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Geospatial Assessment of Housing Quality in Moro, Ife North Central Local Government, Osun State, Nigeria

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Geospatial Assessment of Housing Quality in Moro, Ife North Central Local Government, Osun State, Nigeria

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ABSTRACT

Generally, housing has not been ranked higher on the scale of priorities for economic spending. So, the state government has to rely on the local authorities to meet the housing standard. Using GIS and remote sensing techniques to assess quality of housing, geospatial assessment was used based on both physical and material criteria. The socio-economic factors, basic utilities, environmental factors, and the basic housing facilities were considered. The topographical maps covering the study area and high resolution Google Earth image were acquired. The spatial reference coordinates of buildings, questionnaires, landmark acquired using handheld Garmin GPS device and GIS and Non-GIS software package method were adopted. The data analyses are based on the sample size taken from the population of the study via the use of questionnaires which were administered in the study area. To achieve the objectives, road network and buildings were digitized with all the responses from the respondents were embedded into the GIS environment showing each result. Most houses were in poor condition with lack of accessibility to infrastructures and poor environment. Areas suggested include improvement on the state of infrastructural facilities in the area. The environmental quality of the environment highly depends on the functionality of the available physical infrastructure. There is much lack of drainage system in the area. The survey revealed that 61% of the area lacks drainage, while 39% seems to have one form of drainage or the other which is either stagnant or flow nowhere in particular.

The stakeholders in property investment should enlighten the landlords and tenants on the importance of maintenance and also, the community development efforts and participation should be encouraged. The problem of housing in Nigeria is worrisome. This is because; it is one of the essential needs of living. Local building materials should be exploit to the maximum, so that cost of construction will be reduce drastically.

Keywords; Geospatial, Quality, Housing, Sub-urban, GPS, ArcGIS, Development.

INTRODUCTION

Housing can be anything that covers, protects, or supports another thing. It could also be buildings or structures that individuals and their family may live in that meet certain federal regulations. Different housing situations vary for individuals and may depend on age, family, or geographical location. Konadu-Agyemanyg *et al* (1994) have established a strong correlation between housing, good health, productivity and socio-economic development. Also, Gilbertson *et al* (2008) have observed that there is a significant association between housing conditions and physical and mental health of an individual. Furthermore, so and Jiboye (2010) have also established a significant correlation between the quality of life and the comfort and visual acceptability of the house. In determining the quality of residential development, the Scottish Housing Standard stipulates five basic criteria which provide that housing must be in compliance with tolerable standard which is free from serious disrepair, energy efficient, provided with the modern facilities and services, and must be healthy, safe and secure.

So in this context, integrated geo-spatial technologies, such as remote sensing (RS), geographical information system (GIS) and global positioning system (GPS) can contribute to interactive operations that would be an asset for assessing housing quality and variation, understanding, and mapping utility and service facilities, as well as solving complexity problems facing housing quality in country. By utilizing the remote sensing data and implementing the GIS mapping techniques, changes in urban extent can be monitored and mapped for specific developmental projects. Creating linkages between remote sensing data and socio-economic data obtained on the ground from household surveys have been recognized as one of the major challenges of land use/land cover change studies (Ola hall, 2003). In these settings, a GIS and remote sensing approach is a highly favoured approach for the effective management of housing quality in the country. Social science issues applicable to remote sensing exist, such as: urban growth and development, quality of life, and urban population density and structure. Environmental quality and quality of life are

concepts that are sometimes used interchangeably. The first concept is closely related to the quality of the environment surrounding a human population. While the latter concept usually involves some variables of socio- economic quality, such as: affluence, housing quality, etc. Therefore, RS/GIS techniques are used to supporting the evaluation of housing quality from multi-criteria based approach to prototyping of housing quality variation, in an earlier research work by Khan *et al* (2006) which focused on accessibility of housing in Liverpool city and multi-criteria based analysis of urban road network routes spatial layouts.

