



AN ASSESSMENT OF RESIDENTIAL DENSITY AND TYPOLOGY OF HANWA AREA OF ZARIA, KADUNA STATE

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ABSTRACT

Understanding the effect of building and human population on urban land and environment is important for urban governance and creation of liveable urban environment. This is important for a realistic urban planning for sustainable development. This work enumerated the building density and typology of Hanwa area of Zaria this was carried out through physical surveys and on-site enumeration, the survey revealed a building density of 607 buildings on an area of 273150m². It also indicates a shift from bungalow to storey buildings. This implies that the demographics densities are increasing to cope with it. It now rests with the planning authorities in Zaria city to take cognisance of this fact and plan accordingly.

INTRODUCTION

Housing is an essential and fundamental component of the overall land use activities in both rural and urban centres. Housing is considered as a bundle of services such as neighbourhood services (parks, schools); a location (accessibility to jobs and amenities) and proximity of certain types of neighbours (a social environment). It embraces more than shelter or lodging for human habitation. The quality of housing is used to measure the quality of life even at International level (Daramola 1996). Besides, it has a tremendous positive influence on the health, safety and economic and social welfare of any residents of any community. Any concern for understanding changes in rapidly urbanising cities, particularly those in sub-Saharan Africa, requires the comprehension of the underlying factors for their evolution and subsequent development. Unlike in Europe and other industrialised countries, where urbanisation was triggered by industrialisation and where cities were largely organised in a regular manner, on-going changes in many of the cities in poor countries have their roots in colonial planning influences with rapid changes taking place after independence.

Urbanisation trends in many of the poor countries have been taking place under the dictates of poverty and growth of informal settlements. City growth in these countries has been largely unregulated. Informal land subdivision and housing development characterise city development processes. While many cities in these countries were established during the colonial period, their exponential growth started after the attainment of independence. The expanded post-colonial city exhibit stakes of layers of urban types reflecting the various periods of city growth or of planning intentions. In the colonial city, for example, the major ideas behind town planning are evidenced by racially segregated zones for Europeans, Asians and Africans, an ideology that pervaded town planning during the colonial era. At the time of independence new political goals were often established. Sometimes, this induced new housing and town planning policies, but often the colonial procedures were continued or only moderately revised. The relevance of the old and more recent planning principles and existing urban types to the new economic, socio-cultural and political conditions has not often been the focus of urban planning research and practice. Conventional planning models seem to have less effect when it comes to guiding and regulating development in these settlements. The overall cityscape that emerges from this type of city growth is a complex pattern of spatial entities comprising varying house forms, densities and spaces with differentiated spatial qualities. Yet informal settlements dominate the general city structure, providing habitat to the majority of the urban residents.

The most obvious effect of urbanisation - an effect which is implicit in its definition is an intensification, as well as diversification, of environmental resource exploitation. There are usually changes in the land cover and landscape pattern brought about by the shift from less intensive to more intensive uses of land. This relates, particularly, to energy, water and agricultural land, as well as basic construction materials, such as sand, clay, stone and wood, all of which are extracted from the environment (Carvalho and Prandini, 1998). Nearly always, however, such diversification of environmental resources exploitation is accompanied by an increase in environmental degradation. By environmental degradation, it is meant the long-term loss in ecosystem function and productivity. Its symptoms include 20% soil erosion,



nutrient depletion, salinity, water scarcity, pollution, disruption of biological cycles, and loss of biodiversity. Urban land degradation obviously is more marked in developing countries, which are characterized by high and largely uncontrolled urbanization rate. This is a global development and environmental issue recognised by the UN Convention to Combat Desertification, the Conventions on Biodiversity and Climatic Change, and the Millennium Goals (UNCED, 1992). The major concern which motivated carrying out this study is associated with two issues. First is the persistent knowledge gap on the processes and the rapid changes taking place in formal and informal settlements which seem to be unguided. The second is the significant city sprawl manifested in the negative externalities of poor infrastructure provision and inadequate community facilities. While the first issue expresses the epistemological concerns of understanding built environments, the second one is ontological in nature with emphasis on practical problems confronting built environments in rapidly urbanising cities.

