

Research Paper

Characteristics of housing in Nigeria: A case study of Oyo state

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ABSTRACT

The objectives of the research were to determine the problems of housing Nigeria Urban centres having residential areas using Oyo State in particular, assessing the problems, analyze the possible consequences rising from these problems and solutions to the problems. The questionnaires administered and oral interview were used to gather and analyze information (data) received from the respondents. The information (data) were collated, analyzed and presented through the use of Statistical Package for Social Science (SPSS). According to the findings, which show the current trend of the housing characteristics, indicated that there was overcrowding of houses and over-utilization of basic infrastructural facilities and utilities provided in most houses. The demand for houses are more than the houses available and the housing conditions are getting worse and worse every day as a result of increase in the population of people living and working in Oyo State.

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INTRODUCTION

Background situation

Most area of Urban Centers of Nigeria is faced with vast numbers of problems, which have resulted to overcrowding, high rents and slum settlements. This brought about inadequacies of basic infrastructural facilities and social services in term of quantity and quality such as pipe borne water, electricity, roads, schools and health institutions. It is also portrayed by the gradual breakdown of the urban economic way of life which is reflected in rising employment, diminishing incomes and poverty especially among the less privileged (Aina, 1990).

A prominent aspect of the urban economic crisis is the deteriorating condition of the places where commercial activities take place. Many of these areas have turned to commercial slums and marked by congestion, deteriorated structures, shortage of infrastructure, insanity conditions and a host of others. Life of the urban dwellers and the likeability of the urban environment (Hornby, 1995). The quality of life experienced by an urban household is a

product of the opportunities available for securing those resources, which its members hold most dear for their own welfare. In any society, there will be constraint on the degree of access to those opportunities (Newcombe, 1983). There are several parameters that could be applied in order to measure the quality of life of an area. It varied from one area to another and depending on the socio-economic, ideology, culture and aspirations of the people (Okpala, 1978). The indicators for assessment include economic component such as individual economic well-being and community economic well-being, personal income distribution of income expenditure pattern among others. It also includes health and health services component, housing and environmental component and host of others. All the above associated indicators are combined together using multi variable statistical measures in order to give overall quality of life in an area.

This research is centered on the living condition of Kara

which is a small area in Mokola using the housing and environment indicators for assessment in order to determine the quality of life of residents.

Statement of problem and justification of this study

Town and cities are centers of human civilization irrespective of the level of socio-economic development of the countries in which they are situated all over the world over time, urban centers seem to suffer from a variety of problems and these reflect on the stage that the urban community has reached in its development and also the general state of society at the time (George, 2001). Among such problems evident in urban centers some are in physical, economic, social and psychological form. However, these problems are all part of the general process by which urban communities function and interact (Gyuse, 1984). The problem also manifesting in Mokola which is the area of focus of the research. Mokola is located within regional market of Ibadan and also characterized with vast number of problems. These include:

Deteriorate structure: The buildings in the study area are in poor condition. Walls cracked roof sagging, materials for the construction looked obsolete and even unfit for human habitation. Even the environment quality of the structures is poor and unhygienic.

Shortage of infrastructure: The study area lacks infrastructural facilities such as pipe-borne water and this make the residents to depend on water vendors. Also, there is absence of refuse depots or dustbins. The users of the area to be an eye sore and stinking with offensive odours.

Presence of commercial slum: Almost half part of the area is used for commercial activities due to its closeness to Sango market. The shop and stalls are haphazardly arranged without adequate air spaces and setbacks. This arrangement has made the residential part to be hiding and unidentified.

Poor accessibility: The poor arrangement of the shops has made the area to be inaccessible and people have to trek long distance before getting to the shops and even residential part of the area. Even most existing roads are not motorable and contain series of potholes.

Unsanitary condition: The buildings in the study area lack toilet facilities and faeces are seen over the place and this makes the area to be stinking with bad odours. There is problem of drainage system and thereby resulting in soil erosion in some part of the study area.

Poor maintenance of existing facilities: Most facilities provided for Mokola market, which also constituted part of

the study area, are poorly maintained and even abandoned. This has made the structure to be deteriorating.

Presence of prostitutes: The prostitutes are occupying spaces within the study area and making the area to be socially stigmatized.

Overcrowding: Unauthorized housing conversion and structural modification buildings are converted to commercial shops and even modifications are made to existing structure. This however, makes the area to be overcrowded.

Street trading: Most of the roads are occupied by street traders and thereby constituting nuisance to the motorist. This has made the roads to be in deplorable condition. Having identified problems facing the Mokola Settlement. It is quite certain that the area needs urgent attention through proper formulation of Action Plan in order to improve the quality of life of the residents.

Significance of the study

Housing forms one of the basic necessities of the life after food. A suitable housing, devoid of environmental hazards is inevitable to human existence. The study area forms a blighted zone within Ibadan North Local Government area. The condition of living of the inhabitant calls for serious investigation as this could pose health hazard in the nearest future. Past researchers in housing condition and human health. This however forms the core of this study as it poses to solve the problem of living condition of residents of Mokola with a view to formulating action plan for its improvement (Onibokun, 1969).

Scope of the study

The scope of the covers Mokola in Ibadan North Local Government. The study emphasis was placed on the area where commercial slum is highly prominent. It also covers the socio-economic in Oyo State (Figure 1 and 2). characteristics of the residents, the quality and quantity of houses and a host of others.

Aims and objectives

The aim of this research work is to assess the living condition of residents of Mokola with a view of formulating Action Plan for its improvement.

The main objectives of this study includes:

1. To assess the socio-economic characteristics of the residents.
2. To evaluate the quantity of structure in the study area.

RESEARCH METHODOLOGY

These methods were employed to achieve the aim and objectives of the study. That is Reconnaissance Survey, Data Collection and Data Analysis.

Reconnaissance Survey was carried out in order to familiarize the researcher with the general condition of the study area. It involved inspection of the commercial slum area especially the area that needs urgent attention. This was necessary to have an insight of the existing situation of the area.

Sources of data

Data were collected through primary and secondary sources.

Primary sources: These include the use of questionnaires. The questionnaires were drawn and administered on the residents in order to determine their socio-economic characteristics and their quality of life. It also covered the quality and quantity of houses and the perception of government and residents on the development of the area.