STATEMENT OF PROBLEM

The study area being a suburb is also faced with different environmental and housing challenges and needs to be studied in order to provide needed framework for effective management. Thus, housing problems comprise both the qualitative and the quantitative terms. The quality of the environment in most urban centres in Nigeria is deplorable and the need for quality assessment and mapping is imperative. This is not so much dependent on the material characteristics of the buildings (Mabogunje, 1980) but on their organization as spatial units. The slow process of urban planning and zoning in the face of rapid urbanization in most urban centres, has resulted in poor layout of buildings with inadequate roads between them and inadequate drainage and provision for refuse evacuation. Thus, there is a high incidence of pollution such as water, solid waste, air and noise, including inadequacy of open spaces for other land uses. In the light of this, the study area is faced with a lot of housing problems, pronounced among these is high occupancy ratio. Some other identified problems in the area include; unkempt drainage system, inadequate supply of electricity, indiscriminate waste disposal, deteriorating building condition, poor access to buildings in the area, lack of adequate social and physical amenities, and absolute qualitative deficiency in houses available in the area.

Apparently, most of the houses in the area developed haphazardly with no clear-cut distinction of between one house and the other. Houses within the area are gradually sinking into the ground due to the environmental condition of the area. Houses within the study area are below standard in terms of level of comfort and safety, including the physical characteristics of the buildings. Majority of the houses within the area are with either a minor or major crack. The buildings in the area are badly maintained and lack sanitary facilities. The dominant house type in the area is the rooming house system built in singles, 'face me, I face you'

AIM AND OBJECTIVES

The aim of this study is to use geospatial techniques to assess the quality of houses located within a sub-urban community in Moro Local Government Area, Nigeria. Use geospatial techniques to access the quality of houses located within the study area using: Socio-economic factors and basic utilities, Environmental factors and basic housing facilities, and to produce maps showing identified variations across different social economic and environmental indicator.

REVIEW OF LITERATURE

The literature review aimed at establishing the context and providing background evidence, while highlighting relevant issues addressed on housing situation. The increase in poverty and over-crowding is one of the serious problems. Also, the rapid population growth in developing countries has created substantial pressures on housing provision. In this view, it was as a result of inadequacy in housing stock and housing provision. One of the greatest challenges facing this study area, Moro, is housing (Abiodun, 1974, 1976). This is an established truth, because housing encompasses so many things. Most of the problems in Nigeria were as a result of housing problems such as the road setback encroachment, drainage blockage and so on. Housing supply shortage and the deterioration in the quality of the housing stock through aging and lack of repair, have become serious problems that need to be addressed in these countries. The University of Waterloo, presents a housing quality index (HQI) model that seeks to provide government -housing planners with household and area based information that allows areas of deficient housing quality to be identified, as well as identifying the primary contributory factors in terms of a set of quality- based indicators. Orhan (2008), from his findings, observes that inadequate housing is a pervasive problem affecting higher- as well as low- income households. Since said inadequate housing is a pervasive problem, affecting high and low income household. Housing inadequacy for higher- income households would be publicizing the importance of preventive maintenance on public health and safety. The deplorable quality of housing in Nigeria is reflected in the predominance of structurally unsound and substandard houses in urban areas as well as the rural areas (Mabogunje, 1975; Onokerhoraye, 1976; Olotuah, 2003; Olotuah and Adesiji, 2005). This is an acceptable fact, because using low quality

materials for construction of buildings, will end-up producing poor housing. Although, it is not in all cases, yet it is common especially in the rural areas. The magnitude of housing needs in Nigeria is manifested in the number of households residing in substandard housing units (Olotuah, 2005). Factors that limit the number of housing units include: high cost of land, insufficient funds, improper distribution of funds and improper management (Massoudi, and Simonian, 1978). Charles (1964) proposes a solution for solving housing problems. This is one of the strategies that can be used to solve housing problem in the area. The national housing policy (1991), also recommends the ideas of co-operative as one of the remedies for solving housing problems in Nigeria.

MATERIAL AND METHODS

STUDY AREA

Moro is under Ife North Central Local Government Area, Osun State. It is also known as Ife, the ancestral traditional city of Yoruba people who live in Nigeria, West Africa.

Moro Ife North Central Local Government Area located in Osun state south western part of Nigeria. The local government lies approximately between longitudes 70° 30', 70° 35'N and latitudes 40° 30', 40° 35'E. Originally, the area was located within the tropical maritime (MT) and tropical continental (CT) belt. The region enjoys two major seasons, which are the Dry and the Wet seasons. The dry season is between November and March while the wet season is between March and October.

