

HOUSING CONDITIONS IN KANO, NIGERIA: A QUALITATIVE ASSESSMENT OF ADEQUACY

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Abstract: Many studies have attempted to assess the qualitative adequacy of housing in Nigeria. However, most of these studies focus either on slums or on public housing projects. There are very few empirical studies that examine and compare the qualitative adequacy of housing belonging to different population groups and from different neighborhoods in a city. The purpose of this study is to assess the housing quality in the (entire) city of Kano, Nigeria and to examine the disparities in housing adequacy across the city based on four factors: neighborhood density level, location of the neighborhood relative to the old city wall, monthly household income and ownership type and status. We found that, although bad by western standards, the condition of dwellings in Kano is better than in other Nigerian cities (based on information from previous studies), even when we consider only the high-density neighborhoods. Another major conclusion of this paper is that the four indicators mentioned earlier can be used as predictors for the quality of housing in a particular neighborhood.

Key words: housing, qualitative adequacy, Kano, Nigeria, Africa, housing quality,

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INTRODUCTION

Africa is dealing with one of the fastest urbanization rates in the world. While in 1960 only 15% of the African population was urban, by 2010 the proportion of urbanites went up to 40% and is projected to reach 60% by 2050 (Olotuah and Bobadoye, 2009). In absolute numbers, urban population in Africa is expected to triple over the next 50 years (Freire et al., 2014). Similarly, in Nigeria, urban population has increased from 19.2% in 1963 to 42% in 1991 (Onibokun and Faniran, 1995) and 47.8% in 2015.¹ Rapid urbanization has created a huge demand for urban housing and infrastructure which could not be met by the government and the formal private sector (Ademiluyi and Raji, 2008; Tesfaye, 2007; Tipple, 1994) leading to the development of numerous unplanned and uncontrolled neighborhoods and poorly built housing units (Agboola and Ayanlade, 2016; Chokor, 2005; Dankani and Abubakar, 2011; Muhammad and Bichi, 2014; Msindo et al.,

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¹ www.cia.gov

2013). At the same time, due to overcrowding and poor maintenance, older houses situated in Nigerian city centers are rapidly decaying (Coker et al., 2008; Onibokun and Faniran, 1995). Consequently, between 20% and 35% of urban housing in Nigeria is either dilapidated or in need of major repair (Onibokun, 1987).

The housing problem in Africa, in general, and in Nigeria in particular, is two-fold (Oladapo, 2006). On the one hand, there is massive housing deficit which ranges between 12 and 16 million units (Akeju, 2007; Onwuemenyi, 2008). The government, through the Federal Housing Authority (FHA) managed to build only 30,000 housing units nationwide between 1973 and 2000 (Akeju, 2007) while at least 3 million housing units are needed to be built every year to meet the deficit and replace dilapidated units (Onibokun and Faniran, 1995).

The second major issue related to housing in Nigeria is qualitative. Rapid urban population growth and slow supply of decent housing has led to the proliferation of slums (Aribigbola and Ayeniyo, 2012; Omde, 2010). It is estimated that almost 75% of Nigeria's urbanites live in slums (Olotuah and Bobadoye, 2009). Especially for low – and medium – income families, access to housing outside informally built slums is extremely limited (Berrisford et al., 2008; Chirisa and Matamanda, 2016; Muhammad and Bichi, 2014; Umoh, 2012) proving that the issues of population poverty and housing are inseparable and have to be dealt concomitantly (Fabiya, 2013; Freire et al., 2014). Many studies have confirmed that there was a positive correlation between the population's quality of life and the quality of its houses and suggested that improving the standards of existing houses should be the main focus of housing policies (Odalapo, 2006; Ozdemir, 2002), especially since poor housing conditions could, in time, lead to major health problems for residents (Adetunji and Isah, 2015; Arku et al., 2011; Baker and Douglas, 1990; Govender et al., 2011; Luginaah et al., 2010; Wan and Su, 2016).

There are many studies published on urban housing conditions in Sub-Saharan Africa and in Nigeria. However, most of these studies focus either on slums (Omde, 2010; Sani, 2006; Yoade, 2015; Yoade et al., 2015) or on public housing projects (Djebarni and Al-Abed, 1998; Ibem and Alagbe, 2015; Ibem and Amole, 2011; Ilesanmi, 2010; Olotuah, 2015; Olotuah and Taiwo, 2013; Umoh, 2012). However, focusing strictly on high-density neighborhoods, and especially on squatter settlements, would distort the real situation even though 75% of the urbanites are said to reside in such settlements. These studies paint a very bleak picture of the housing situation in Sub-Saharan Africa. But do all urban Africans live under such conditions? There are, for sure, some studies on gated communities in Sub-Saharan African cities as well as studies on public housing projects. However, to our knowledge, there are few studies depicting a unifying picture of housing conditions in African cities (see, for example, Coker et al., 2008) or comparing housing quality between different types of neighborhoods (Mallo and Anigbogu, 2009). The purpose of this paper is two-fold. The first goal is to assess the housing conditions and quality in the city of Kano, Nigeria. The second and main purpose is to compare housing conditions of Kano residents based on four factors: neighborhood density level, location of the neighborhood, monthly household income and ownership type and status.

The paper is organized the following way: After defining housing adequacy we will proceed with a thorough review of the extant literature on qualitative assessment of housing. Then we will provide a detailed description of the study area including any background information needed to understand the housing situation in the city of Kano. Following this, we will introduce our study approach and methodology. Next we will present our findings and will discuss them in the context of the extant literature. We will also mention the main limitations as well as the main theoretical and policy implications of the study. Finally, we will end the paper with a few concluding remarks.

LITERATURE REVIEW

Shelter is one of the basic human needs together with food and water. The right to adequate housing is recognized as part of the United Nations' Universal Declaration of Human Rights and

included in the wider Right to Adequate Standard of Living (UDHR, 1948). It is then not surprising that a great number of works has been dedicated to assessing the quantitative and qualitative adequacy of housing. Indeed, carrying a survey of existing literature on the urban sector in Nigeria, Onibokun and Faniran (1995) found that, of the 1747 entries, the highest number of entries was recorded under housing. 66% of these works were done at national level, while 5.2% were at state level and 28.7% at local level. But what, exactly, is adequate housing?

Definition of adequate housing

Housing adequacy can be understood from two major perspectives:

1. Quantitative adequacy – debating whether or not the extant housing stock meets the demand in a certain country, region or locality. Many studies on housing in Sub-Saharan Africa pointed out the chronic underdevelopment of this sector (Anim-Odame, 2014; Ganiyu et al., 2017; Makinde, 2014; Ndubueze, 2009).

2. Qualitative adequacy refers to the qualitative appraisal of housing conditions (Lee et al., 2014) and describe the extent to which dwellings fulfill the requirements set for them (Voordt and Wegen, 2005). This is more subjective and more difficult to appraise as the concept of qualitative adequacy is relative to local standards and conditions (Amao and Ilesanmi, 2013).

In this study we will focus on the qualitative aspect of housing adequacy.

The Universal Declaration of Human Rights mentioned above does not provide a definition for qualitative housing adequacy. However, a document released later by the International Committee on Economic, Social and Cultural Rights (ICESCR, 1991) mentions that housing is considered adequate if it meets the following criteria: security of tenure, availability of services, materials, facilities and infrastructure, affordability, habitability, accessibility, location and cultural adequacy.

Numerous definitions can be found when examining the extant literature on housing adequacy (see, among others, McCray and Weber, 1991; Morton et al., 2004; Ogu, 2002; Thiele, 2002; UN-Habitat, 2006), some more comprehensive than others. However, one can easily notice many similarities among these definitions as they were all probably more or less based on the definition articulated by ICESCR (1991). Nevertheless, we have to keep in mind that there may be a different understanding of “adequacy” from one country to another and from one socio-demographic group to another. A dwelling that is considered qualitatively adequate by one group may not be perceived as such by others (Ibem and Alagbe, 2015).