The study area was delineated into two; that is commercial area and residential zones. Two hundred pieces of questionnaires were administered. The questionnaires were directed to head of households and shop owners using random sampling technique.

Secondary source: Data were collected from various books, Governmental offices and parastatals. For instance the base map of the study area was obtained from Oyo State Ministry of Land, Housing and Survey. The population of the study area was obtained from National Population Commission (1995), past dissertation; textbooks and journal were consulted from the University of Ibadan library in order to gather information in the quality of life.

Instrument for data collection

The data were collected by means of questionnaires, interviews, and review of records and through observation.

Interviews were conducted both at the pilot survey and real survey stage of the research. The respondents were the residents of the study area. The item sought information include the respondents marital status, sex, employment, occupation, religion, income, education, household size, age, etc. Maps facilitating the delimitation of the study area were updated.

Method of data analysis

Data were collected through primary sources i.e., through

the use of structured questionnaires. Data collected from this source were subjected to both quantitative and qualitative analysis. After the coding of the parameters, the data were subjected to descriptive analysis with the aid of statistic cal package for the social sciences (SPSS).

Geographical location of Mokola

Mokola is situated in the northern part of Ibadan (i.e. Ibadan North Local Government Area). It is bounded by Ibadan-Oyo road to the North and West and Queen Elizabeth road to the South, Premier Hotel and Cultural to the East in Oyo State.

Historical development of Ibadan

The history of Ibadan where Mokola is located has many versions to it but it is generally agreed that there are three (3) Ibadan. The first Ibadan was formed by Lagelu, the Warrior and former first camp originally known as "Abe-Odan" which means "by the field" or "by the side" that is in between the forest and the savannah and finally grown to a large settlement and later metamorphosed to "Ibadan" which is still in existence at the moment (Onibokun, 1985).

The settlement of the first Ibadan did not last for long but was delayed by the Olowu because Ibadan treated Egungun mystery with levity and disdain; Lagelu narrowly escaped with his family and settled down at Eleyele Hill where the second Ibadan was founded.

Lagelu and his people sufferer much hardship on the hill that is Eleyele and had to feed on snails and wild apple called "Oro" which were both found in the hill. The "Oriki" of bad originated from the consumption of snails and wild apple. Hence, "Ibadan" omo a jorosun, omo a je igbin je ikarahun, omo a fi karahun foorimu" feed on snails and use shells as bowls for taking palp. Other people from various parts joined Lagelu and his people on the hill and it grew to the extent that it could no longer accommodate them (Onibokun, 1982). As a result of this situation, they moved to the present site which is the third and existing Ibadan up to date.

Contribution of knowledge in housing

Housing is more than a shelter. It is the totality of what makes a place liveable, the physical structure which provides accommodation for people including other facilities that make the place habitable, its location, road and environment etc.

Physical planning aims at providing a functional and aesthetically pleasing, living, working and recreating environment. In order to achieve the predetermined goal of planning as earlier mentioned, the housing quality of the

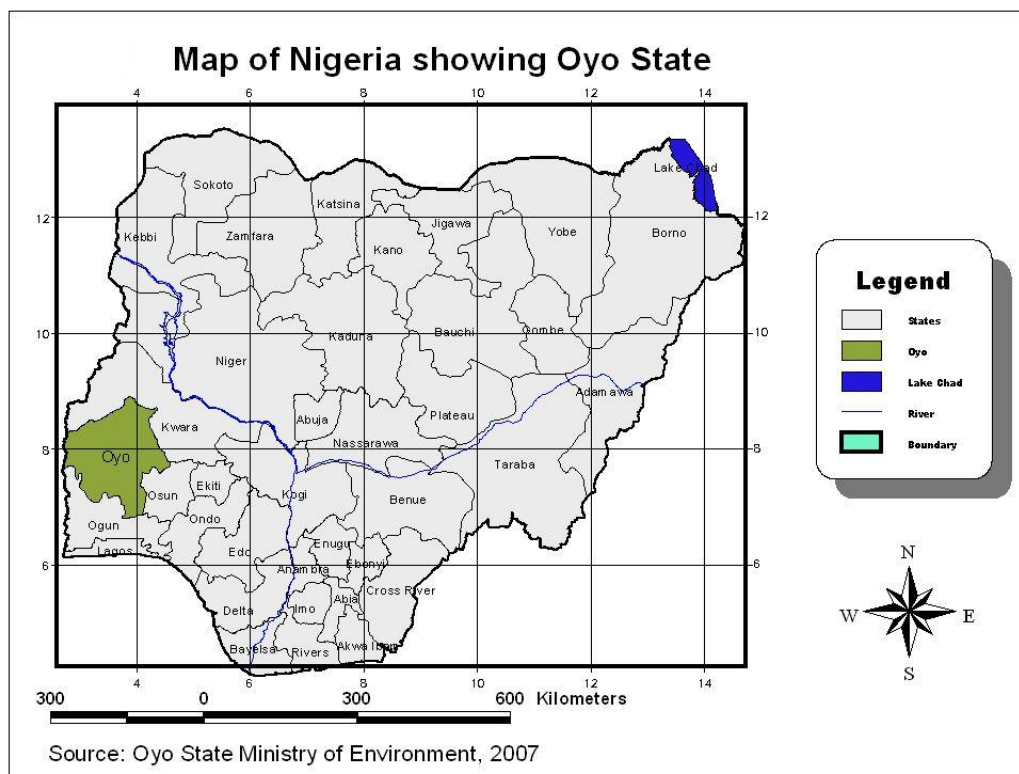


Figure 1. Map of Nigeria showing Oyo State.

