 2020 about 300 million people should be living in urban areas. Dimuna and Omatsone (2010) observed disproportionate rate of urbanisation and inadequate housing infrastructure development to meet growing populations in developing countries like Nigeria. According to Kazman *et al.* (2002), housing design decisions taken in Architecture should meet technical objectives and tolerance for risks that may occur. This implies that housing design decisions are to be considered regarding the health of the occupants.

A good house is not just the building alone but it includes the environment where the building sits; it also covers the ability of the house owner or occupant to undertake his activities properly within the housing environment. The health of the housing in many informal housing settlements in Nigerian cities is usually suspect because the nature of the houses is usually poor health wise. The decisions taken by the house owners on their housing create problems for the environment thereby making the housing less healthy. This is one of the reasons why several researches in past have referred to these types of housing environments as places of disarray (Federal Government of Nigeria, FGN 1996, 1997; United Nations Centre for Human Settlement, UNCHS 1996; Nigeria Institute for Social Research, NISER 2001; Federal Ministry of Works and Housing, FMW and H 2002; Anugwom, 2001). A key factor that gives rise to the nature of the type of housing environment found in Nigerian cities is the growth of the informal housing sector that

has little regard for housing standards and health of the built environment.

The healthiness of the built environment is of concern to professionals in the built environment concerning the users. According to European Union (EU) 2010 report and Dimuna (2011), to achieve positive impact with built environment on the people the environment has to be sustainable. It is on this basis that this paper seeks to examine the design decisions taken in informal housing schemes in Northern Nigeria due to the peculiar climate characteristics of this region. The choice of the informal housing schemes is due to the Government of Nigeria's recognition that the provision of housing has become a great challenge.

#### ***Housing Provision in Nigerian Cities***

Contemporary housing in Nigeria started with the provision of housing by the colonial masters of Nigeria, the development of Government Reserved Areas (GRA) to cater for themselves and the staff that work with them (Adedayo 2013; Olotuah, 2007; Olayiwola *et al.*, 2005; and Kabir and Bustani 2009). This trend led to the development of mass housing schemes to cater for the growing urban population, the surge in urban population in many urban areas of Nigeria in new millennium and the increase in demand for funds from Government by other sectors saw a decline in housing provision by Federal and State Governments. This change saw the advent of the Private sector taking centre stage in the provision of housing for the growing urban population and Government making the policies (Aribigbola, 2008). The growth of the housing sector has led to several legislations; however, these legislations have not been operational in the housing sector of many states of Nigeria because the demand for housing has forced people

to circumvent it particularly in the informal housing sector. The sale of government staff quarters to the occupants encouraged informal housing development (Ademiluyi and Raji, 2008), which led to the development of lands at the peripheral of the cities.

#### ***Informal Housing in Nigerian Cities***

Self-help housing according to Akpomuvie (2010) is a means by which people sought to augment the deficiency of government. Toyobo, *et al.* (2010) established that the state of housing condition in urban areas of Nigeria has continued to evoke considerable concern as evident in informal housing settlements. The type of informal housing found in urban areas of Nigeria usually offer minimum housing conditions for the occupants to live and undertake their daily activities. According to Olotuah (2009), the economic power of many occupants of informal housing schemes affects the type of housing they could access and is characterized by substandard housing and acute environmental and sanitary problems. These problems greatly affect the occupants of the housing in such areas and the surrounding environment. There have been several approaches towards the issues of quality of informal housing in Nigeria (Aribigbola, and Ayeniyo, 2012; Odebiyi, 2010; Ukwai *et al.*, 2012; Agbo, 2012). The key problem with majority of the informal housing found in the urban areas is healthiness.

#### ***Housing Design Process and Decisions***

Raney and Jacoby (2010) stated that through design process designers break the decision down while simultaneously giving themselves new options. The final decision is usually a product of final analysis of the various options with the best option selected. In the informal housing sector often, the design decisions are not solely

that of the architect as many house owners usually modify their houses, during construction. The impact of design decisions is very significant as it affects the life span of the building and the occupants at any given period. According to Struck and Hensen (2007), design decisions in architecture are based on experience and intuition, which is often a result of specialized training. Milne, *et al.*(n.d.), stated that every decision made on any building design has an impact on the environment. Papamichael (1999), also stated that design decisions are usually based on comparison of possible courses of action with respect to different performance considerations for the house. Informal housing design decisions in Northern Nigeria usually focus on comfort and aesthetic of individual house owners. The cumulative effect is the creation of unhealthy environment and houses.