Many countries and local communities have created their own standards against which the quality of housing is judged. For example, the American Housing Survey (AHS) uses a complex classification with 14 criteria to assess physical adequacy of dwellings. This standard was established by the Housing Act of 1949 and reflects the needs and expectations of an American public for “*a decent home and a suitable living environment*” (Eggers and Moumen, 2013). These standards should be understood in a certain cultural, social, environmental and economic context specific to the USA. They cannot be easily replicated when assessing housing conditions in Africa where residents may have different cultural requirements for “*decent*” housing. Cultural values are, therefore, important when assessing housing adequacy in Nigeria (Maina, 2014; Cittadini, 2014). Standards may also be influenced by variations in climate, degree of urbanization and socio-economic progress (Coker et al., 2008).

Most of the definitions and standards mentioned above are based on a set of “*minimum requirements*” which need to be met to ensure “adequacy” or “decency” of housing. However, Shlay (1995) has opined that any definition of adequate housing should go beyond minimum physical requirements and include other issues that would help residents’ ability to become successful members of the society. While many of us may agree with Shlay’s take, this would make the process of quality assessment a lot more difficult, if not impossible.

To sum up, there are six dimensions to housing adequacy, according to the New Zealand-based Habitat for Humanity: affordability, suitability, habitability, and tenure security, freedom from crowding and freedom from discrimination.²

Here habitability refers to:

- The physical condition of the building;
- The existence of basic utilities, facilities and amenities, such as cooking, washing and heating/cooling facilities;
- The condition of the neighborhood.

When assessing qualitative housing adequacy we should, therefore, address (Ibem et al., 2012):

1. interior and exterior structural soundness looking at walls, windows, doors, roofs and ceiling;
 2. information about space and density: availability of space, number of rooms + information about lighting and ventilation, security and privacy of the housing unit);
 3. the availability of basic amenities: water, power supply, sanitary services + accessibility to neighborhood infrastructure (schools, healthcare, recreational, shopping + other basic facilities).
- Due to space constraints, this paper will address only the first set of dimensions.

A review of the extant literature on qualitative assessment of housing in Nigeria

Most scholars on Nigeria's housing situation have assessed the condition of housing in urban centers as inadequate. For example, Onibokun (1987) found that 22.3% of houses nationwide were dilapidated. Moreover, it seems that, since the 1980s, instead of improving, the quality of urban housing has been worsening (Arku et al., 2011; Konadu-Agyemang, 2001; Olokesusi and Okunfulure, 2000).

Olotuah (2006a) examined the physical characteristics of the buildings and the factors that impact the condition of these buildings. The findings point to the poor state of buildings in Akure (Nigeria), most of which were found to be dilapidated (1.8%) or requiring major repairs to make them sound (60.4%). This means that almost two-thirds of all buildings in Akure are substandard, a very high proportion even for a developing country like Nigeria.

In another study, Olotuah (2006b) developed a linear model through multiple regression analysis for the prediction of the housing condition and quality. Twelve independent variables were entered and regressed against housing quality, the dependent variable. Of these, three independent variables (use of toilet, age of buildings and frequency of collection of refuse) were found to be reliable predictors for housing condition and quality.

Olotuah and Taiwo (2013) noticed a rapid deterioration of housing situation in the Nigerian urban centers due mainly to population explosion and massive rural-to-urban migration. The effect of this is a severe shortage of housing units as well as overcrowding and poor quality of extant dwellings. The authors assert that, in order to achieve the goal of adequately housing the urban poor, the strategy should be extensive mass housing development and the use of indigenous materials and methods. Based on two case studies, from Oke-Ola (Ado-Ekiti State) and Kano, the authors have shown that using local, traditional construction materials could be really cost saving.

Yoade (2015) examined the physical and environmental characteristics of traditional core area of Ife-Ile city in Nigeria. He found that more than half of the dwellings in the core area are in a very poor condition, majority of these being more than 30 years old. The building materials used may also be responsible for the deplorable state in which most of these dwellings are in. Thus, 70% of all houses were found to be made of mud while another 20% are made of a combination of mud and brick. Based on these findings, Yoade (2015) concludes that housing conditions in the inner core of Ife-Ile are not suitable for human habitation.

² www.habitat.org.nz

Yoade et al. (2015) assessed the housing and neighborhood condition in Ilesa, Nigeria. They found that most houses were made of less desirable materials such as mud (which constitute almost 40% of the houses) and were very poorly maintained. Based on their findings, they argued that the condition of the building walls is influenced by household income, location of neighborhood and population density level in the neighborhood.

Ogu (2002) developed a systematic spatial assessment of urban satisfaction with housing quality using Benin City, a traditional West African city, as a case study. Based on the physical condition of houses, housing and population density, socioeconomic status of residents, environmental variables and phases of urban development, he identified four residential zones in Benin City: the core area, the intermediate zone, the planned settlement zone and the suburban zone.

Ibem and Amole (2011) assessed the level of qualitative adequacy of newly constructed dwellings in urban centers of Ogun State, Nigeria. They found the overall quality of housing to be inadequate. However, it was mainly the poor neighborhood facilities that deemed the housing quality to be inadequate while the housing unit attributes were, in general, found to be satisfying. The main practical and policy implication resulting from here is that authorities and private investors should pay more attention for the provision of adequate infrastructure facilities. This could increase the level of satisfaction with the quality of housing.

The study by Ilesanmi (2010) evaluated the physical characteristics of buildings and the residential environments of a number of low-income and medium-income public housing estates in Lagos, Nigeria. The assessment revealed a number of building defects and aspects of housing in which maintenance intervention, repairs and renovations were considered urgent.

A study by Jiboye (2010) in three residential zones of Osogbo, Nigeria, on the relationship between housing quality and socio-demographic of household heads revealed a significant relationship between household size and housing quality. He found that in the core area almost 80% of the households include 6 persons or more. This, in author's opinion is an important reason why housing quality in the city's core area is poor compared with other residential areas in the town.

Yetuderonke (2015), using Ogbomoso (Nigeria) as a case study, examined housing adequacy in terms of space and privacy. He found that, although most dwellings were overcrowded by western standards with 8-12 persons cramped in one or two rooms, residents did not see this as a problem but rather as a reflection of a lifestyle based on Yoruba customs and traditions. The author concluded that the adequacy of housing reflects its capacity to meet an individual household's needs.

The paper by Ahianba et al (2008) examined the decay of Nigerian urban built environment and its impacts on the health of city dwellers. The authors found that the main problems leading to decay were: inadequate basic infrastructure amenities, substandard housing, overcrowding, poor ventilation in homes and work places, poor sanitation and non-compliance with buildings by-laws and regulations. The paper also made the assertion that the deterioration of housing conditions could have serious adverse effects on the health of city dwellers.

Speaking of the relationship between housing quality and health of residents, Fabiyi and Garuba (2015) studied the spatial pattern of cardiovascular disease burden in Ibadan City, focusing on differences among neighborhoods. The study showed a high concentration of cardiovascular disease burden in the urban centers and especially in the neighborhoods with high population densities.

Housing quality disparities

One way of looking at housing from a geographical standpoint is to address uneven distribution of access to housing within cities (Gregory et al., 2009). Housing is an important factor for determining the quality of life for all people in cities, and uneven access to adequate and affordable housing is a critical aspect of inequality that classify the types of residential neighborhoods in Kano. In order to measure housing inequality between different residential neighborhoods, aspects of housing location and conditions are of great importance, since the

quality of the residential neighborhoods does not only mirror the city development but also planning and allocation systems between the socio-economic groups (Majale, 2004).

Most people in urban Nigeria live in substandard housing and good quality housing is not readily available to everyone in the Nigerian cities (Ademiluyi and Raji, 2008; Jiboye, 2011). However, without any doubt, some residents live in better quality housing units than others. Thus, in order to better understand local housing realities, we need to examine the housing differences among various groups. This approach may offer insights into how to deal with the housing problems in the most effective way (Ndubueze, 2009).

In developing countries a clear relationship has been noted between population densities and housing conditions (Songsore et al., 2005). In general, three density zones are distinguished in research papers dealing with housing in urban Africa: high-density zone, medium-density zone, and low-density zone. In Nigeria, previous studies have found significant differences in the pattern of housing quality among the three residential zones (Yoade et al., 2015). For example, Mallo and Anigbogu (2009) compared housing quality between residential neighborhoods in the city of Jos, Nigeria. They noted that most residents in low-density neighborhoods and some medium-density neighborhoods live in adequate houses and decent neighborhoods. On the other hand, households in high-density neighborhoods live in dwellings that lack basic infrastructure and facilities. Similarly, location of the neighborhood within the central city or in the suburbs could also generate significant differences in housing quality (Kutty, 1999).