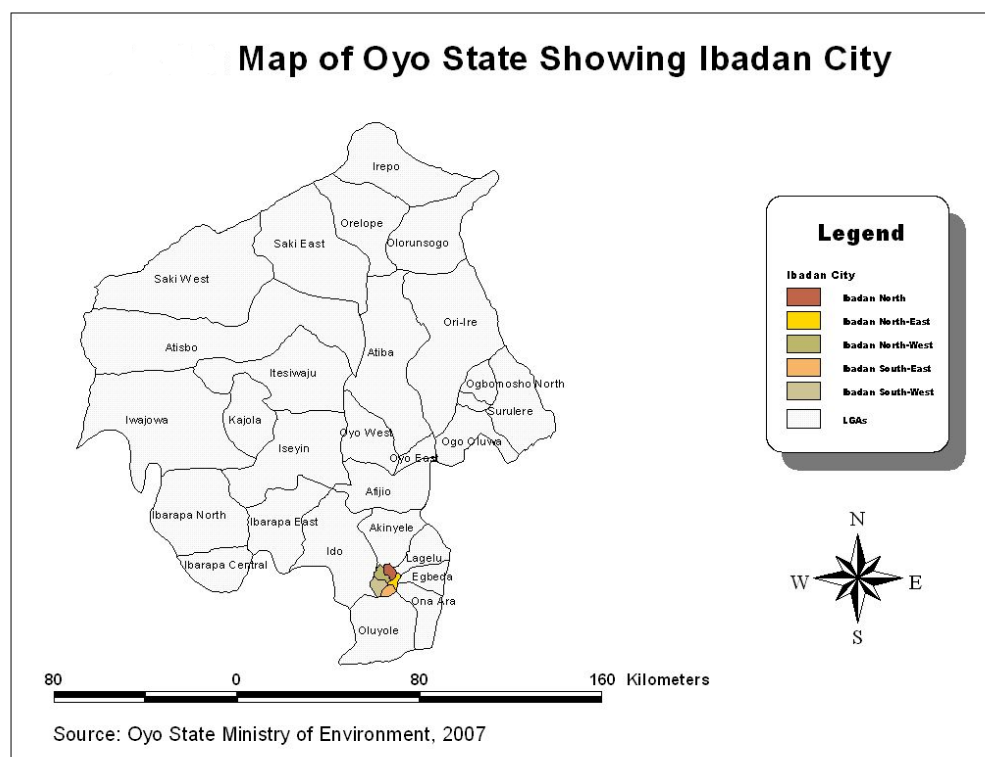


Figure 2. Map of Oyo State showing Ibadan City.

area needs to be accessed (Wahab, 1974).

Planning is a major concern of the people and the priority of the people is the immediate environment that is the residential sector of urban area, the residential and other sectors need to make it functional among which is good housing with adequate infrastructural facility.

The provision of good housing has a profound influence on the health, efficiency and well-being of an urban community, also associated with housing are other environment qualities within which housing is provided and in which urban dwellers live (Agbola, 1991). The housing is therefore accessed using several indicators such as indices of housing adequacy, quality distribution, state of housing environment, access to essential facilities, land use density pattern, general environmental decay and a host of others.

However, it is important to have housing, which is conducive for living and habitation. This has prompted the researcher to embark on the assessment of the living condition of Mokola in order to make action plan for improvement.

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

This study discussed the various concepts and review of literatures in this research work.

Conceptual framework

The project was based on some certain concepts. These include neighbourhood planning concept and concepts of urban renewals.

Concept of neighbourhood planning

Henry Wright and Clarence Stein developed the idea of neighbourhood with a view to adopt the concept of garden city of Ebenezer Howard (1850-1928), who has concerned for the social reformation in the nineteenth century and its physical repercussions upon urban form in Britain to suggest the concept of creating a model community to accommodate the working class (Rapkin, 1991). Neighbourhood on the other hand was first outlined by Fadaunsi (1971). The neighbourhood is a locality with variable definition depending upon the perception of the residents, i.e. "the region where one lives" (New Oxford Advanced Learners Dictionary of current English).

As a concept it has various interpretations but basically, Clarence saw it as a scheme of arrangement for the family life community within convenient access to an elementary school, shopping facilities, water and electricity supplies, good sewage disposal system, common play spaces. George (2001) describes has the locality where there exist social

relationship between individual and family groups and a degree of social interdependence.

Vagale (1993) believed that the neighbourhood idea was evolved to solve two planning problems. The first was the need to drive an orderly means of allocating the various household services among the population as a whole and second was to foster a community spirit by creating a physical environment, which would give the inhabitants a sense of belonging to their own environment (Otegbulu, 1979). A neighbourhood is not a separate town like the new town concept, but an integral part of the town or city, simply a geographical unit with arrangement of land uses, road and services designed to produce good accessibility and safety in ways which are consistent with spaces and traffic needs and the separation of users which are non-conforming. Peattie (1979) viewed that a neighbourhood should contain facilities like roads, recreational facilities, open space, sewage disposal system, water supply, electricity supply and schools (elementary, primary, secondary) other utilities desirable for the common use of the inhabitants.

Concept of urban renewal

The concept of urban renewal is as old as the cities themselves. It started as different people have differently defined the concept of urban development renewal. According to Drake (1979), in his book "Home Towns and Traffic" urban renewal is the gradual re-ordering of the use of the use of land and building to meet the present day requirement and estimated future developments and needs (Amis, 1990). Among the definitions to it is that it is a process aimed at upgrading the physical improvement of the existing urban settlement particularly to eliminate planning problems in our settlements (Wurster, 1957).

Ordinary urban renewal covers three major types of programmes, which may still be further substandard structures to a prescribed standard.

- (a) Rehabilitation: That is bringing substandard structures to a prescribed standard.
- (b) Conservation: Involving both rehabilitation and spot clearance in order to upgrade an area and
- (c) Redevelopment: Which is the demolition, clearance and reconstruction of an entire area on a general basis.

Strem (1990) described urban renewal as a deliberate effort to change the urban environment through planned, large-scale adjustment of existing city areas to present and future requirements for urban living and working.

Having understood the meaning of urban renewal then it is important to introduce this to the study area in other to change the present mode of living in the area. Hence the concept of rehabilitation which involve revitalization of the slum area by upgrading older housing, the old and

dilapidated building are repaired and rejuvenated as well as open spaces and public amenities are provided to ensure a more balanced functional and rich environment in the study area.