#### ***Housing Design and Healthy Buildings***

The physical design of a building and the environment where it is located affects human behaviour such as mental and physical well-being at all levels be it inside buildings, neighbourhoods, communities, and regions (Eitler *et al.*, 2013). The advent of technology and way of living has changed over the years and many house owners seek buildings that fit their current demand. Blagojevich (2006) stated that a healthy building is a facility designed to provide a productive environment for occupants, promote a healthy lifestyle, save operating costs and help sustain the environment. The current form of sedentary lifestyle of many urban dwellers has ensured that many spend their time within the building. Spengler and Chen (2000), established that indoor air quality (IAQ) is an important determinant of healthy design. There are several design decisions in housing that have overall

effect on some of the parameters. Fernández-Juricic and Jokimäki (2001) opined that the next decade would witness, urban sprawl reaching a magnitude that several natural areas surrounding cities will give way to buildings and residential areas. The implication of such growth is that the quality of the environment would be affected by the reduction of the natural environment. The housing decisions that are subject to the approval of client can affect the healthiness of the building and the environment.

**Research Method**

The research adopted a Post-Occupancy Evaluation (POE) method, using an observation schedule. Post-Occupancy Evaluation method as stated by Adedeji and Fadamiro (2012); Zimmerman and Martin (2001), is generally accepted for obtaining opinion of users and observation studies in the built environment. Northern Nigeria has vast area in terms of landmass and the significant developments are in state capitals. Using stratified random sampling six cities were selected based on security level. Six hundred copies of the observation schedule was developed and handed to 14 research assistants and 568 copies were returned. The data was collated, sorted out based on the state capitals, entered in SPSS and cross tabulation was used for analysis.

Table 2.0: Urban Areas Studied

Name of city
Minna, Niger State Capital
Bida, City in Niger State
Federal Capital Territory (FCT), Abuja
Lokoja, Kogi State Capital
Lafia, Nassarawa State Capital
Ilorin, Kwara State Capital

**Results and Discussion**

*Nature of Buildings within the Selected Cities*

An examination of the informal housing buildings showed that a high percentage of the buildings are bungalows. Table 1 shows that 44.7% of houses in FCT were duplex, which was attributed to the status of city. The economic capacity of the house owners usually determined the type of house they built, as it was done in phases. The effect of certain design decisions such as choice of fence and distance of building to the fence affected the occupants of the building differently. The duplexes had single-family occupation which reduced the pressure on the facilities within the community, this was however different in the case of block of flats that often had a minimum of two-family occupation. The occupation rate of the bungalow buildings varied from single-family occupation for house where the house owner was the occupant and in case where it was for rental purposes the occupation rate was minimum two families within the compound.

Table 1: Distribution of Buildings by City based on Type

Name of City	Bungalow	Duplex	Block of flats	others
Bida	94	2	4	0
Ilorin	83	14	3	0
FCT	37	38	15	3
Lafia	39	16	29	5
Minna	61	5	33	1
Lokoja	58	10	17	0

The average percentage distribution of the different types of buildings as shown in Figure 1 showed that 66% of the building are bungalows, which is an indication of high consumption of land. This type of buildings places a high demand for infrastructure on the city, because of population spread, in many of these communities; the people are responsible for the provision of the infrastructure. The initial landowners distributed the land as they deemed fit and plot owners tried to make the best out of it. In Figure 2, 73% of the roads were not tarred and the people yet found a way of living within the community. The problem with the untarred access road was the issue of dust during the dry season and cases of mini flooding during the rainy season particularly for buildings located within the low land areas.