Statement of the Research Problem

Rapid urban growth especially since the turn of the century has put enormous pressure on land in Nigerian cities. The number of people living in Nigeria's towns and cities is expected to rise to 300 million people by 2050, having doubled from 80 million to 100 million by 2010 within 10 years (World Bank, 2016). The consequences especially for urban development and land management are many. The Federal Government of Nigeria (FGN) in a white paper observed that, "the uncontrolled nature of urban development is brought about by the tremendous difficulty experienced by individuals and corporate bodies in gaining access and permit to build" (FGN, 2002:45). Government has re-iterated that the main objective of its National Urban Development Policy is, "to ensure that land is available for the purpose of controlled and orderly development in the urban areas (FGN, 2006:14). There is no doubt that in recent times, sprawling activities have profoundly changed the pattern and environmental management in Hanwa area, Zaria, while comprehensive assessment and survey of urban sprawl and its management in the town and environs has yet been undertaken. Fragmentary information tends to suggest that a number of environmental problems such as congestion,

pollution, sprawling along the adjoining country-side, within and around the city have increased in spatial extent and severity (Jaiyeoba, 2010). There is every indication that this trend would continue for a long time, if necessary actions are not taken. Zaria started as a nucleus settlement and gradually increased to its multiple nucleus settlement. Presently, the rate of urban sprawl is increasing; more neighbourhood sub-settlements have emerged due to different factors.

Aim of Research

This research is aimed at finding out housing density and building typology of Hanwa area Zaria.

Objectives of the Research

- i. To Find out total land mass of Hanwa area of Zaria;
- ii. To enumerate numbers and sizes of plots in Hanwa area of Zaria;
- iii. To enumerate numbers of houses in Hanwa area of Zaria;
- iv. To enumerate building typology in Hanwa area;
- v. To determine building density in Hanwa area.

Scope of the Research

This research was conducted in Hanwa Area, Zaria, Kaduna State, to act as pilot study for the determination of building density for the entire Zaria city. Hanwa area was chosen due to its central location in Zaria. The main transportation routes connecting Samaru and Shika to PZ and Sabon gari/ Tudun wada and Zaria city intersect with the main trunk-A route connecting Kaduna to Kano. Hanwa neighbourhood is thus a magnet for most settlers from across the ethnic spectrum of Nigeria. Its cosmopolitan atmosphere is a magnet for a lot of staff of the various federal institutions found in Zaria. As a result, a lot of social and commercial activities therefore take place around Hanwa and the pulse of Zaria can easily be felt in Hanwa.

Justification

Landscape disturbance is a common problem caused by changing land covers and landscape patterns of urbanization (Wang and Moskovits, 2001). Such disturbance could lead to low productivity of the ecosystem due to extra travel time, wasted space along borders and the inability to



use certain types of facilities. Landscape complexity and heterogeneity are key aspects in assessing ecological processes and biodiversity within regions (South worth, Munroe & Dagendra, 2004). Past researches have demonstrated that aspects of landscape pattern or structure influence the occurrence and distribution of species (Forsyth, 1993). This study is envisaged to assist Kaduna State Urban Planning Development Authority (KASUPDA) and the State Ministry of Works and Housing who are responsible for the supervision, monitoring, management, planning and maintaining development control and ensuring that the policies of government set out as rules and regulations of the Authority and Ministry are followed. The study focuses on Hanwa area of Zaria because it is one of the fast-growing towns in the Northwest of the country, due to the many activities carried out in the City. The research seeks to assist Kaduna State to create synergies between Architects, Planners and other Professionals that are involved in urban planning and city.

LITERATURE REVIEW

Density is generally defined as the amount of residential development permitted on a given parcel of land (Britannica Encyclopaedia, 2017; Alexander, 1993). It is typically measured in dwelling units per acre – the larger the number of units permitted per acre, the higher the density; the fewer units permitted, the lower the density. Urban land use density is a measurement of the ratio of the intensity of use of land- use features for a geographic area. It may include the measure of the intensity of dwellings, structures or ground surface cover. Forsyth (2003) defines density as a number of units –people, dwellings, trees, square feet of buildings in a given land area and it varies greatly depending on the base land area used in the density calculation. Obateru (2005) refers to density as the number of persons or object per unit of space such as the number of persons or houses per acre or hectare. In its simplest form, residential density can be described as some numerical measures of the extent to which land is occupied by buildings or people (Evans, 1973). Residential densities are expressed in terms of dwelling units per hectare or in terms of bed spaces per unit, that is, in terms of the population expected to live on the site. Within a given city, permitted densities are likely to be higher in the inner areas than in the suburbs.