Strategies and planning for urban renewal

Urban renewal (UR) strategies could take one out of several forms; alternatively a combination of strategies may be adopted in accordance with the circumstances and the places in question. Urban renewal started in the countries reviewed as outright slum clearance. This means demolition of a sub-standard area, which is adjudged to be so bad that it is beyond redemption (Baross and Mulk, 1980). In designating an urban built environment as a clearance area, it is not enough to be able to justify this proposed action, it is equally important to be able to identify those factors that have given rise to slum conditions in the first instance. Nevertheless, slum clearance according to the experiences of countries reviewed is not a strategy that could be recommended for adoption without reservations (Turner, 1968). Apart from the problem of displacement, break-up of family relationships and disruption of work-place in relation to home arrangements, outright clearance of slum and redevelopment has the character of eating too deep into government's budgets such that other equally essential services are neglected (Ughamadu, 1991). This has important implications for cities in developing countries where problems of UR are enormous but where financial and management resources are meager.

Fortunately, other more realistic variants of urban renewal have developed through experience. A more tempered strategy than clearance is rehabilitation (Agbola, 1994). This involves enhancing the quality of deteriorating neighbourhood through the code enforcement and the private action of owners. It requires repairs, rising of standards and improvement in the provision of facilities. Rehabilitation is less radical an approach while it is less expensive than clearance (Agbola, 1994 & 1998).

Yet another variant of urban renewal includes conservation. This approach is applied to neighbourhoods that are adjudged basically sound but which required only increased capital input by the owners in the form of renovation and better maintenance. Conservation may essentially be aimed at preventing the deterioration of presently sound areas through the provision of infrastructure and upgrading of the existing ones (Agbola, 1991).

Thus these variants of urban renewal can be seen as a scale with 'clearance' representing one end and 'conservation' representing the other with several options lying in-between (Eteng, 2001). Where exactly a choice is made will be a function of several factors including the magnitude of prevalent problems, and the amount of

resources available (Turner, 1968).

DETAILED ANALYSIS OF THE EXISTING SITUATION IN THE STUDY AREA

This study discussed the historical background, geographical location, relief and drainage, population, storm water, water supply, land use, among others.

Historical background of Ibadan

Ibadan, the capital city and the administrative headquarter of Oyo State, is the largest indigenous urban center in Sub Sahara Africa. Ibadan began its existence as a war-camp in the early part of the nineteenth century precisely 1829 but has since developed to become one of the most important administrative centers in tropical Africa (Ayeni, 2003).

The history of Ibadan relates that there were three Ibadan in history (Abumere, 1994). The first Ibadan was founded by Lagelu, an Ife warrior, a strong man and a farmer. He and his people packed their properties and left Ife-Ife to settle down on their own. Lagelu and his people settle in a place between the forest (Ilu-Igbo) and the grassland (Ilu-Odan), because of this, people passing by named it as Ilu Eba-Odan, which later metamorphosed to Ibadan (Ayeni, 2003).

Lagelu was so respected by Yoruba people that some other Oyo, Ife and Ogbomosho later joined them. The town continued to grow rapidly. However the existence of the town was short lived as a result of dispute during an Egungun festival which led to the destruction of the town.

The second Ibadan was associated with the Lagelu descendants that escaped from the war. The people hid themselves on a hill called Eleyele hill, hence, they were said to have suffered hardship and to feed on snails and wild apple known as "Oro", which were both, found on the hill. Many people later joined them and they continued to live there together. That one also faced extinction sooner than later (Ayeni, 2003).

The third Ibadan, which is the present one, was a result of the allied armies of Egbas, Ijebus, Ifes and Oyo who later came to join the Lagelu people in 1892. This marked the foundation of the present Ibadan. The Eleduwe war of 1839 marked the total collapse of the Oyo Empire which made some Owus and Erunmu refugees to migrate back to Ibadan and later negotiated for titles as they concluded to make Ibadan their home, hence, Ibadan continued to grow. The sustained growth of Ibadan over the years resulted in its sudden emergence as the largest urban center in Nigeria as from about 1860. This is not unconnected to its location in the heart of the Yoruba territory as well as its location in relation to older Yoruba city states of Abeokuta, Oyo, Ijebu-ode and Ife. Its central location and accessibility from the colonial capital city of Lagos were major considerations in

the choice of Ibadan as the headquarter of western province that later became the Western Region of Nigeria (Ayeni, 2003).

Today Ibadan is one of the principal commercial, educational, administrative, industrial and socio-cultural centers of Nigeria. These functions have given rise to a lot of transport needs and consequently traffic problems.

Geographical location of Ibadan

Ibadan, the capital city of Oyo State is located approximately on Latitude 7°22'N and Longitude 3°58'E of the Greenwich Meridian. Nevertheless the expanse of land normally referred to as Ibadan metropolitan area lies in the portion lying between latitude 7°15' and 7°30' north of the Equator, and Longitudes 3°45' and 4°00' east of the Greenwich Meridian (Ayeni, 2003). Oyo states as one of the constituent states of Nigeria lies in the South-western part of the country and is bounded by Ogun State in the South, Kwara State in the North and Osun in the East. The state is bounded in the West by the Republic of Benin (Ayeni, 2003). Ibadan is approximately 145 km in a North-eastern direction from Lagos by the most direct route but the city is directly connected to many towns in Nigeria, by a system of roads, railways and air routes. All the road traffic from Lagos to the northern state through Abeokuta and Sagamu converge on Ibadan before proceeding to these destinations. The railway to the northern states also passes through Ibadan, which has since become a major break of bulk point for trade goods from the Southwest to the north as well as from the north to the southwest.

Relief and drainage

Ibadan lies between 100 and 200 m above sea level with an undulating landform and hilly topography in many places. To the east of the city rises Agodi hill and to south is Mapo hill (Ayeni, 2003). The largest of these hills lies in the central part of the city such as Mapo, Mokola, Aremo, Sapati and range in elevation from 160 and 220m above sea level, thus, affording the visitors a panoramic view of the city (Ayeni, 2003). The hilly nature accounts for the naming of many quarters and streets, such as Oke-Ado, Oke-Are, Oke-Mapo, and Oke-Badan among others.

As regard drainage, two rivers drain the area occupied by Ibadan. They are the Ogunpa and Ona rivers. The former drains the eastern while the latter drains the western parts. Thus, rising in the north-eastern section of the area, the Ogunpa flows south-eastwards breaking through the central ridge before turning south along a course that is parallel to the ridge. Its major tributary is the Kudeti, which drains the eastern part of the ridge (Ayeni, 2003).

On the other hand, the western parts of the city is drained by River Ona (Odo Ona) and its numerous tributaries

include Alalubosa, Osun and Yemoja streams in the north while Ido and Ibadan North-West local government areas bounded it in the West.