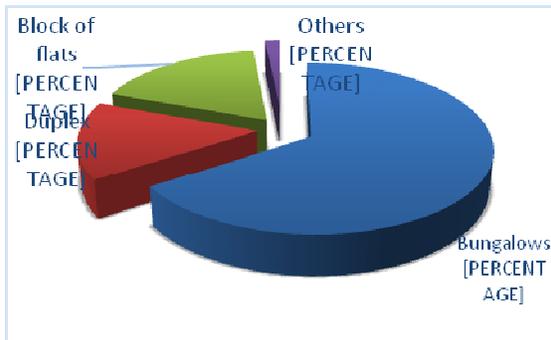


Figure 1: Average percentage distribution of Buildings within study area

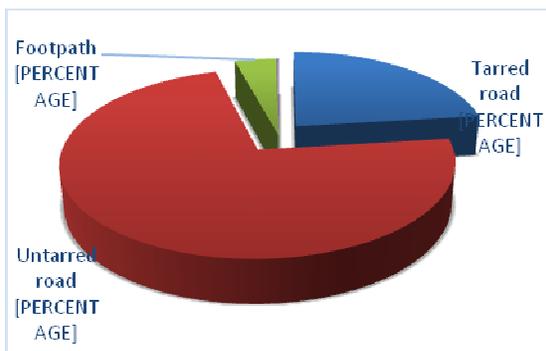


Figure 2: Average distribution of Access Route to Buildings within study area.

In Figure 3, that majority of the plots were over-developed because 4% of the houses had developed less than 30% of their plot. It implied that many spaces required for a building to function were disregarded. This action has negative effect on the occupants of the house, which makes them spend time within the building interior, with little or no space for any form of exercise.

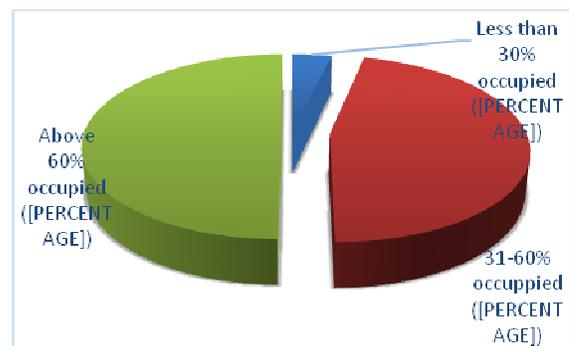


Figure 3: Average distribution of Built-up area within Plot

### Design decisions on Fence of Buildings

The issue of security is usually a major concern to many house occupants and house owners within the cities in northern Nigeria; this is evident with the type of fence they usually provide. Figure 4 show that 70% of the houses were fenced while Figure 5 showed that 96% of duplexes were fenced. Security was cited as the factor for this action however; lack of adequate ventilation is usually felt within the rooms at the ground floor. In the case of the bungalows, the percentage is equally high and many consider fence as a method of demarcating their property lines. It was noticed that the design and choice of fence provision is usually solely that of the house owner, hence; you will find many streets having variety of fence designs.

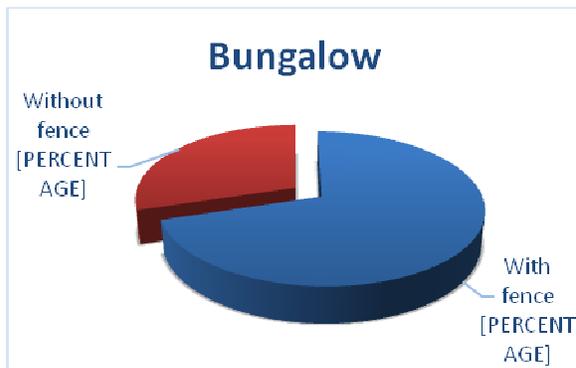


Figure 4: Distribution of Fence provision in Bungalows

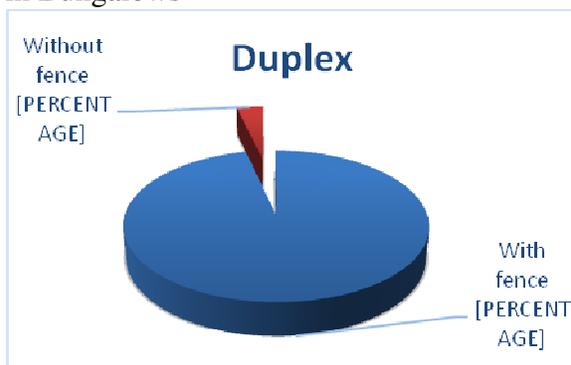


Figure 5: Distribution of Fence provision in Duplex houses

In Table 2, the nature of the fence provided did not vary considerably in terms of the material used in construction; however; the walled type of fence was predominant. The houses with a combination of iron grill and wall did not fare better because the height at which the iron grill is fixed was usually above the window height. The height of the fences as indicated in Table 3 showed that majority of the windows in the bungalows are hidden from the path of wind. The implication of this design decision is that many house occupants in these houses had to depend on mechanical means of cooling the house.