Obeng-Odoom (2009) identified both socioeconomic variables and consumer preferences as having direct association with housing adequacy. Of these variables, income may play the most important role. Indeed, Kutty (1999) maintained that there are important urban housing quality disparities due to differences in monthly household incomes. Also, in a study conducted in Nigeria on residents' perception of housing adequacy and residential satisfaction, Ibem et al. (2015) determined that income and tenure are the strongest predictors of housing adequacy. Similarly, Olotuah (2006a) and Kutty (1999) found that one of the strongest factors that could be used to predict the condition of a building is tenure.

One of the main purposes of the present study is to check whether or not the four factors mentioned here (density level, neighborhood location, income and tenure) generate significant disparities in terms of dwelling adequacy.

STUDY AREA

Kano is a very old city. A local community based in Dala Hill is documented in Kano since the 7th century (Iffe, 2007). Local chiefdoms continued to grow in time and the first kingdom was established in the area in 999 (Adamu, 1984). The city walls were built during the 11th and 12th centuries. They enclose an area of 19.2 km² (Dankani, 2013).

During the same period, the local population started to accept Islam (Adamu, 1984). Islam greatly influenced the architecture of the buildings and the layout of the streets. Thus, while the main streets serve as public roads and are open to everyone, most residential buildings concentrate along cul-de-sacs. Access there is restricted to residents, assuring those households a great deal of privacy (Sani, 2006).

In 1903, a British administration was established outside the city walls and European population began settling in low-density, airy and well-planned government residential areas (GRAs) situated away from the indigenous city from which they were separated by parks and plenty of green spaces. Non-Hausa population also started to settle outside the city walls (Dankani, 2013).

However, a few years later, the colonial administration in Northern Nigeria was moved to other centers and Kano's growth slowed down. After independence (in 1960), and after the creation of Kano State from the Northern Nigeria State, Kano city regained its importance as a major political and commercial center. Population has increased many-fold from 127,000 in 1952 to 1.5 million in 1991 (NPC, 2007).

Today, Kano is the second largest city in Nigeria, after Lagos, and the most important city in northern Nigeria with more than 3 million people living in metropolitan Kano.

As a result, Kano City kept expanding outside the walled city. Many new morphological units were formed in the process, such as Fagge, Nasarawa, Sabon Gari, Gwagwarwa, Tudun Wada, Tarauni, Na'ibawa, Hausawa, Gyadi-Gyadi and Kurnar Asabe (Dankani, 2013).

To better administer the resulted urban agglomeration, local Edict No. 15 of 1990 created the Kano Metropolitan Area consisting of all land within a radius of 32 Km from Kurmi Market (the central market within the Kano City walls). Using this definition, Kano Metropolitan Area would include (Dankani, 2013; figure 1):

1. The Dala Municipality, Nasarawa, Fagge, Tarauni, Gwale, Kumbotso and Ungago Local Government Areas;
2. Parts of Dawakin Tafa, Gezawa, Kura and Rimin Gado Local Government Areas.

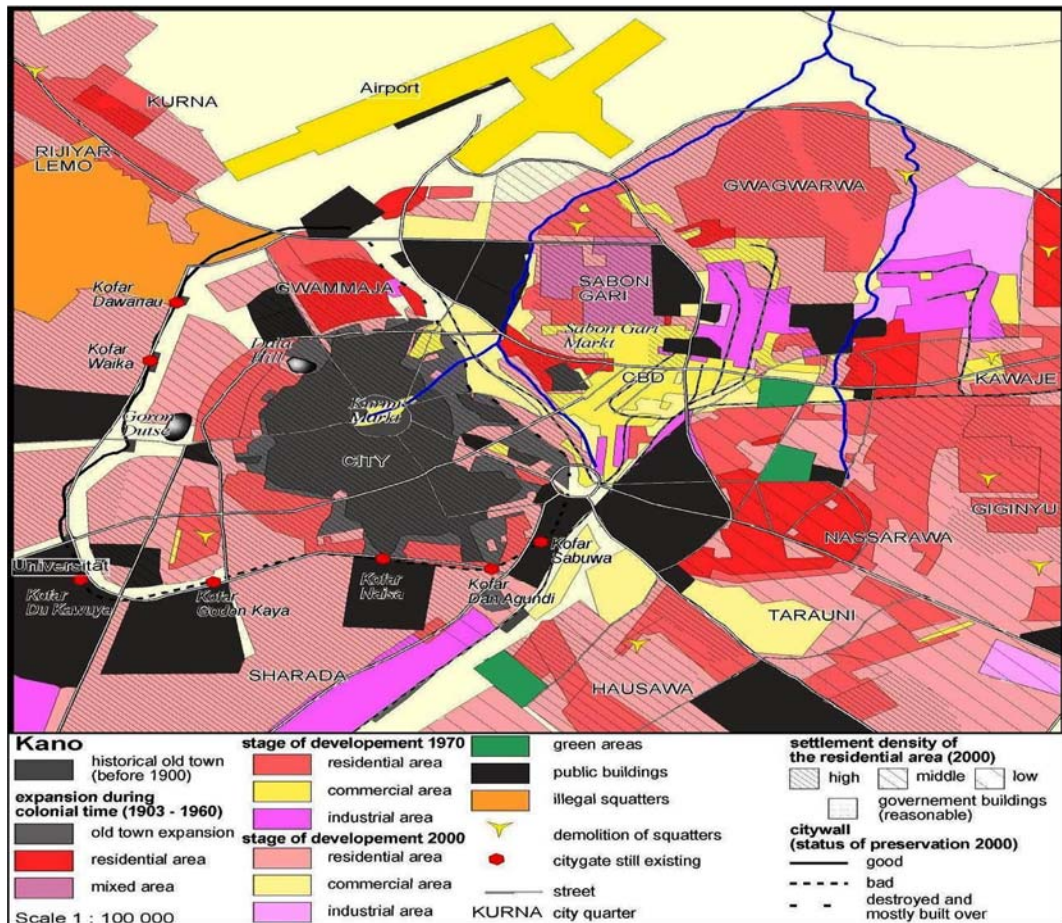


Figure 1. Map of metropolitan Kano
(Source: Nabegu, 2008)

The following table (table 1) shows the population of Kano Metropolitan Area and of each component Local Government Area (LGA) recorded at the 2006 Census and as a 2011 projection. The population of parts of Dawakin Tafa, Kura and Rimin Gado LGAs, which are included in the Kano Metropolitan Area, was not computed.

Table 1. Population Kano, Nigeria by Local Government Area (LGA)
(Data source: National Population Commission of Nigeria)

LGA	Population – Census 2006	Population Projection 2011
Dala	418,759	493,880
Fagge	200,095	235,990
Gwale	357,827	422,020
Kano Municipal (“walled city”)	371,243	437,840
Kumbotso	294,391	347,200
Nasarawa	596,411	703,400
Tarauni	221,844	261,640
Ungogo	365,737	431,350
Kano Metropolitan Area	2,828,861	3,333,300

Rapid growth of population fueled by high natural growth rates and rural-to-urban migration has worsened the housing situation in the city both quantitatively and qualitatively (Dankani and Abubakar, 2011). In Kano, the housing deficit was calculated at 500,000-600,000 units (Ajanlekoko, 2001). This has resulted in overcrowding, high rents and prices, insecurity of tenure and low-quality infrastructural services (Ajanlekoko, 2001). The average household size in Kano is 6.7 and the number of persons occupying one room generally ranges from 1.6 to 3.0 (Sani, 2006); however, Audu (2013) reckons that room occupancy rate could be as high as four persons per room in some areas.

Overcrowding and the increased pressure on the existing housing stock have led to the deterioration of housing conditions. In Kano State, the proportion of substandard housing units (21.3%), which consists of dilapidated housing (2.7%) and of dwellings in need of major repair (18.6%) is higher than in Nigeria (15.8%; 0.5%; and 15.3% respectively) (Onibokun, 1987). As a direct consequence, urban utilities (water, electricity and waste disposal) are grossly inadequate as are the social amenities such as schools and health centers or the availability of recreation opportunities (Onibokun and Faniran, 1995).