Population of Ibadan

Ibadan North Local Government is the most populous local government area in Ibadan. The population of the local government was given as 300,939 persons according to 1991 census (Ayeni, 2003). Major residential areas in Ibadan North include Agbowo, New Bodija, Ikolaba, Idi-Ape, Old Bodija, Sango market, Ijokodo Sabo, Yemetu and the study area, Mokola.

Land use of Ibadan North Local Government

Ibadan North local government area where the study area is located has a total land area of 145.58 km² (Table 2).

Table 2 shows that residential land use has the largest. The total population of 2,143,200 in 1996 (Table 1). Table 2 shows the local government land area occupying 62.4% of the total land area. The commercial activities as well as public and semi public land use take 3.50% of the total land area. The industrial (145.58km²) and circulation land (90.8km²) use take 0.94 and 28.2% respectively. Open spaces including parks and streams setbacks accounted for 0.46% of the land while unused land takes up the remaining 0.94% of the total land area.

Land Use Analysis of Mokola Area in Ibadan North Local Government

Mokola represents one of the twelve wards in Ibadan at South-East of Ibadan North Local Government. According to the Ministry of Land, Survey and Housing Oyo State the residential use has a largest area of land which is 61.7% of the total land area of Mokola (50.28 hc) while open space/vacant land has the smallest of 1.24% (0.55 hectares) of the total land area (50.28 Hectares) of Mokola (Table 3).

Economic characteristics of the Mokola area of Ibadan North Local Government

The people of Mokola engaged in different economic activities for their livelihood. This ranges from commerce to service industries and civil service. Most of the people engaged in trading and industrial activities (Table 4). The economic activities take place at Round About and along the Mokola major roads.

Local geology of the area

The rocks underlying Mokola Area of Ibadan are mainly the

Table 1. Population of Ibadan by Local Government.

Local Government	Population		Percentage	
	1991	1996	1991	1996
Ibadan North	300,939	352,270	16.45	16.50
Ibadan North East	272,979	319,541	14.92	14.90
Ibadan North West	146,759	171,793	08.02	8.00
Ibadan South East	227,865	266,733	12.46	12.50
Ibadan South West	274,022	320,770	14.98	15.00
Sub-total (Urban)	1,222,564	1,431,107	66.83	66.90
Akinyele	139,587	163,400	07.63	7.60
Egbeda	128,998	151,001	07.05	7.00
Ido	55,893	65,428	03.06	3.80
Lagelu	68,732	80,455	03.76	3.80
Oluyole	91,020	106,546	04.98	5.00
Ona Ara	122,387	143,263	06.69	6.70
Sub-total (Rural)	606,617	710,093	33.17	33.10
Total	1,829,181	2,143,200	100	100

Source: Ayeni (2003) and National Population Commission (1995).

Table 2. Land Use Analysis of Ibadan North Local Government.

Land use	Area (km ²)	Percentage
Residential	90.8	62.4
Commercial	5.15	3.50
Industrial	1.37	0.94
Public/Semi Public	5.15	3.50
Circulation	41.06	28.2
Open space	0.68	0.46
Vacant land	1.37	0.94
Total	145.58	100

Source: Oyo State Government/UNICEF (1997).

Table 3. Land Use Analysis of Mokola Area.

Uses	Hectares	Percentage
Residential	32.27	61.71
Commercial	3.86	8.73
Industrial	0.68	1.53
Circulation	6.64	15.02
Public/semi public	6.28	11.77
Open/vacant land	0.55	1.24
Total	50.28	100

Source: Ministry of Land, Survey Housing Oyo State Nigeria (2006).

ancient meta-sediments forming a prominent topographical feature with an average height of about 75 m above the surrounding plane (Ayeni, 2003). The meta-sediments are mainly the battered quartzite with a lot of micaceous minerals (muscovite). Some degree of foliation is always discernable in the quartzite bands and is due principally to

the presence of muscovite. The muscovite gives rise to flaggy, highly jointed rock in the area. Mineralogically, the rock consists of quartz mainly with mica (muscovite) flakes occurring as subordinate. Texturally, the rock is medium to fine grained. Structurally, the rock is very weak because of the numerous joints (parting planes) that characterized the

Table 4. Predominant economic activities in Mokola Area of Ibadan North Local Government.

Economic activities	Percentage
Trading	30.00
Artisanship	
Service Industry and Craftsmanship	30.00
Civil service	20.00
Food processing	12.00
Industrial	08.00
Total	100

Source: Department of Town Planning, Ibadan North Local Government (2007).

rock in the area (Ayeni, 2003). The rock strikes roughly North-South ($0 - 008^\circ$) with high dip angle ($75 - 85^\circ$ east). In order words, the quartzite band in the area is almost lying vertically to the horizontal. The dipping attitude of the rock is likely to have a negative effect on the stability of the sub grade material. Thus the splitting of the schistose quartzite along the joins/parting planes whenever there is any load on it.

Storm water

Rainfall data from the metrological stations of IITA, U.I and the old Airport have been collected, processed using Lloyd Davies method (Rational formula) $Q=0.00278CIA$ and the resulting graph compared with the existing rainfall intensity curve for Ibadan (Ayeni, 2003). This is found to be quite in agreement with the one used at the preliminary design stage In the above Rational formula, Q = Max rate of run off at the point of interest in m^3/s ; C = Coefficient of runoff; I = Average rainfall intensity in $mm.hr$; a =Area of the drainage tributary to the point of interest in hectares. To resize the inadequate drains, the project area is divided into various smaller drainage or tributary areas. Nearly all these areas are demarcated (bounded) by the road net-work along the downward slope of the project area. There is a slope advantage both towards Queen Elizabeth and Oyo roads. The project area is practically fully built up (residential) with the unpaved road surface well consolidated. The following storm frequencies are chosen for the respective purposes on the basis of judgments supported by records of performance in similar areas.