Residential densities are expressed in terms of dwelling units per hectare or in terms of bed spaces per unit, that is, in terms of the population expected to live on the site. Within a given city, permitted densities are likely to be higher in the inner areas than in the suburbs. Typology (in urban planning and architecture) is the taxonomic classification of (usually physical) characteristics commonly found in buildings and urban places, according to their association with different categories, such as intensity of development (from natural or rural to highly urban), degrees of formality, and school of thought (for example, modernist or traditional). Individual characteristics form patterns. Patterns relate elements hierarchically across physical scales (from small details to large systems).

Building typology refers to the study and documentation of a set of buildings which have similarities in their type of function or form. There are two ways of looking at the term "building typology". The first is a functional typology that categorizes buildings into groups by the similarity of their use. A functional building typology under this definition may create groups such as hospitals, schools, and shopping. The second is a typology that groups buildings according to their forms, which is explained in this article. Formal building typology may be based on configuration, format, or relationships of building to streets and each other. Any single functional type can be subdivided into formal types. For example, the residential functional type may be further subdivided into formal categories such as high rise towers, single family homes, duplexes, and townhouses. The townhouse building is one formal type that has a specific configuration: single units are placed side-by-side with others, vertically oriented up to four stories tall, and facing the street. Many more variations of this formal type are found around the world, each with variations that are the result of local materials, cultural habits, age and technology (Firley, 2009). Documenting a type is the process of discovering the elements of similar forms which are the same. Usually building types are distinguished by their basic form, site configuration, and scale, but not their specific architectural style, colour, or even precise use, and are related to the era, the culture, and the environment in which they arise (Cannigia, Gianfranco; Maffei, & Gianluigi, 2001).



Urbanization is the outcome of social, economic and political developments. It entails changes in land use and the transformation from rural to metropolitan pattern of organization and governance (Gyabaah, 2003). Cities emerge and evolve from the coalescence and symbiotic interaction of infrastructures, people and economic activities. These interactions are systematic, generally in that they are related to development in the global economy and are related to the building and transport technologies. But these interactions are also sensitive to local context, in that settlements are individually resilient to constraints in their evolutionary path (Alexander, 1993). Urbanisation can be more broadly understood as a process of social and economic change which has accompanied industrial development. The environmental effects of urbanisation therefore usually include, impacts associated with the public and private activities that occur in urban areas. These activities may also occur in rural areas. However, the impacts in urban areas may be concentrated within a smaller area or be much greater in absolute terms. Because of economies of scale, the environmental impacts of activities in urban areas may also be easier to manage cost-effectively. A typical example is the case of collection and treatment of sewage (Cannigia et al, 2001).

Urbanisation can affect the built environment, the natural environment, and human populations. Similarly, its environmental impacts may occur at local, regional and global scales. The impacts of urbanisation are highly interrelated. For example, land-use patterns within urban areas can influence transportation options, while the mode of transportation chosen by residents can affect air quality and noise levels (Gyabaah, 2003). With respect to the concept of environment, this has been viewed from diverse perspectives, and defined in various ways. The variety of definitions and conceptions of environment is closely linked to the fact that the study of environment is multi-disciplinary, and thus each discipline tended to develop and adopt definition(s) in line with its interest.

Study Area

Zaria is a major city in Kaduna State in northern Nigeria, as well as being a Local Government Area. Formerly known as Zazzau, it was one of the original seven Hausa city-states. Today it is known for housing

Nigeria's largest university, Ahmadu Bello University, as well as being home to a number of prominent Nigerians. The 2006 Census population was estimated as 406,990. It is home to the Zazzau Emirate. Zaria, initially known as Zazzau, was the capital of the Hausa kingdom of Zazzau (Jaiyebola, 2010). Zazzau is thought to have been founded in 1536 and later was renamed after Queen Zaria. Human settlement predates the rise of Zazzau, as the region, like some of its neighbours, had a history of sedentary Hausa settlement, with institutional market exchange and farming. Zaria was the most southern of the Hausa city-states. It was a trading destination for Saharan caravans as well as a prominent city in the Hausa slave trade. In the late 1450s, Islam arrived in Zaria by the way of its sister Hausa cities of Kano and Katsina. Along with Islam, trade flourished between the cities as traders brought camel caravans filled with salt in exchange for slaves and grain.