The housing situation is worst for the urban poor, many of whom are compelled to live in dehumanizing environments. Due to the high cost of decent housing, most poor households are forced to live in self-made structures in slums and squatter settlements (Dankani, 2013; Dankani and Abubakar, 2013; NPC, 2007).

METHODOLOGY

Approach

There are two major research approaches for the assessment of the condition of housing units: the normative (or objective) quality evaluation approach and the satisfaction approach. The normative technique is used to assess the qualitative adequacy of housing based on local, national or global parameters (Ibem and Amole, 2011; Ogu, 1994). In this case, the quality of the housing unit and of the surrounding environment is judged against these “*minimum standards*” and when these are not met outside intervention is deemed necessary (Burisch, 1979). In the second approach, people self-evaluate the adequacy of their housing environment based on self-assessed needs and aspirations. In this case, in order to assess adequacy, residents, rather than using certain international, national or local standards, compare the condition and quality of their housing environment with standards they believe they may reasonably aspire to have (Al-Momani, 2003; Galster, 1987). In this study, we follow the first approach: our survey assistants were instructed to visually inspect the physical condition of the building and to assess adequacy based on standards previously discussed with the first author. The research assistants and the first author are all local and have a good understanding of the local housing realities. In the absence of official local standards for housing adequacy, we believe it was more relevant to base our assessment on a

standard created by a panel of local inhabitants than to use a standard based in a developed country or in a place with a completely different economic, social, physical or cultural environment.

Data acquisition

The data for this study were collected from both primary and secondary sources. The primary data were collected using a structured questionnaire administered to household heads selected across the metropolitan Kano. We approached household heads because household heads are those who make housing decisions in Africa (Sinai, 2001). While administering the questionnaires, we also visually observed the spatial arrangement and condition of buildings and of the physical surroundings. The study also relied on various secondary sources such as journal articles, books, conference presentation papers, and PhD dissertations. Other materials were collected from government agencies such as: the National Population Commission, Kano State Urban Planning and Development Authority (KANUPDA), and Community Department in three local government headquarters in the metropolitan area of Kano (Kano Municipal, Gwale and Nasarawa Local Governments Areas).

Neighborhood selection

Our population sampling method and study area selection are somewhat similar to those used by Yoade et al. (2015) and other scholars of Africa housing. In selecting the neighborhoods in which to conduct our study we were guided by two aspects characteristic to cities in Sub-Saharan Africa:

1. Any city in Sub-Saharan Africa can be divided along residential density lines (Aliu and Ajala, 2014; Coker et al., 2008; Godon, 1983). As such, we can easily distinguish three zones in Kano: high-density neighborhoods, medium-density neighborhoods and low-density neighborhoods. In high-density neighborhoods, in general, more than 300 persons live on one hectare of land, while in medium-density neighborhoods the density may be between 100 and 300 persons and in low-density neighborhoods below 100 persons (Coker et al., 2008).

2. African cities can also be divided between a historical urban core (in Kano, the old “*walled city*”) and a rapidly-expanding suburban area. Some studies also mention a transition area. However, while the limit between the walled city and the suburban area in Kano is very clear, the limit between a transition zone and the suburban area would be more difficult to determine. Thus, for practical reasons, we divided the city of Kano into two zones separated by the old wall. Similar to many inner city cores in Nigeria, the “*walled city*” comprises largely traditional compound housing. Residents here are local Hausa people, and, therefore, more organized on a communal basis, living with extended families and owning property in common. They also seemed to be more attached to African values (Chokor, 2005). The suburbs are often occupied by Hausa populations from other parts of Northern Nigeria, as well as non-Hausa populations and non-Muslim populations settled here from the south of Nigeria or from other countries. Therefore, the communal bound is less visible there. Three distinct types of neighborhoods could be found outside the old wall. The wealthy (business people, professionals, high ranking administrators) live in high quality modern residential neighborhoods, such as the GRAs, with low density of buildings and population and surrounded by green belts. These neighborhoods have developed under modern planning policies, have good accessibility and connectivity and are protected by zoning regulations. Emphasis here is on the nuclear family (Chokor, 2005). Many migrant traders and businessmen, who cannot afford to live in GRAs, live in houses developed by private property interests that are motivated by profits rather a concern for African values, in medium-density neighborhoods. Finally, the poor have no other choice but to live in crowded, self-built houses often situated on land occupied illegally and lacking access to most basic utilities and amenities.

We then selected two neighborhoods from each residential density zones. Of the two neighborhoods, one was to be from the walled city and one from the suburbs. However, there is no low-density neighborhood within the walled city. In this case we tried to pick a neighborhood that was close to the city walls and one that was farther away.

High-density residential zones

We selected two high-density neighborhoods for our study; Tudun Wazirchi (within the old walled city) and Dorayi Karama (in the suburban area). Tudun Wazirchi is a very high-density residential neighborhood situated in the old city of Kano and is characterized by low accessibility, especially to motorized vehicles. Most residents here are low-income earners, although there are also some middle- to high-income business people and civil servants. There are 1829 houses in the neighborhood with 18,295 inhabitants.³ Dorayi Karama is an unregulated residential area situated in suburban Kano. It is a typical squatter settlement resulted from illegal development of lands for house building popularly known as “*Awon Igiya*”. One of the fastest growing residential areas in Kano, Dorayi Karama is characterized by narrow streets and overcrowded houses with poor sanitary conditions, inhabited mainly by low-income earners. There are 1638 housing units in the neighborhood with a population of 19,200 inhabitants.

Medium-density residential zones

The two neighborhoods we selected for analysis are Sani Mainagge B (within the walled city) and NNDC Quarters (in the suburbs). Sani Mainagge B is relatively well-planned and has good accessibility. Most residents here are middle-income and high-income business people. A total of 8,145 people live in the 905 housing units in this neighborhood. NNDC Quarters is of similar size with 953 housing units and 8,577 inhabitants comprising of middle- to high-income earners (mainly civil servants, security personnel and business people). Housing development continues at the edges of this suburban neighborhood.

Low-density residential zones

As already intimated, there is no low-density residential neighborhood located within the city walls. Of the two low-density residential areas selected for this study, Sharada Phase I is the closest to the old walled city while Nasarawa GRA is situated well out into the suburbs. Sharada Phase I was built after independence to house civil servants. It has a well laid-out plan with good accessibility. As expected, most residents of this neighborhood are high-income earners. There are 4285 residents living in 856 housing units. Nasarawa GRA was initially built to house the European population during the British colonial administration. Today, the Kano State government house is located there. This is a very low-density neighborhood with a well-laid out plan and a good transport network and is situated close to all major commercial and administrative parts of the state. Nasarawa GRA is one of the wealthiest neighborhoods in Kano with most of the residents in the high-income category. The neighborhood comprises of 1034 housing units with 5,173 inhabitants.

Sampling method

A systematic sampling method was adopted to select household heads from each of the six neighborhoods. The household head of each n^{th} housing unit was selected to be interviewed where n was based on the number of houses in each neighborhood. So, for example, there are a little over 1800 dwellings in Tudun Wazirchi. Since we aimed at collecting 100 questionnaires from each neighborhood, we selected each 18th house in the neighborhood to be part of our study. If the household head refused to participate we moved on to the next house. In total, a number of 600 questionnaires were administered between the six neighborhoods. However, some of these questionnaires had too many missing answers and were discarded. In the end, a number of 534 questionnaires were deemed usable for the study.

Data Analysis

The data derived from the questionnaires were analyzed using the Statistical Package for Social Sciences (SPSS). We used descriptive statistics to examine the demographic profile of our

³ The figures are based on the 2013 house numbering exercise conducted by the state ministry of local government.

respondents and to understand the qualitative adequacy of housing conditions in the city of Kano. Although in some cases the qualitative analysis of housing may include access to different types of utilities and amenities and even an analysis of the surrounding environment, in this study, due to space constraints, we limited ourselves to the structural analysis of the housing units, including the condition of the walls, roofs, painting, doors and windows.