1. Drains and storm sewers in Residential areas. - 5yrs
2. Drains and storm sewers in Market areas. - 10yrs
3. Small Culverts- 10yrs
4. Drains in all major (access) roads - 10yrs
5. Bridges, big box culverts and outfall sewer - 50yrs

The choice of the runoff coefficient (C) is based on the

general character of the tributary (drainage) area (Residential and Commercial). The residential area is assumed to be multi-unit attached (as Mokola area is fully built up) and Commercial (Market area. The coefficient taken for these areas are respectively 0.70 and 0.65. As mentioned earlier, Mokola is fully developed and the soil is consolidated lateritic. The topography of the area is relatively steep from the crest (around Adenle Avenue, and Kabiawu Street) towards Oyo and Queen Elizabeth road. The consolidated and impervious surfaces (i.e. macadamized roads) shed their water in a short time direct into the well-spaced drains. The inlet time " T " in assumed throughout is 5 min. The second supplement of the time of concentration ($T_c = T_n + T_f$) is time of flow (T_f) which is the time of flow in the drain from the remote inlet to the point under consideration, is dependent on the length of flow and the velocity of flow. In this project a maximum flow velocity that will not erode and reduce life span of the drain is being adopted.

A special attention should be drawn to the necessity of continuing Olayeni road (i.e. Road 14) to link Oyo road through road 14A. This is important to allow the overland flow to drain into the box culvert along Oyo road which is eventually discharged through the box culvert at the edge of Elizabeth by Oyo Road into Ogunpa stream.

Equation 1

R = Hydraulic radius in metre = A/P

A = Cross-sectional area of the channel in m^2

P = The wetted perimeter in (m)

S = Slope of the drain

A maximum velocity of 5 m/s adopted because of the slope advantage of the area, and to reduce scouring effect of the outfall. As much as possible the natural slope of the land (which varies from 8.92 to 12.7%) will be followed. The minimum velocity adopted is 0.75 m/s. This is expected to disallow sedimentation situation and eventual blockage and to provide self-cleansing ability. The time of concentration T_c adopted is time based on the Mathematical expression

Table 5. Water rationing period.

Area	Day of Week Supplied
Oremeji/Coca Cola	Monday
Oketunu	Tuesday
Mokola	Wednesday
Premier Hotel	Thursday
Fatolu (near Oketunu)	Friday
Sobande	Saturday
Premier Hotel	Sunday

Source: Ministry of Land, Survey Housing Oyo State Nigeria, 2006 (Reproduced Table B²⁰ of preliminary Design Report).

proposed, by Kirpich which involves length of flow 'L' n slope of flow 'S' as well as coefficient of roughness (n) of the sewer. In the project area double street channel drain is adopted throughout as the road layout of the area is good. However there is an exception to this from drainage to drainage on Adenle and Kabiawu road. All the drains will be lined rectangular or square shaped. Thus the roughness coefficient (n) is 0.15. The possible exception to these rules will probably occur in the entire sewer discharging into the main drain along Queen Elizabeth road. This is mainly due to the high difference in level of the main receiving drain and the various minor discharging drains (the drains here will be cascaded).

In view of the ecological and erosion problem that is rampant, and for higher safety margin, a freeboard of 0.3 m will be considered for all the drains (sewer) in the project area.

Water supply

Presently water is supplied to the project area once in a week according to Table 5 shown above. Water rationing period as contained in part B of preliminary design report which is reproduced. This is affected by the on-line booster pump located in the Oyo state pumping station on the Oyo road (Ayeni, 2003). This (3-phase 50 Hz, 155 Amps motor with rate capacity of 76 kw) pump, delivers water into a 200 mm diameter AC pipe from a loop round the project area.

The preliminary design report provided a 4000 m³ ground services tank to be located at premier hill. The capacity of this tank is based on one day water demand of the area (Ayeni, 2003). However, the per capital water considered a little low for a city like Ibadan particularly in an area like Molokai where majority of people living there are working class. Even at this rate, in case of fire demand domestic supply would be shut off. The population estimated at a growing rate of 2% annum for the year 2015 is 35,040. If this is approximated to 36,000 then the daily water need is 5760.0 m³. This is a daily water supply of

5760 m³ (or approximately = 6000 m³).

As recommended in the preliminary design one day (24 h) water demand will be used to size the ground concrete service reservoir (Ayeni, 2003). The capacity of the tank shall however be 6000 m³ (instead of 4000 m³ recommended in preliminary design report) and there shall be three tanks each of 2000m³ volumes located in a triangular configuration with 10 m spacing. The diameter of each shall be 20 m with a height of 6.5 m. An area of 70 m by 40 m shall be acquired for this purpose on the premier hill. The sump of the tanks shall be drained into the side drain of the road from Premier Hotel to parliament road.

A new and separated booster system whose capacity of 1000 m³ (equivalent to storing 6 h of water pumping) shall pump water to the three tanks through a 200 mmφ asbestos cement (AC) pipe. The pump must be capable of pumping 150 m³/h of treated water to a head of 98.5 m. The pump shall not be on line. It shall pump from an underground balancing concrete reservoir whose capacity is 500 m³ (10 × 5 m height). This shall be located within the premise of Oyo State water Corporation booster station at Oyo road (Ayeni, 2003).

The pipe network of water supply in the project area will be analysed by the use of computer. The result of this shall be incorporated in the next report. Meanwhile the field data are being assembled now final processing. When this is completed it shall come up with the general layout of the area showing all the proposed drains, their horizontal alignment, slopes and lengths. The water or draft from each road confirms the already sized pipe diameters. Asbestos cement (AC) pipe as recommended at preliminary design stage shall be used except where it is unavoidable that the pipe should be exposed, then cast iron shall be used. All the roads shall be included in the gridiron distribution network system.

Sewage and sanitation

It is obvious that central sewage system cannot be provided yet in Molokai area. This is because all the facilities

required for such services are not yet in place anywhere in the city of Ibadan (Abumere, 1994). It is expected that if the water supply system is functional and reliable, adequate and regular, all the existing soak away system will be in functional use in collecting and digesting human wastes (Ayeni, 2003). Mokola area is almost a completely built up area, therefore a sanitary facility as distinct from central sewage system that will be efficient and occupy minimum possible space is required. One toilet each shall be located on Bolarinwa Street. At the existing public toilets site (1) in Mokola market, (2) along Craig bye pass road after Olayeni Street towards Queen Elizabeth road, (3) at Ago Tapa preferably along Adeleye on Darlington Street and between Kobomoje and Olayeni Street, (4) along Adenle Street towards Oyo road.