MAP OF THE STUDY AREA

Fig 1.0 Map of the area Moro -Ife

Data Type and Processing

In order to achieve the objectives of the study, both the primary and the secondary data which contain both spatial and non-spatial attributes were used. The secondary data are; The topographic maps covering the study area at a scale of 1:50,000 sourced from the office of the survey General (OSGOF); Administrative map of the study area used to further explain the location of the study area; Extracted High resolution Google Earth Image covering the area; Periodicals; social statistics and necessary demographic data containing the area. The primary spatial reference coordinates of the buildings where questionnaires were administered and selected landmark acquired, using hand hold Garmin GPS device and Structure questionnaire design to elicit information from the resident respondent. Considering the objectives of this research and the need to synthesis different data, GIS and Non-GIS software packages were used.

Study Area Delineation: the study area for this project is Moro town in Ife Central Local Government Area (LGA) of Osun State. To delineate the study area, the topographic and administrative maps covering the study area were scanned and geo-referenced (with Root Mean Square (RMS) error value of 0.0002) and subsequently digitized in ArcGIS environment. Coordinate point acquired during the recognizance survey of the study area was input to mark the area extent. The satellite image data used for this project is extracted from Google earth image (geoeye 2011). This enables proper marking of the area of interest on the Google earth. Subsequently, the area was extracted with a constant scale into Adobe Photo-shop where there were merge and subsequently exports into ArcGIS where it was geo-referenced and digitized.

Work Flow

Figure 2 Data Analysis and Spatial Query procedure chart

DATA ANALYSIS AND PRESENTATION

These analyses of the data collected are based on the sample size taken from the population of the study via the use of questionnaires in the study area. The analysis is based on the survey carried out on Housing quality in Moro lfe North Central. A total of 110 questionnaires were distributed and 89 (81%) were validly collected. The results obtained from these were analysed based on the significant proportion of the respondents.

Figure 3.1 Image extracted from Google earth showing residential building of the study area.

Socio-Economic Characteristics

The socio-economic characteristics of the people living within the study area were analysed in order to give the discrepancy of the findings in the area. The socio-economic features that were analyzed include the income level of the respondent, occupation of the respondent, age group, and ownership of house.

Age Group of Household

The age group of the household head is to show the genuineness of the data collected from the study area. The age group of household respondent varies and ranges from 0-20 years, 21-40, 41-60 and 61 years above. The data gathered from the field survey shows that a greater proportion of the respondent (39%) falls within the age bracket of 41-60 years, while a total of 23% of the respondent falls within the age bracket of 21-40 years, 14% is between the age bracket 60 years and 13% is between 0-20 years.

Fig 3.1.1 Age Group of Household Head

Source: field survey, May, 2015.

The result above shows that majority of the respondents are adults who know, understand and can really give the necessary information required for this kind of research study. This implies that the sampled respondents are capable of responding meaningfully to questions raised in the questionnaires. This makes the results more reliable.

Level of Educational

The levels of educational attainment by the people living within the study area vary. The chart below shows their levels of Education:

Fig 3.1.2: Educational Attainment of the Respondents

Source; field survey, May, 2015

The chart above shows the Educational attainment of the respondents in the study area: none formal education 15%; the primary education 14%; the secondary 29%, the vocational 2% and the tertiary 26%. This reveals that educational level in the study area is fair and majority of the respondents are educated.

Marital Status

Fig 3.1.3: Marital Status of the Respondents

Source; field survey, May, 2015

The result obtained from survey above reveals that 77% are married, 18% are single and 5% widows.

Occupancy status

The occupancy status shows the details of the ownership status of the respondents. Either they are owner-occupier, a family house or a rented apartment. Based on the field survey, it was observed that 51% of the respondents live in their house on owner- occupier basis, while 30% live as tenants, and 19% of the respondents are family house. Majority of the houses occupied by the owners, are either inherited or owner occupier and those living as tenants have a long history of tenure covering as long as 5-25years.

Source; Field Survey August 2012

Fig 3.1.4 ownership houses

The results from the figure above reveal that majority of those that occupy the houses have a clear understanding and know the situation and the condition of the environment. This implies that the respondents can supply necessary information and the situation faced in the area.

Occupations

The study area over the years has experienced a major departure from its traditional farming occupation to other areas of economic activities, predominantly in the farming and informal sector. The informal sectors include petty trading, and other activities for keeping body and soul together. Other occupation is the private sector. Although, some work in

different government organization, while some are employed in private organizations and others are self-employed. The survey carried out reveals that 22% of the respondents are farmer, while 21% covers the civil servant, the public servant with 13%, self-employer 8%, student 8%, retirement 12% technician 12% traders 3% and artisan 1%.