Table 2: Fence type based versus house types

Type of building	Iron grill	Walled	Wall and Iron grill	Others
Bungalow	11	199	43	8
Duplex	5	43	33	1
Block of flats	3	55	15	0
Others	1	1	0	1
Total	20	298	91	10

Table 3: Average height of fence based versus house types

Type of building	less than		
	1.2m	(1.2 - 1.9) m	2m and above
Bungalow	10	108	142
Duplex	1	52	29
Block of flats	1	21	51
others	0	3	0
Total	12	184	

As wind encounters the fence it goes above and then attempts to come down toward the building; however, for this to effectively work the building should be at

a good distance from the fence. In Table 4 it can be observed that majority of the buildings were at an average distance of 6m from the fence. In areas with more than

6m setback from the fence, it was attributed to the need for parking spaces for the car. 65% of houses examined had at least two sides of the house at distances

less than 3m in an attempt to maximise the plot, the rooms located in these areas usually had air and day lighting problems.

Table 4: Average building distance to fence based versus house types

Type of building	Less than 3m	(3.1- 6) m	Above 6m
Bungalow	148	96	18
Duplex	17	52	13
Block of flats	40	32	1
Others	2	1	0
Total	207	181	32

**Design decisions on Surrounding Building Environment**

The surrounding building environment plays a significant role in determining the success or failure of the house. In the informal housing schemes examined, the house owners usually occupied into the house immediately practical completion was attained. In 72% of houses examined, the economic power of the house owners determined the type of floor finish within

the compound. The use of concrete related floor finish was dominant in the houses as seen from Table 5 and this affected the amount of heat gain within the premises and the building. The choice of floor finish also affected the ability to provide play areas. It is observable from Table 6 that on the average 67% of the houses examined did not have play areas hence creating a sedentary type of life style for the occupants of such houses.

Table 5: Surrounding ground cover within building premises

Type of building	Mass concrete	Concrete tiles	Sand	Grass
Bungalow	115	55	188	14
Duplex	28	37	17	3
Block of flats	38	14	40	7
others	2	1	4	2
Total	183	107	249	26

Table 6: Provision of Designated play areas in houses

Type of building	Houses with play area	Houses without play area
Bungalow	123	248
Duplex	47	38
Block of flats	17	83
others	0	9
Total	187	378

The flexibility of parking at any part of the building necessitated the complete use of concrete finishing within the compound. In Table 7 it is observed that 95% of the Duplex houses had dedicated car park while the location and the choice of design of the car park

*Assessment of Housing Design Decisions in Informal Housing Schemes.....ADEDAYO & ZUBAIRU*

Table 7: Provision of Designated Car park areas in houses

Type of building	Houses with Car park	Houses without Car park
Bungalow	230	142
Duplex	81	4
Block of flats	76	24
others	2	7
Total	389	177

The respondents usually considered their needs in their houses before considering those of their neighbours such is the case of run-off water, which is usually a problem for the house owners and the community. Their design decision was simply to make the floor slope from the house towards the road. In Table 8 it can be observed that 35% of the houses

had drainages, hence run-off water was controlled within the compound, however this did not translate to provision of drainage within the community as some house owners simply drained the water to the road. The final destination of the central drainage is never considered and this usually affected healthiness of the community.

Table 8: Provision of Drainages within houses

Type of building	Houses with drainages	Houses without drainages
Bungalow	80	291
Duplex	41	44
Block of flats	16	83
others	1	8
Total	138	426

### ***Design decisions on Landscaping of the Environment***

A key element in ensuring oxygen within housing areas is the soft landscape of the building. House owners usually clear the land of all encumbrances to accommodate the new building; hence loss of green vegetation. It is usually difficult to replace the lost vegetation and in many cases difficult to maintain the new ones. Figure 6.0 shows that only 65% of the houses had provided some form of flowerbed to cater for the green spaces, the functional flowerbeds are considered as those located within the premises, this is reflected in Figure 7 where 73% of the flowerbeds are located within the building premises alone. The choice of flowers vary between house owners and the height of

which, depended on the maintenance practice.