The following facility shall be made available at each public toilets site:

- (i) a minimum of 5m³ of elevated water tank to service the toilets
- (ii) Electricity Supply
- (iii) Maintenance crew – to be provided by the local community on a token sum.

The 5000 L or 5 m³ elevated steel tank to service the toilets. The tower of the tank shall be such that it will just be sufficient to command the basin of the water closet. Dislodging the existing household pit latrines and septic tanks by the use of waste conservators shall be introduced and shall be once in 15 years depending on the usage.

Solid waste generation and collection

The population of the project area in the year 2015 at the growth rate of 2% is projected to be 36000. Using the calculated daily average solid waste generation of 2.0 kg per head estimated for Ibadan (Ayeni, 2003). The estimated total wastes to be generated per week in the project area in the year 2015 are 504 tones.

To combat this kind of waste effectively it is necessary to mobilize the people to acquire litter binds or drums. The collection and disposal in accredited refuse dump site in the periphery of the city shall be recommended to be fanned to contracting firms. These firms will collect refuse weekly from the household drums. With the new road network that would result from this project, accessibility to the refuse (house) drums will be facilitated.

In the next stage of this project, the possible cooperativeness of the people of the area to the use of drums and contractors for collecting and removal of waste shall be shown from the result of the random (street by street) opinion of the people of the street (Ayeni, 2003). The result will show how effective it would be to enforce the law on the inhabitant to cooperate in the garbage gathering exercise.



Figure 3. Solid waste disposal. Source: Field Survey (2008).

Roads and drainage

This aspect of the study gives an account of the work already carried out on roads and its drainage for Mokola project area, since the start of the final engineering design. It is a presentation of the detailed survey work carried out and part of the draft final engineering design standards as contained in the preliminary report. These roads are classified at the preliminary design stage into five functional groups based on the available right of way.

- (1) Primary distribution roads
- (2) District distribution roads
- (3) Local distribution roads
- (4) Access roads
- (5) Foot paths

However, this classification is being revised for the next stage of the report.

Variation to the preliminary engineering design

During the detailed survey work it was discovered that the horizontal alignment of some roads was different from the presentation in preliminary drawing No. RLP. 04. The researcher has corrected, the researcher noticed also that there is a building (Miracle farm) situated on Road 4. Since demolition is not allowed in Mokola Area it is recommended to terminate Road 4 at drainage 0+089 m.

Design standards

The design criteria employed were from guidelines stated in the term of reference and in accordance with the specification of the "Highway Manual Part 1 Design" of the

Table 6. Table of design criteria.

Design criteria	Value	Unit
Design Speed		
All Roads	50	km/h
Vertical alignment		
Gradient for Primary Distributor Roads	4-5	%
All other Roads	Depends on terrain	%
Minimum length of Vertical curve	28	M
Minimum stopping Sight distance	60	M
Minimum passing sight distance	245	M
Horizontal Alignment		
Maximum degree of curvature	26.5	Degree
Minimum radius of curvature	245	M
Minimum stopping sight distance	60	M

Source: Ministry of Land, Survey Housing Oyo State Nigeria (2006).

Federal Ministry of work and Housing, and as in the preliminary Report (Ayeni, 2003). The design criterion as applicable to this project is shown in Table 6 based on vertical, horizontal alignment and design speed recommendation in the preliminary Report (FGSNDP, 1962).

However, there are slight deviations from the design standards in some areas that have difficulty terrain for the following reasons:

- (i) The project area is almost fully developed with buildings very close to each the road.
- (ii) The geology of the area reveals quartzite sub grade which makes massive excavation very expensive and hazardous to existing buildings.

Based on these reasons aforementioned, the proposed road profile and horizontal alignment are design to relate as closes as possible to the existing.

PRESENTATION OF DATA AND FINDINGS

This aspect of this study deals with the analysis of data collected through the aid of structured questionnaires. The discussion begins with the examination of socio economic and demographic characteristics of respondents and the housing characteristics of Mokola.

Socio economic characteristics of respondents

The various factors that could affect the living standards in

the study area are discussed. Consideration is given to other variables such as age, sex, marital status, education and income which are major determinants of living standards in the study area.

Age of the respondents

The respondents cut across people of different age groups including the elderly youths and youngsters. This study revealed that 35.6% of the household respondents covered by the survey fall between 26 and 30 years old. A percentage of 21.9% of them fall within 31 and 40 years (Table 7). This implies that the bulks of the respondents were young and middle aged people. The implication of this structure implies the readiness for them to improve their living standard;

Educational background of the respondents

The educational background of the respondents is shown in Table 8. This study shows that 9.8 and 30.6% of the respondents had no formal education and first school leaving certificate respectively. The table further revealed that those who had had WASCE/GCE/NECO, NCE/ND, HND/B.Sc. and others amounted to 23.5, 19.1, 15.5 and 1.1% respectively. This implies that the level of education in the study area is very poor. This has serious effect on the environmental quality of the study area in terms of poor drainage system, poor environmental sanitation and host of others.

Table 7. Age of the respondents.

Age	Number of Respondents	Percentage
17- 25	36	18.4
26-30	65	35.6
31-40	40	21.9
41-50	21	11.3
51-Above	5	3.2
Missing system	17	9.3
Total	183	100

Source: Field survey (2008).

Table 8. Educational background of the respondents.

Educational Background	Frequency	Percentage
No formal education	18	9.8
First School Leaving Certificate	56	30.6
WASCE/GCE/NECO	43	23.5
NCE/ND	35	19.1
HND/B.Sc.	28	15.3
Others	18	1.1
Missing system	1	0.5
Total	183	100

Source: Field Survey (2008).

Table 9. Occupational Structure of the Respondents.

Occupation	Frequency	Percentage
Farming	5	2.7
Civil Servant	26	14.2
Student	18	9.8
Artisan	36	19.7
Trading and Commerce	72	39.3
Others	19	10.4
Missing system	7	3.8
Total	183	100

Source: Field Survey (2008).

Table 10. Income level of the respondents per month.

Income level	Frequency	Percentage
Less than N10000	64	35.0
N1001-N20000	69	37.7
N20001-40000	34	18.6
N40001-N60000	5	2.7
N60001-N80000	3	1.6
N80000-100000	3	1.6
Missing system	5	2.7
Total	183	100

Source: Field Survey (2008).