Fig 3.1.5 Occupation of Respondent in percentage
Source: field survey, May 2015.

The figure above reveals that majority of the people living within the study area are under the informal sector, implying that housing quality is not a determinant factor for cost. Since housing within the informal economic sector is generally living on low income.

Income Levels

The level of income of the people will strongly be attached to the nature of work the people are involve in. the income may not be from one source, and as such, it gives room for variation in the income level per month. Higher proportion of the respondents ,14% earn between N20,000 – N100,000 monthly, 29% of the respondents can be classified as low-income earners, while about 38% are middle earn between N100,000 above. This result shows that majority of householders or residents of the study area are low income earners.

Fig 3.1.6 Income Levels of Respondent

The table above reveals that majority of the people living in the area earn below N100, 000 per month. This can be categorized as the low and medium earners

House Facilities

The quality of houses in the study area was also assessed by the availability and functionality of home amenities such as: Kitchens, Toilets, and Bathrooms.

Available Types of Toilet

The survey reveals that pit latrines have the highest percentage (51%) of buildings in the area. Followed by water closet with (49%) and none 3% while others unspecified covers. Therefore, the majority of the toilets and the bathrooms are not in good condition. Despite the fact that they used water closet and pit latrine.

Fig 3.1.7: Types of Toilet
Source: field survey May, 2015

However, the table above shows that majority of the buildings in the area are substandard and many residents of the area defecate anywhere and cause environmental problems.

Fig: 3.2 the image above shows the black buildings that have pit latrines while the red show buildings with water closet in the study area

Physical Condition of Housing Units/ Material of Construction

The physical condition of the houses shows the structural stability of the building, the state and the condition of various components that make up the building, vary from the wall, roof, window, age of the building, etc. The physical characteristics and conditions of these houses in the study area focus only on roofing materials and are discussed below.

From these results, it can be deduced that the buildings that are constructed with wooden materials have the tendency of having more security and safety problems. This implies that majority of the buildings in the area are safe and secure, considering the construction materials that dominate the area.

Roofing materials and conditions

Roofing materials used in the study area are of different types. They vary from Aluminum, Galvanized iron sheet, Asbestos and some other related materials. From the field survey, 97% of the housing stocks used Galvanized iron sheet while 2% of the buildings use Aluminum and 1% used Asbestos houses.

3.3.1 Percentage of roofing materials

Source; field survey, May, 2015

The study reveals that majority of the roofing materials in the area are partly damaged. This is as a result of the age of the construction of the buildings. The implication of this is that the houses will be substandard and may result to loss of lives and properties.

Age of Buildings

Majority of the houses in the study area are in a very poor condition. One of the reasons is that most of the buildings have been constructed over 45 years ago. About (43%) of the houses in the area have been constructed over 10-20 years ago, (44%) of the houses are constructed over 20 years age and 13% of the house were also constructed below 10 years . The chart below gives a detail analysis of the building age in the study area.

Fig 3.3.2 Chart show the Percentage Age of Building

Source: field survey, May 2015.

However, from the above analysis, one can see that the year of construction of most of the buildings, couple with the level of maintenance, has a lot to do with the physical outlook of the house, especially in the study area. According to the building regulation, the houses constructed over 50years, will gradually lose their quality and the houses

constructed below 50 years without good materials for the construction are of low quality. The implication of this is that gradually, the houses within the area will continue to deteriorate and as such, endanger human life.

Water Supply

The sources of water distributed within the area vary from pipe-borne water and well water or borehole. The major sources of water in the study area were hand-dug wells found and pipe-borne water. The wells and boreholes were found in 71% of the buildings. Water from the public mains hardly runs in the buildings. The one from public taps situated along the streets was however available to 13% of the buildings

Fig 3.4: The map above shows the source of water within the study area.

Fig 3.4.1: Source of water
Source: Field Survey May, 2015

The available water supply in the area is not portable, due to poor provision made for the supply and distribution of the water. However, the quality of the water is affected in various degrees by the presence of particles and taste. However, the implication of this findings is that majority of residents of the area depend on water supply from unsafe sources thereby lowering the quality of housing in the area.