We, then, conducted chi-square tests for independence to understand whether or not there was a significant association between the condition of different parts of the dwelling (walls, roof, painting, windows and doors) – or Variable A – and different neighborhood (density level and location within or outside the city walls) or socio-demographic characteristics (household monthly income and ownership type) – Variable B. Our null hypothesis is that knowing the level of Variable B does not help us predict the level of Variable A (meaning that the two sets of variables are independent). The alternative hypothesis would be that the two sets of variables are not independent, meaning that they are related (without actually implying that one “*determines*” the other).

FINDINGS

Socio-demographic characteristics of the respondents

For our study, we surveyed 403 male (75.5%) and 131 female (24.5%) residents across the six neighborhoods selected within the three residential density zones (table 2). Whenever possible, we attempted to speak with the household head, hence the much higher proportion of men among our respondents. This is a characteristic of a patriarchal society and has been reported also by other similar studies (see, for example, Yoade et al., 2015). The majority of the respondents is within the age group of 40-60 (54.7%) followed by respondents within the age of 21-40 which constituted 39.7% of the total residents, while very small numbers of respondents were recorded to be within the age of 60 and above. In terms of marital status table 2 shows that about 88.6% of the surveyed residents were married. Although not recorded, many male respondents reported having multiple wives, polygyny being widespread in the city. Our respondents were from all walks of life, with the greatest proportion being business people, self-employed (often in the informal sector) and civil servants (table 2).

Table 2. Socio-demographic characteristics of respondents
(Data source: Authors' survey, 2014)

Attribute	Frequency	Percent	Valid Percent
Gender			
Male	403	75.5	
Female	131	24.5	
Age			
21-40	212	39.7	
41-60	292	54.7	
Above 60	30	5.6	
Marital status			
Single	12	2.2	
Married	473	88.6	
Widow/widower	49	9.2	
Occupation			
No occupation	6	1.1	
Student	3	0.6	
Self-employed	76	14.2	
Employed by a private company	60	11.2	
Business person/business owner	192	36.0	
Civil servant	129	24.2	
Security personnel	23	4.3	
Retired	28	5.2	
Other (e.g. housewife)	17	3.3	

Average household monthly income (in Nigerian Naira)			
Low income (below 38,000)	82	15.4	15.4
Medium income (38,000-70,999)	88	16.6	16.6
Middle-high income (71,000-145,000)	121	22.8	22.8
High income (over 145,000)	240	45.2	45.2
Missing value	3		
Education			
Qur'anic/Islamiyya School	67	12.5	12.6
Primary	5	0.9	0.9
Secondary	78	14.6	14.7
Tertiary	81	15.2	15.3
University	225	42.1	42.5
Post-graduate school	64	12.0	12.1
Adult education	10	1.9	1.9
Missing value	4	0.7	
Household size			
1-2	6	1.1	1.2
3-4	141	26.4	27.5
5 and above	365	68.4	71.3
Missing Values	22	4.1	
Total	534	100.0	

Table 2 also shows that the majority of our respondents were relatively well-off by Nigerian standards and well-educated with more than half having university diplomas or post-graduate degrees. The data obtained shows that most of our respondents have big families, 43.3% of the households surveyed having 3-4 children, and 34.5% having 5 children or more. This explains why most households are big (with five or more members). Large households are still the norm in Africa and have been reported in many other studies. For example, 64.4% of the residents surveyed by Yoade et al. (2015) lived in households that included seven or more members.

Housing Type occupied and Ownership Status of the Respondents

The study also recorded the type of housing occupied by the households surveyed and ownership status. The results are presented in table 3.

Table 3. Type of housing units
(Data source: Authors' survey, 2014)

Attributes	Name of neighborhood												Total	
	Low density zone				Medium density zone				High density zone					
	Nassarawa GRA		Sharada Phase I		Sani Mainagge B		NNDC Quarters		Tudun Wazirchi		Dorayi Karama		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Single-family house	44	48.9	57	65.5	52	73.0	54	61.3	87	94.1	85	92.4	389	72.8
Detached two-story house	0	0	46	52.9	36	42.4	12	13.6	1	1.1	7	7.6	102	19.1
Bungalow	44	48.9	6	6.9	18	21.2	42	47.7	86	93.0	78	84.8	274	51.3
Multi-story building	0	0	5	5.7	8	9.4	0	0	0	0	0	0	13	2.4
Multi-family house	46	51.1	31	35.6	21	27.0	34	38.6	6	6.5	7	7.6	145	27.2
Duplex/Triplex/Quadruplet	46	51.1	30	34.5	19	22.4	34	38.6	0	0	0	0	129	24.2

Apartment	0	0	1	1.1	2	2.4	0	0	0	0	0	0	3	0.6
Room(s) in a house	0	0	0	0	0	0	0	0	6	6.5	7	7.6	13	2.4
Total	90	100	87	100	85	100	88	100	92	100	92	100	534	100

In the low-density neighborhoods, most households in Sharada Phase I live in detached two-story houses whereas in Nasarawa GRA most of our respondents were split between duplex/triplex/quadruplet (51.1%) and bungalow (48.9%). In the medium-density neighborhoods, most households lived in single-family houses, with respondents from Sani Mainagge B preferring two-story houses and respondents from NNDC Quarters living mainly in bungalows. Almost all households in the high-density neighborhoods inhabited bungalow-style houses (usually located within a compound), with a minority occupying room(s) in a house.

Also majority of the respondents were owners and only 21.5% rented their housing units. Most of the owners built the house themselves and less than 10% of the respondents bought the house through a mortgage system. However, there are important differences at neighborhood level. For example, a lot more households seem to be renting in the high-density neighborhoods than in low-density neighborhoods. Also while, in low density neighborhoods, most households have acquired their house with cash, in high-density neighborhoods most families have either inherited their house (Tudun Wazirchi) or have built them (Dorayi Karama). Almost all houses bought through a mortgage system are in the low-density neighborhoods (table 4).

Table 4. Home ownership status
(Data source: Authors' survey, 2014)

Attributes	Name of neighborhood												Total	
	Low density zone				Medium density zone				High density zone					
	Nassarawa GRA		Sharada Phase I		Sani Mainagge B		NNDC Quarters		Tudun Wazirchi		Dorayi Karama		N	%
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Ownership status														
Inherited	13	14.4	12	13.8	9	10.6	8	9.1	69	75.0	5	5.4	116	21.7
Bought with cash	36	40.0	22	25.3	14	16.5	15	17.0	3	3.3	4	4.3	94	17.6
Mortgage	26	28.9	23	26.4	0	0	0	0	0	0	2	2.2	51	9.6
Built the house	1	1.1	15	17.2	47	55.3	39	44.3	7	7.6	49	53.3	158	29.6
Total owner	76	84.4	72	82.7	70	82.4	62	70.4	79	85.9	60	65.2	419	78.5
Renter	14	15.6	15	17.2	15	17.6	26	29.5	13	14.1	32	34.8	115	21.5
Total	90	100	87	100	85	100	88	100	92	100	92	100	534	100

Age of the building

Most housing units appeared to be relatively old (table 5). However, there were important differences among neighborhoods. Among the housing units in the high-and medium-density neighborhoods the difference in terms of building age is mainly generated by the location of the neighborhood within or outside the city walls. Thus, in the neighborhoods situated within the walled city, the housing units tend to be older. For example, in Tudun Wazirchi, over three-quarters of the housing stock is older than 20 years. On the other hand, in the suburban neighborhoods, buildings are generally less than 20 years old. For example in NNDC Quarters, 96.6% of the housing stock is less than 20 years old while in Dorayi Karama the proportion of newer buildings amounts to 79.4%. When we look at the low-density neighborhoods, the situation is completely opposite. Although both low-density

neighborhoods are situated in the suburbs, they are dominated by older dwellings. Thus, 86.7% of the dwellings in Nasarawa GRA and 61% of the houses in Sharada Phase I are 20 years old or older (table 5).