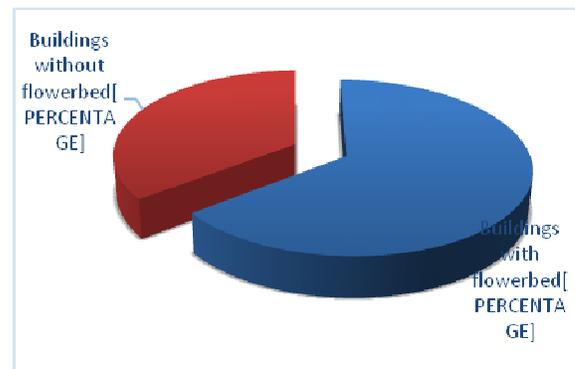


Figure 6 Provision of Flowerbeds in housing schemes

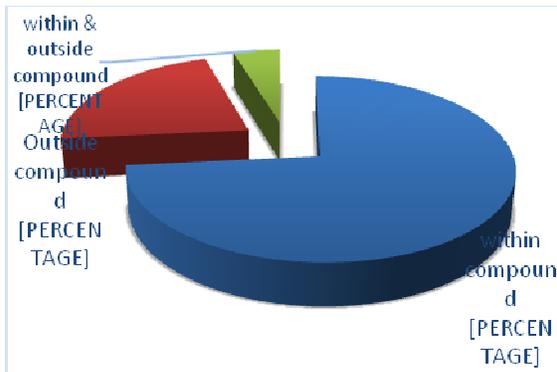


Figure 7: Location of Flowerbeds in housing schemes

Table 9 shows the number of trees available in the houses within the study area and that 178 houses have young trees either 1 or 2 trees. It was observed that 31

houses had trees that were 11 years and above, these houses were able to handle the issue of strong wind better during raining season. Table 10 shows that 33 house owners planted trees for wind breaking purposes, although some other houses benefitted from this action inadvertently. In Table 10 many house owners design decision was to have trees that served as sun shading and relaxation. The number of trees provided makes it practically impossible to accept that the buildings were shaded as some respondents complained of hot interiors in the evenings.

Table 9: Distribution number of trees based on Age

Number of trees in the compound	less than 3yrs	4-6yrs	7-10yrs	11yrs and above
1-2	52	74	43	9
3-4	20	34	17	5
5 and above	7	12	10	17
Total	79	120	70	31

Table 10: Distribution number of trees based on purpose of tree

Number of trees in the compound	Sun shading	Relaxation	Windbreakers	Economics
1-2	76	69	16	14
3-4	29	35	4	6
5 and above	13	17	13	3
Total	118	121	33	23

Table 11 shows that large proportion of the trees planted were within the building premises, the breakdown of the purpose of the tree showed that relaxation was a key reason, given the location of trees. It was common to find that trees used for relaxation purposes had the base of the tree well maintained. The sun shading trees

were planted along the fence either within or outside the compound along the sun path regardless of the presence of a neighbour's house. The type of trees planted varied from fruit trees to ornamental trees hence the location was of importance to the house owners, because it allowed for sitting under the tree.

Table 11: Location of trees based on purpose of tree

Location of trees	Sun			
	shading	Relaxation	Windbreakers	Economics
Within compound	89	106	26	21
Outside compound	28	12	5	2
within and Outside compound	1	3	2	0
Total	118	121	33	23

In summary, it was observable that about 50% of the houses examined attempted to reduce the effect of cutting down trees on the building status. The types of trees or shrubs provided were inadequate and often ineffective considering. The ideal order would have been for house owners to adapt their buildings to the environment.

**Conclusion**

Formal housing schemes are usually easier to control from design stage through to occupation. It is easier to adhere to instructions and ensure that the design decisions are followed throughout the life span of the building. In the informal housing schemes the design decisions are individualistic in nature but with a broad community effect. It was observable in the study that design decisions taken by house owners were not within the design. Zubairu (2006) stated the need to have community participation in public building design and that the benefits that accrued from such practice were enormous. In individual informal housing, participation was achieved locally, the implication is that the community is not healthy. The issue of ventilation is a major consideration in the health status of a building and hence the choice of window type. Decisions such as type of fence, choice of windows and even construction of other buildings within the premises can significantly alter the environment. It was observable that there were significant

design decisions taken after occupation. A factor responsible for this trend is the differences in time of completion and occupation of the houses. In conclusion, the need to create healthy living environments houses in urban areas should take into account the informal housing schemes as it accounts for a significant volume of the housing provision. Housing designs for clients in informal housing schemes be made with possibility for future design changes. House owners in informal housing schemes need to stop thinking on individual basis in order to improve the healthiness of the community.

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