The city-state's power peaked under Queen Amina whose military campaigns established a tributary region including the kingdoms of Kano and Katsina. At the end of the 16th century, after Queen Amina's death, Zaria fell under the influence of the Jukun Kingdom and eventually became a tributary state itself. Between the fifteenth and sixteenth century the kingdom became a tributary state of the Songhai Empire. In 1805 it was captured by the Fulani during the Fulani Jihad. British forces led by Frederick Lugard took the city in 1901. The old part of the city, known as Birnin-Zazzau or Zaria-City was originally surrounded by walls and fortress, which have mostly collapsed or absorbed in modern constructed buildings. The Emir's palace is in the old city. In the old city and the adjacent Tudun Wada neighbourhood people typically reside in traditional adobe compounds. These two neighbourhoods are predominantly occupied by the indigenous Hausa (Gihring, 1984). The neighbourhoods of Samaru and Sabon Gari were initially predominantly occupied by Nigerians of southern origin, such as the Igbo, Yoruba and other ethnicities (Gihring, 1984). These neighbourhoods were formed during the colonial period. The largest marketplace is in Sabon Gari, while other more recent neighbourhoods include Danmagaji/Wusasa, PZ, Kongo, GRA-Zaria, Hanwa, Bassawa, Low-cost Kofan-Gaya and Shikka. There is great variety in the architecture of Zaria, with buildings made of clay in the Hausa style juxtaposed with modern, multi-storied



university and government buildings. The ward of Anguwan Liman is located north of the Zaria palace.

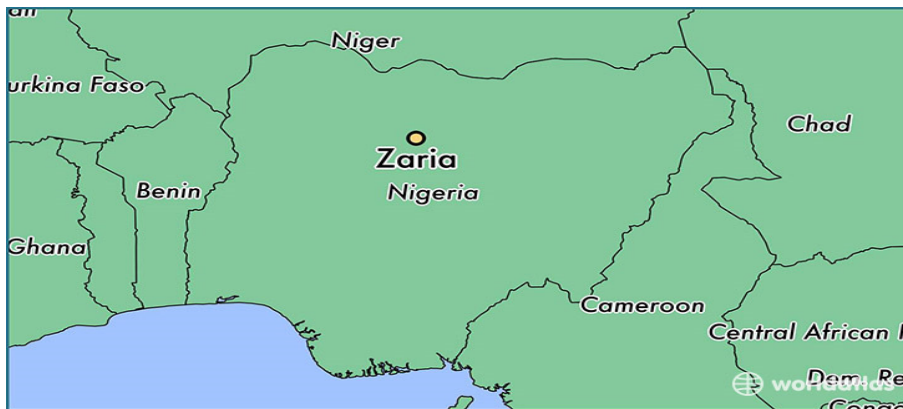


Figure 1. Location of Study Area. Google maps, 2020.

METHODOLOGY

This study was carried out through conducting physical field reconnaissance of Hanwa area, to establish the boundary that constitutes Hanwa settlement. The boundary was then marked out using Google Earth pictures; the area was then sub-divided into sectors labelled a, b, c, d, e, f, and g, for easy identification, enumeration and analysis. Then a physical field enumeration of number of buildings per plot and types in Hanwa area was also undertaken. The Google Earth images of Hanwa area was used to validate the enumeration from physical count. Field observation of building typologies and style were also made during the survey.



Figure 2. Delineated Hanwa study area. Google Earth, 2021.



Figure 3. Delineated sector Hanwa study area. Google Earth, 2021.



The total area of Hanwa was established. The areas covered by roads were subtracted. Then the area coverage of each sector was determined using Google Earth Area calculator. The number of enumerated buildings per sector area was used to determine the densities per sector, then a summation gave the overall density of Hanwa area.

The results from observations were then tabulated to give an easy reading and are presented as follows.