Table 5. Age of the dwellings
(Data source: Authors' survey, 2014)

Age of the dwelling (in years)	Name of neighborhood												Total	
	Low density zone				Medium density zone				High density zone					
	Nassarawa GRA		Sharada Phase I		Sani Mainagge		NNDC Quarters		Tudun Wazirchi		Dorayi Karama		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Less than 10	1	1.1	5	5.7	10	11.8	47	53.4	12	13.0	31	33.7	106	19.9
10-19	11	12.2	29	33.3	36	42.4	38	43.2	11	11.9	42	45.7	167	31.3
20-29	54	60.0	39	44.8	36	42.4	3	3.4	12	13.0	12	13.0	156	29.2
30-39	22	24.4	13	14.9	3	3.5	0	0	11	11.9	5	5.4	54	10.1
40 and above	2	2.2	1	1.1	0	0	0	0	46	50	2	2.2	51	9.6
Total	90	100	87	100	85	100	88	100	92	100	92	100	534	100

Qualitative Assessment of Housing Conditions

Besides evaluating the general (structural) condition of the housing units we have also examined the quality of several of their components, such as the walls, the roof, the outside painting, the doors and the windows. The examination of the component parts of the dwellings can be done either by recording the main material they are made of (see for example Bello and Egresi, 2014; Mallo and Anigbogu, 2009; Odediran et al., 2013; Tesfaye, 2007) or by evaluating their condition (Govender et al., 2011; Olotuah, 2006b). In this study the latter approach is applied.

Walls

The analysis of housing across different residential density zones shows that, the majority of the housing surveyed (73%) has signs of crack on its walls (table 6). However, while in low density and medium density neighborhoods no dwelling has open cracks and no dwelling is on support or needs to be put on support, in high density neighborhoods almost one-quarter of all homes have open cracks and a few (5%) even are on support or need to be put on support (table 7).

Table 6. Evaluation of the condition of various dwelling parts by neighborhood
(Data source: Authors' survey, 2014)

Attribute condition	Name of neighborhood												Total	
	Low density zone				Medium density zone				High density zone					
	Nassarawa GRA		Sharada Phase I		Sani Mainagge		NNDC Quarters		Tudun Wazirchi		Dorayi Karama		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Walls														
No crack	26	28.9	15	17.2	16	18.8	28	31.8	6	6.5	2	2.2	93	17.4
Sign of crack	64	71.1	72	82.8	69	81.2	60	68.2	47	51.1	78	84.8	390	73.0
Open crack	0	0	0	0	0	0	0	0	33	35.9	9	9.8	42	7.9
On support or needs support	0	0	0	0	0	0	0	0	6	6.5	3	3.3	9	1.7

Painting														
Paint in good condition	37	41.1	37	42.5	40	47.1	45	51.1	2	2.2	6	6.5	167	31.3
Some padding	49	54.4	39	44.8	37	45.5	43	48.9	27	29.3	48	52.2	243	45.5
Paint peeling	4	4.4	5	5.7	2	2.4	0	0	34	36.9	16	17.4	61	11.4
Not painted	0	0	6	6.9	6	7.1	0	0	29	31.5	22	23.9	63	11.8
Roof														
Firm and solid	86	95.6	87	100	81	95.3	88	100	26	28.3	42	45.7	410	76.8
Some rust	4	4.4	0	0	3	3.5	0	0	60	62.5	50	54.3	117	21.9
Loose and flapping	0	0	0	0	0	0	0	0	4	4.3	0	0	4	0.7
Ridges and overlap open up	0	0	0	0	1	1.2	0	0	2	2.2	0	0	3	0.6
Total	90	100	87	100	85	100	88	100	92	100	92	100	534	100

The differences in terms of wall quality between the three density zones are shown to be statistically significant ($X^2(6)=125.858$; $p=0.000$). Major differences in wall quality are also visible when looking at the location of the neighborhoods ($X^2(3)=49.491$; $p=0.000$) (table 8).

Thus, more dwellings situated within the walled city have open cracks (18.6%) or need support (3.4%) than dwellings situated in the suburban neighborhoods (2.5% and 0.8% respectively). We also found statistically significant differences for wall quality based on average household income ($X^2(9)=180.888$; $p=0.000$) (table 9).

Where household incomes are over 71,000 Naira no dwelling has open cracks or in need of support. Under 71,000 Naira, however, the proportion of houses with open cracks and of those on support or in need of support rises with the declining incomes. Our study has also revealed that homes bought with cash or on mortgage have the best quality walls (none of these dwellings has open cracks or is in need of support) (table 10).

On the other hand, houses that are inherited have the worst quality walls (28.4% have open cracks and 3.4% need support). The differences based on ownership status are shown to be statistically significant ($X^2(12)=104.735$; $p=0.000$).

Table 7. Evaluation of the condition of the walls by residential density zones
(Data source: Authors' survey, 2014)

Condition of the walls	Residential density zones ($X^2=125.858$; $df=6$; $p=0.000$)							
	Low density		Medium density		High density		Total	
	N	%	N	%	N	%	N	%
No crack	41	23.2	44	25.4	8	4.3	93	17.4
Sign of crack	136	76.8	129	74.6	125	67.9	390	73.0
Open crack	0	0	0	0	42	22.8	42	7.9
On support or needs support	0	0	0	0	9	4.9	9	1.7
Total	177	100	173	100	184	100	534	100

Table 8. Evaluation of the condition of the walls by the location of the neighborhood
(Data source: Authors' survey, 2014)

Condition of the walls	Location of neighborhood ($X^2=49.491$; $df=3$; $p=0.000$)					
	Walled City		Suburbs		Total	
	N	%	N	%	N	%
No crack	22	14.4	71	19.9	93	17.4
Sign of crack	116	65.5	274	76.8	390	73.0
Open crack	33	18.6	9	2.5	42	7.9
On support or needs support	6	3.4	3	0.8	9	1.7
Total	177	100	357	100	534	100

Table 9. Evaluation of the condition of the walls by household monthly income
(Data source: Authors' survey, 2014)

Condition of the walls	Household monthly income (in Nigerian Naira) ($X^2=180.888$; $df=9$; $p=0.000$)									
	< 38,000		38,000-71,000		71,000-145,000		>145,000		Total	
	N	%	N	%	N	%	N	%	N	%
No crack	0	0	2	2.3	36	29.6	55	22.9	93	17.5
Sign of crack	50	61.0	70	79.5	85	70.2	185	77.1	390	73.4
Open crack	23	28.0	16	18.2	0	0	0	0	39	7.3
On support or needs support	9	11.0	0	0	0	0	0	0	9	1.7
Total	82	100	88	100	121	100	240	100	531	100

Table 10. Evaluation of the condition of the walls by ownership status
(Data source: Authors' survey, 2014)

Condition of the walls	Ownership status ($X^2=104.735$; $df=12$; $p=0.000$)											
	Inherited		Bought with cash		Mortgage		Self-built		Rented		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
No crack	12	10.3	28	29.8	9	17.6	29	18.4	15	13.0	93	17.4
Sign of crack	67	57.8	66	70.2	42	82.4	122	77.2	93	80.9	390	73.0
Open crack	33	28.4	0	0	0	0	4	2.5	5	4.3	42	7.9
On support or needs support	4	0.7	0	0	0	0	3	1.9	2	1.7	9	1.7
Total	116	100	94	100	51	100	158	100	115	100	534	100

Painting condition

The painting condition of housing in Kano also shows a polarized situation. Whereas in the low and medium density neighborhoods close to a half of all the houses are painted and shining, in the high density neighborhoods only a small percentage of the houses are in this state (4.3%) while the majority either have their painting peeling or have no painting whatsoever (54.9%) (table 11). The differences are statistically significant ($X^2(6)=190.658$; $p=0.000$). Location of neighborhood (within or outside the city walls) also matters in the analysis of painting condition (table 12). Thus, dwellings in the suburbs have their paintings in much better conditions than dwellings within the walled city, with the differences being shown to be statistically significant ($X^2(3)=42.603$; $p=0.000$). Almost 43% of the highest income households and almost 48% of the middle-high income households live in dwellings that are painted and shining and only 7.6% and 7.5% respectively live in dwellings with painting peeling or no painting (table 13). On the opposite, only 1.2% of the low income households live in housing with good painting condition while two-thirds of these households have to live in dwellings with no painting or with painting that is peeling

($X^2(9)=235.528$; $p=0.000$). Finally, in terms of ownership status, 43.4% of dwellings bought with cash and 43.1% of those mortgaged have their outside wall painting in very good condition and only 3.2% and 13.7% respectively have their painting peeling or have no painting (table 14).