Electricity Supply

Conventionally, the major source of electricity supply in Nigeria is public, from the Power Holdings Company of Nigeria Plc. (PHCN). The situation in the study area is not different as majority of the respondents depend solely on the public source of power supply, with a total of 100 respondents. Those who have no access to public source or could not afford it, devise alternative sources like lantern and gas Light. Most of those who depend on public source also make use of alternative sources when the public supply fails.

Fig 3.4.2: Source of Electricity
Source: field survey May, 2015.

The analysis in Fig 3.5 above shows that 82% of the residents used power supply and 18% used both PHCN and generator in study area. The two major problems were found to be responsible for the irregular flow of electricity. These are the distribution problem and transformer and power failure.

Roads

Fig 3.4.3 Access to Road Network

Therefore, the result of the study shows that most of the houses located in the study area are motorable. 60 percent of the roads in the study area are not tarred while the remaining 40 percent are tarred

Environmental Quality

The quality of the environment highly depends on the functionality of the available physical infrastructure. The infrastructure is to enhance the functionality of the environment. Such infrastructure includes; refuse disposal system, drainage system, air space/ ventilation and set back between buildings.

Refuse Disposal System

Refuse collection and disposal remains one of the major challenges in the contemporary Nigerian settlement. It is more pronounced in a Metropolitan City like Oshogbo. Although, the State Government is making effort to reduce this problem, but for residents of the study area, refuse disposal is indiscriminate as refuse is dumped in the abandoned drainage channel, despite the fact that the sanitation comes once in a month.

Refuse Disposal System

Fig 3.4.4 Chart shows the types of waste disposal system

From the field survey, 77% of the wastes are used as dumping ground, 21% by incineration or burning, 2% dump in the gutter and none was collected by environment agency. The implication of these is that the area will not only be unhealthy but destroy and pollute the environment.

Fig 3.5: Map showing the waste disposal in the study area.

Drainage System

Indiscriminate discharge of effluent and untreated waste is prevalent in the study area. This is one of the things that add to the degrading of the standard of the environment.

The result of the survey reveals that 61% of the area lacks drainage, while 39% seems to have one form of drainage or the other which is stagnant and flows nowhere in particular.

Fig 3.6: Map showing the availability of drainage in the study area

CONCLUSION

This study reviews that the conditions of most of the houses located within the study area were sub-standard. 83% of the people living in the study area are low and medium earners. Therefore, the lower the income and middle income are the most resident, the lower the quality of houses of the respondent within the study area. Most of the houses lacked basic functional home amenities such as toilet, bathroom and kitchen which are not attached. 77% of the residents disposed their waste in dumping ground, 21% used incinerating method while 2% of the respondent dumped refuse in gutters. Also, 61% of the area lacked proper drainage system. Considering the building age, about 44% of the buildings have been constructed more than 20 years ago, and as such, this reduces the value and the quality of the building. Again, the quality of the housing facilities is not in good condition. Toilet availability is on the high side in the area, this is because the area is a suburban area. About 55% of the houses uses pit latrine, while 42% uses water closet and 3% none. Another important infrastructure is the electricity supply. Majority of the respondents depend solely on public power supply, with a total of 89 respondents.

The environmental quality of the environment highly depends on the functionality of the available physical infrastructure. They lack drainage system in the area. The survey reveals that 61% of the area lack drainage, while 39% seems to have one form of drainage or the other which is either stagnant or flow to nowhere in particular. All these factors lead to environmental degradation.

Based on all the above findings, See figure 4.8 the general findings of the quality of the houses in the area, is that 5% of the total housing stock can be described as qualitative houses based on the result queried using ArcGIS 9.3.

RECOMMEDATION

Since housing has expressed to be more than shelter, but to includes all those facilities that make up the environment as a livable place, such as: road, drainage, electricity, water supply and open space. Areas suggested include improvement on the state of infrastructural facilities in the area. The stakeholders in property investment should enlighten the landlords and tenants on the importance of maintenance and also the community development efforts and community participation should be encouraged. The relevance of urban renewal and housing cooperative strategies in bridging the gap between demand and supply of housing cannot be underrated. Federal and State Government should promote and encourage urban renewal and housing cooperative programmes, so as to bring old houses into habitable forms again. This way, houses will be able to add to existing housing supply by also enhancing housing quality of the affected towns or cities. The problem of housing in Nigeria is worrisome, because it is one of the essential needs of living. Local building materials should be exploited to the maximum so that cost of construction will be reduced drastically.

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