Analysis of Findings

Table I. Summarised table of findings

Sector	Area (m ²)	Housing Density (No/Area)	Typology	
			Bungalow	Storey
A	30000	71	63	8
B	40000	122	107	15
C	70000	172	159	13
D	20000	62	41	21
E	20000	77	68	9
F	40000	92	81	11
G	70000	11	9	2
TOTAL	290000	607	528	79

The findings showed that the delineated sectors A has a total area of 30,000 square meters; sector B 40,000 square meters; sector C 70,000 square meters; sector D 20,000 square meters; sector E 20,000 square meters; sector F 40,000 square meters and sector G 70,000 square meters. Sectors A, B, C, D, E, F and G had housing densities of 71, 122, 172, 62, 77, 92 and 11 respectively. Of these densities, the building typologies consists of: sector A 63 bungalows and 8 storey buildings; sector B 105 bungalows and 15 storey buildings; sector C 159 bungalows and 13 storey buildings; sector D 41 bungalows and 21 storey buildings; sector E 68 bungalows and 9 storey buildings; sector F 81 bungalows and 11 storey buildings; and sector G 9 bungalows and 2 storey buildings. These gives the following totals;

- i. Area of Hanwa settlement is 290,000 M²
- ii. Number of plots in Hanwa is 607;
- iii. Number of houses in Hanwa is 607;

- iv. Building typology in Hanwa consists of 528 bungalows and 79 storey buildings;
- v. The average building density in Hanwa is 607houses/29 hectares which gives 21 houses per hectare approximately.

DISCUSSION

The delineated Hanwa area of study covers 290000m² out of which 70000m² has no residential building but is made up of commercial buildings, this leaves a balance of 220000m² for residential plots, the average size is 450m² (15x30m), The delineated sectors A, B, C, D, E, and F are densely populated, while delineated sector G is virtually empty. This is because the mains 330KVA power supply line of the Power Holding Company of Nigeria (PHCN), passes through sector G. Only activities such as mechanical repairs and paint jobs are carried out there on a temporal basis. The total number of counted plots was 346 in which 31 were undeveloped and 315 developed. Out 315 developed plots 140 plots have three buildings erected on it, 112 plots have two buildings erected on it and 63 plots have single buildings this now gives a total building density of 607 on an area of 273150m² of the 607 buildings 528 are bungalows and 79 storey buildings. Following the objectives of the study, it can be seen that;

- i. The total land mass of Hanwa area of Zaria is 290,000 square meters of 29 hectares;
- ii. 346 plots were enumerated, 315 are developed while 31 are undeveloped.
- iii. 607 houses were enumerated in Hanwa area of Zaria;
- iv. 528 bungalows and 79 storey buildings form the building typology in Hanwa area;
- v. The building density of Hanwa is derived as 607houses/29 hectares which gives 21 houses per hectare approximately, according to Evans (1973).

Implications of Findings

The implications of these findings indicate the following;

1. The storey building appeared to be recently constructed and modern, while the bungalows are old and indicate where constructed long time ago.



2. The implication of this is that due to population density bungalows no longer suffices to accommodate the burgeoning population and housing demand, hence the current erection of storey buildings
3. We can now safely conclude that in the near future the old buildings will give way for storey buildings satisfy the demand for accommodation by the increasing population density.

SUMMARY AND CONCLUSION

The research revealed that buildings density and typology in Hanwa area of Zaria shows a trend of movement from bungalow to storey buildings which are indicative of more demand for housing by an increasing population. This is because Hanwa is centrally located in Zaria town, and strides the main transportation hub with the Kano –Kaduna- Abuja road, and the Gusau-Sokoto road passing right through Hanwa area. Secondly, Hanwa is a melting pot for migrant population coming into Zaria for work and business due to its cosmopolitan ambience. Thirdly, amenities such as good road network, electricity, hospitals, business malls, hospitals, schools, market and the water makes for a reasonably comfortable and easy setting for many people to decide to live in Hanwa neighbourhood. It is safe to say that in the near future the whole of Hanwa neighbourhood will become gentrified, and the building trend will shift from bungalows to storey buildings. It now rest with planning authorities to take cognisance of facts and start planning for infrastructural expansion, ecological impact assessment and development of Hanwa area to accommodate the future buildings and population density pressure.

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