Table 11. Evaluation of painting condition by residential density zones
(Data source: Authors' survey, 2014)

Painting condition	Residential density zones ($X^2=190.658$; $df=6$; $p=0.000$)							
	Low density		Medium density		High density		Total	
	N	%	N	%	N	%	N	%
Paint in good condition	74	41.8	85	49.1	8	4.3	167	31.3
Some padding	88	49.7	80	46.2	75	40.8	243	45.5
Paint peeling	9	5.1	2	1.2	50	27.2	61	11.4
Not painted	6	3.4	6	3.5	51	27.7	63	11.8
Total	177	100	173	0	184	100	534	100

Table 12. Evaluation of the condition of outside painting by the location of the neighborhood
(Data source: Authors' survey, 2014)

Painting condition	Location of neighborhood ($X^2=42.603$; $df=3$; $p=0.000$)					
	Walled City		Suburbs		Total	
	N	%	N	%	N	%
Paint in good condition	42	23.7	125	35.0	167	31.3
Some padding	64	36.2	179	50.1	243	45.5
Paint peeling	36	20.3	36	7.0	61	11.4
Not painted	35	19.8	28	7.8	63	11.8
Total	177	100	357	100	534	100

Table 13. Evaluation of the condition of outside painting by household monthly income
(Data source: Authors' survey, 2014)

Painting condition	Household monthly income (in Nigerian Naira) ($X^2=235.528$; $df=9$; $p=0.000$)									
	< 38,000		38,000-71,000		71,000-145,000		>145,000		Total	
	N	%	N	%	N	%	N	%	N	%
Paint in good condition	1	1.2	5	5.7	58	47.9	103	42.9	167	31.5
Some padding	26	31.7	44	50.0	54	44.6	119	49.6	243	45.8
Paint peeling	17	20.7	29	33.0	6	5.0	9	3.8	61	11.5
Not painted	38	46.3	10	11.4	3	2.5	9	3.8	60	11.3
Total	82	100	88	100	121	100	240	100	531	100

Table 14. Evaluation of the condition of outside painting by ownership status
(Data source: Authors' survey, 2014)

Painting condition	Ownership status ($X^2=89.194$; $df=12$; $p=0.000$)											
	Inherited		Bought with cash		Mortgage		Self-built		Rented		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Paint in good condition	27	23.3	42	44.7	22	43.1	47	29.7	29	25.2	167	31.3
Some padding	34	29.3	49	52.1	22	43.1	88	55.7	50	43.5	243	45.5
Paint peeling	24	20.7	1	1.1	7	13.7	7	4.4	22	19.1	61	11.4
Not painted	31	26.7	2	2.1	0	0	16	10.1	14	12.2	63	11.8
Total	116	100	94	100	51	100	158	100	115	100	534	100

On the other hand, only 23.3% of the houses that were inherited have their wall painting in good condition while almost half of the houses in this category have their painting peeling or have no painting ($X^2(12)=89.194$; $p=0.000$).

Roofing

Table 15 shows that, in the low- and medium-density zones almost all houses surveyed have firm and solid roofs. In the high-density zone, only 37% of all dwellings have firm and solid roofs while the majority have some rust (59.8%) and a few (3.3%) have major problems ($X^2(6)=251.280$; $p=0.000$). Also, houses in the suburbs tend to have roofs in better state than houses located within the walled city ($X^2(3)=45.935$; $p=0.000$) (table 16). When examining roofing conditions based on household income we found that almost all high and medium-high income households live in houses with roofs in good condition (table 17).

Table 15. Evaluation of the condition of the roofs by residential density zones
(Data source: Authors' survey, 2014)

Roof condition	Residential density zones ($X^2=251.280$; $df=6$; $p=0.000$)							
	Low density		Medium density		High density		Total	
	N	%	N	%	N	%	N	%
Firm and solid	173	97.7	169	97.7	68	37.0	410	76.8
Some rust	4	2.3	3	1.7	110	59.8	117	21.9
Loose and flapping	0	0	0	0	4	2.2	4	0.7
Ridges and overlap open up	0	0	1	0.6	2	1.1	3	0.6
Total	177	100	173	100	184	100	534	100

Table 16. Evaluation of the condition of the roofs by the location of the neighborhood
(Data source: Authors' survey, 2014)

Roof condition	Location of neighborhood ($X^2=45.935$; $df=3$; $p=0.000$)					
	Walled City		Suburbs		Total	
	N	%	N	%	N	%
Firm and solid	107	60.5	303	84.9	410	76.8
Some rust	63	35.6	54	15.1	117	21.9
Loose and flapping	4	2.3	0	0	4	0.7
Ridges and overlap open up	3	1.7	0	0	3	0.6
Total	177	100	357	100	534	100

Table 17. Evaluation of the condition of the roofs by household monthly income
(Data source: Authors' survey, 2014)

Roof condition	Household monthly income (in Nigerian Naira) ($X^2=245.216$; $df=9$; $p=0.000$)									
	< 38,000		38,000-71,000		71,000-145,000		>145,000		Total	
	N	%	N	%	N	%	N	%	N	%
Firm and solid	31	37.8	31	35.2	113	93.4	235	97.9	410	77.2
Some rust	50	61.0	52	59.1	7	5.8	5	2.1	114	21.5
Loose and flapping	1	1.2	3	3.4	0	0	0	0	4	0.8
Ridges and overlap open up	0	0	2	2.3	1	0.8	0	0	3	0.6
Total	82	100	88	100	121	100	240	100	531	100

The situation is different with dwellings of low and middle income households. Only a little over one-third of these roofs are in perfect condition while 1.2% and 5.6% respectively had major issues with the majority in both categories having minor problems (rust). The differences were found to be statistically significant ($X^2(9)=245.216$; $p=0.000$). Almost all dwellings bought with

cash or mortgaged have firm and solid roofs while houses that were inherited have the worst quality roofing with only 52.6% being in good condition while the rest have minor (42.2%) or major (5.1%) issues ($X^2(12)=88.941$; $p=0.000$) (table 18).

Table 18. Evaluation of the condition of the roofs by ownership status
(Data source: Authors' survey, 2014)

Roof condition	Ownership status ($X^2=88.941$; $df=12$; $p=0.000$)											
	Inherited		Bought with cash		Mortgage		Self-built		Rented		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Firm and solid	61	52.6	93	98.9	47	92.2	131	82.9	78	67.8	410	76.8
Some rust	49	42.2	1	1.1	4	7.8	27	17.1	36	31.3	117	21.9
Loose and flapping	4	3.4	0	0	0	0	0	0	0	0	4	0.7
Ridges and overlap open up	2	1.7	0	0	0	0	0	0	1	0.9	3	0.6
Total	116	100	94	100	51	100	158	100	115	100	534	100

Doors and windows

We found doors and windows to be adequate across all population groups and neighborhoods. Most of the problems found were minor. The differences among population groups based on the four indicators were not found to be statistically significant.

Structure of the Building

Table 19 shows that, in general terms, the structural condition of houses in Kano is good, only 2% of the surveyed houses being dilapidated and 16.5% in need of major repairs. However, there are major differences between the three density zones ($X^2(6)=220.643$; $p=0.000$) (table 20). While in low-density and medium-density neighborhoods almost all dwellings are physically sound or need only minor repairs, in high-density neighborhoods, more than half of all dwellings are dilapidated or need major repair.

Also, the general state of housing in the suburban area seems to be better than that of the housing situated within the walled city ($X^2(3)=25.353$; $p=0.000$) (table 21) and dwellings inhabited by households with higher monthly incomes are qualitatively better than dwellings inhabited by households with lower monthly incomes ($X^2(9)=279.878$; $p=0.000$) (table 22).

Table 19. Evaluation of the general condition of the dwellings by neighborhood
(Data source: Authors' survey, 2014)

General (structural) condition of the dwelling	Name of neighborhood												Total	
	Low density zone				Medium density zone				High density zone					
	Nassarawa GRA		Sharada Phase I		Sani Mainagge		NNDC Quarters		Tudun Wazirchi		Dorayi Karama		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
Physically sound	24	26.7	20	22.9	26	30.6	36	40.9	5	5.4	4	4.3	115	21.6
Needs minor repair	65	72.2	65	74.7	58	68.2	50	56.8	36	39.1	44	47.8	318	59.8
Needs major repair	1	1.1	2	2.3	1	1.2	0	0	42	45.5	42	45.5	88	16.5
Dilapidated	0	0	0	0	0	0	0	0	9	9.8	2	2.2	11	2.1
Total	90	100	87	100	85	100	86	100	92	100	92	100	532	100

Table 20. Evaluation of the general condition of the dwellings by residential density zones
(Data source: Authors' survey, 2014)

General state of the dwelling	Residential density zones ($X^2=220.643$; $df=6$; $p=0.000$)							
	Low density		Medium density		High density		Total	
	N	%	N	%	N	%	N	%
Physically sound	44	24.9	62	36.3	9	4.9	115	21.6
Needs minor repair	130	73.4	108	63.2	80	43.5	318	59.8
Needs major repair	3	1.7	1	0.6	84	45.7	88	16.5
Dilapidated	0	0	0	0	11	6.0	11	2.1
Total	177	100	171	100	184	100	532	100

Table 21. Evaluation of the general condition of the dwellings by the location of the neighborhood
(Data source: Authors' survey, 2014)

General state of the dwelling	Location of neighborhood ($X^2=25.353$; $df=3$; $p=0.000$)					
	Walled City		Suburbs		Total	
	N	%	N	%	N	%
Physically sound	31	17.5	84	23.7	115	21.6
Needs minor repair	94	53.1	224	63.1	318	59.8
Needs major repair	43	24.3	45	12.7	88	16.5
Dilapidated	9	5.1	2	0.6	11	2.1
Total	177	100	355	100	532	100

Table 22. Evaluation of the general condition of the dwellings by household monthly income
(Data source: Authors' survey, 2014)

General state of the dwelling	Household monthly income (in Nigerian Naira) ($X^2=279.876$; $df=9$; $p=0.000$)									
	< 38,000		38,000-71,000		71,000-145,000		>145,000		Total	
	N	%	N	%	N	%	N	%	N	%
Physically sound	0	0	4	4.5	39	32.8	72	30.0	115	21.7
Needs minor repair	26	31.7	48	54.5	80	67.2	164	68.3	318	60.1
Needs major repair	45	54.9	36	40.9	0	0	4	1.7	85	16.1
Dilapidated	11	13.4	0	0	0	0	0	0	11	2.1
Total	82	100	88	100	119	100	240	100	529	100

Table 23. Evaluation of the general condition of the dwellings by ownership status
(Data source: Authors' survey, 2014)

General state of the dwelling	Ownership status ($X^2=112.897$; $df=12$; $p=0.000$)											
	Inherited		Bought with cash		Mortgage		Self-built		Rented		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Physically sound	15	12.9	33	35.1	10	19.6	44	27.8	13	11.5	115	21.6
Needs minor repair	51	44	60	63.8	40	78.4	93	58.9	74	65.5	318	59.8
Needs major repair	39	33.6	1	1.1	1	2.0	21	13.3	26	23.0	88	16.5
Dilapidated	11	9.5	0	0	0	0	0	0	0	0	11	2.1
Total	115	100	94	100	51	100	158	100	113	100	532	100

Finally, ownership status is also a factor that could determine statistically significant differences in the general state of housing in Kano ($X^2(12)=112.897$; $p=0.000$) (table 23). Thus, dwellings which were bought with cash or mortgaged are almost all physically sound or need only minor repair while 9.5% of the inherited dwellings are dilapidated and more than one-third need major repair.

DISCUSSION, CONCLUSIONS, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This study attempted to assess the condition and quality of housing units in the northern Nigerian city of Kano. Unlike most other studies on this topic, we did not focus on poor neighborhoods or on public housing projects but rather selected our housing sample from all three population density zones. This approach allowed us to get a more comprehensive image of the housing situation in this city.

We found that the condition of dwellings in high-density neighborhoods is indeed poor, with almost 52% of the housing units being substandard (6% dilapidated and 45.7% in need of major repairs). However, judging by these numbers, the housing situation in Kano's high-density neighborhoods seems to be better than in Akure or Ibadan City, where between two-thirds and three-quarters of all housing units were classified as substandard (Coker et al., 2008; Olotuah, 2006a) and better than the national figure of 22.3% dilapidated houses as determined by Onibokun (1987). Still, the fact that more than half of all housing units in the high-density neighborhoods are substandard should concern the local authorities who need to find a way to improve the living conditions of the city's poor. On the other hand, almost all dwellings situated in the medium-density and low-density neighborhoods are in good condition, at least by local standards. When looking at neighborhood location, it becomes obvious that houses situated within the walled city, which are generally older, have more problems than suburban houses. It is also mainly the low-income households who cannot properly maintain their houses. The local government should initiate a program to help low-income families residing within the walled city restore and improve their houses.

Finally, we should note that unlike in developed countries where the private sector plays a major role in housing production, in African cities, an important proportion of residents build their houses themselves (Tipple, 1994). Many of these houses are built informally and outside the official building codes and planning regulations (Payne, 1989). Another characteristic is that very often the building process is incremental over many years as households are insecure about tenure or lack the necessary finances to finish the construction (Ibem et al., 2012; Ogu and Ogbuozobe, 2001; Shiferaw, 1998). When the household head and builder of the house dies, the house is inherited by his children, often without any major renovations happening for decades. This explains why those houses that were inherited by the owner are in the worst condition. Many rented dwellings are also in need of major repairs because neither the owner nor the renter has any incentive to invest money in building maintenance (Konadu-Agyemang, 2001; Nakamura, 2016). The owner is oriented towards quick profits. Often he needs the money to finish his own house. The renter, on the other hand, does not enjoy security of tenure and therefore has no interest in investing money in somebody else's house.

Another point to make is that not all housing components have quality issues. For example, doors and windows were found to be in good condition throughout the city. Similarly, dwellings in Kano do not seem to have any major problems with their roofs. The only problem, affecting especially houses in the high-density neighborhoods, is rust, but this is considered a minor issue (at least in the short term). Only seven houses were found to have major problems with their roofs. This is good because leaking roofs could further contribute to the deterioration of the housing unit and the water leaking inside could cause damp and mildew on the walls and, thus, affect the health of the residents.

Perhaps because they could take many years to finish, many buildings are not painted at all. This is a problem especially for houses situated in the high-density neighborhoods, but, surprisingly there are also houses in the low-density and medium-density neighborhoods which are not painted. Also, due to the age of the buildings and lack of maintenance, the painting on many houses has deteriorated. The situation is much worse in high-density neighborhoods while in low-density and medium-density neighborhoods, the outside painting for over 90% and over 95% of the houses, respectively, is in good condition. This is similar to the situation in the low-cost settlements in Cape Town where more than 47% of the dwellings were found to be not painted (Govender et al., 2011) and contrasting to the situation in Accra, Ghana where virtually all housing units are painted or whitewashed (Konadu-Agyemang, 2001).

The condition of the walls is problematic only in the high-density neighborhoods where more than a quarter of all houses have open cracks and some even need support. This is a problem because the development of major cracks in the wall could eventually lead to the collapse of the wall. Still, the quality of walls in Kano's high-density neighborhoods seems to be much better than in similar neighborhoods in Cape Town where 68% of the houses were found to have cracks in the wall (Govender et al., 2011).

Another theoretical implication is that density level, location of the neighborhood, household monthly income and ownership status can be used as indicators for the quality of housing in a particular neighborhood. This study has demonstrated that there is a very strong relationship between housing quality and these four indicators.

The main limitation of this study is that the sample of housing units selected for this research is not representative of Kano or any other city in Sub-Saharan Africa. Unlike other studies, which focused exclusively on high-density, poor neighborhoods, we included also medium-density and low-density neighborhoods in our survey sample. This approach ensured a more accurate and more comprehensive image of the housing situation in Kano. However, we surveyed an almost equal number of households from each of the three density zones which is not representative for a Nigerian city. Previous studies have estimated that up to 70-75% of the urban population may reside in high-density neighborhoods. Also, our sample included a higher proportion of educated and high income residents than a representative sample for the population of Kano City would. These shortcomings have limited our ability to generalize our findings. However, we were still able to demonstrate that there are important discrepancies in the condition of housing among different population groups based on the four factors mentioned in the previous paragraph which was the main goal of this study. Finally, we should mention that, due to some communication problems between the researchers and the survey assistants, we are not able to provide unequivocal figures for room density or dwelling area per resident which are two important indicators for housing adequacy.

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