Table 11. Household size.

Household size	Frequency	Percentage
1-3	24	13.1
4-6	70	38.3
7-9	31	16.9
10-12	21	11.5
13-16	9	4.9
16-18	25	13.7
Missing system	3	1.6
Total	183	100

Source: Field Survey (2008).

Occupational structure of the respondents

It shows that 14.2% of the residents of Mokola are civil servants, 19.7% are artisan, and traders are 39.3% while students are 9.8%. A detailed result of the analysis is represented in Table 9.

Income level of the respondents

This survey revealed that most inhabitants of Mokola fall within low income earners. According to Table 10, 35.0% of the respondents earn less than N10000 per month while 37.7, 18.6, 2.7, and 1.6%, respectively earn between N1001-N20000, N20001-40000, N40001-N60000, N60001-100000.

DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS

This covers the number of households per building, the household size and the total number of persons per building.

Household size

It was deduced from Table 11 that building with 4-6 households take the highest aggregate (38.3%). It is followed by 16.9% for the building with 7-9 households. The 13.1, 11.5, 4.9 and 13.7% are for buildings with 1-3, 10-12, 13-16 and 16-18 households respectively. The no. of households in the building determines the standard of housing of the residents. The household size determines the level of overcrowding and congestion of the buildings by the residents.

Housing characteristics of the residents

The significance of the housing characteristics of the

residents of Mokola cannot be over emphasized. This determines the degree of standard of living and the kind of environmental quality of the study area. The variables for the assessment include the type of building, ownership of building, age of buildings, height of buildings, use of building and a host of others.

Types of building

The types of building show the model of structures that are generally acceptable by the people in the study area. It was observed from Table 12 that Bungalow type of building takes 51.9% and followed by Flat which accounts for 21.9%. The Block of flat, multifamily unit, Brazilian type and others take 7.7, 7.7, 9.8 and 0.5% respectively. This shows that the inhabitants of the study area are after roomy structures.

Ownership of building

The ownership of building determined the tenure ship of the building. This is highly necessary to determine the level of maintenance of the building. Table 13 revealed that most buildings are occupied by tenants (rented) and this accounts for 72.1% of the total respondents interviewed. It was followed by 16.4 and 9.8% for the buildings that owners occupied and owner/ tenants respectively.

Age of buildings

The age of buildings determine the degree of dilapidation in terms of wear and tear. This would affect the valuation of the building. It was deduced from Table 14 that buildings that are greater than 20 years takes 56.8%. This is followed by 16.4, 14.2, 6.0 and 5.5% for the buildings of ages between 16-20, 11-15 and 6-10 and 1-5 respectively. It was observed from the field that most buildings are old and this has serious effect on the structures in terms of depreciation.

Table 12. Type of building of the respondents.

Type of building	Frequency	Percentage
Bungalow	95	51.9
Flat	40	21.9
Block of Flat	14	7.7
Multi-family Units	14	7.7
Brazilian (face to face)	18	9.8
Others	1	.5
Missing system	1	.5
Total	183	100

Source: Field Survey (2008).

**Figure 4.** Bungalow. Source: Field survey (2008).**Figure 5.** One storey building. Source: Field survey (2008).

Height of buildings

The importance of height of buildings cannot be ruled out especially in the commercial area due to the high value for land. It was revealed by Table 15 that Bungalow takes 61.2% (Figure 4-7) of the total buildings, the one and two storey account for 24.0 and 9.3% respectively. The high rate of Bungalows are due to the income level of the

residents that is very Low and even little competition for land in the study area.

Number of habitable room

The habitable rooms are types of space used for living, working, sleeping and eating. These include sitting room, dining room, bedroom and a host of others. The number of habitable rooms within the building determines its functionality. It was deduced from Table 16 that buildings containing 5-6 habitable rooms take 27.3% and followed by 24.0% for the buildings of 3-4 and 21.9% for 7-8 habitable rooms. The rest buildings take less than 20%.

Wall materials

The buildings are constructed with different materials such as mud, burnt brick, and cement block among others. It was observed from the field that most buildings are constructed with mud materials representing about 47.0%. The burnt brick and cement block take 43.2 and 5.5% respectively. The mud material has made buildings to be depreciated in value and even in poor condition. This was further emphasized (Table 17).

Floor materials

The floors are furnished with different materials such as earth, sandcrete, tiles/terrazzo and host of others. It was observed from the field that most of the floors of buildings are constructed with sandcrete and this amounts to 49.2% of the total respondents interviewed as indicated in Table 18.

SUMMARY OF FINDINGS

The bulk of respondents were those between the age



Figure 6. Two-storey building. Source: Field survey (2008).



Figure 7. Three-storey building. Source: Field survey (2008).

Table 13. Ownership of Building of the Respondents.

Ownership of building	Frequency	Percentage
Owner Occupied	30	16.4
Rented	132	72.1
Owner/Tenant	18	9.8
Others	1	.5
Missing system	2	1.1
Total	183	100

Source: Field Survey (2008).

brackets of 26-30 which takes 35.6% of the total residents interviewed and this indicates their readiness to improve their standard of living. Majority of the respondents had but first School leaving certificate as their highest level of education and account for 30.6%. This has serious effect on the environmental quality of the area. Traders are mostly

found in the study area and thereby take 39.3%. The highest percentage recorded by trading is due to the closeness of Sango and Dugbe market around the study area. It was observed from the field that majority of the respondents earn less than N30, 000 (72.7%). This has affected the standard of living of the residents.

Table 14. Age of buildings.

Age of buildings	Frequency	Percentage
1-5yrs	10	5.5
6-10yrs	11	6.0
11-15yrs	26	14.2
16-20yrs	30	16.4
> 20yrs	104	56.8
Missing system	2	1.1
Total	183	100

Source: Field Survey (2008).

Table 15. Height of buildings.

Height of buildings	Frequency	Percentage
Bungalow	112	61.2
One-Storey	44	24.0
Two-Storey	17	9.3
Three-Storey	5	2.7
Missing system	5	2.7
Total	183	100

Source: Field Survey (2008).

Table 16. Number of habitable room.

Number of habitable room	Frequency	Percentage
1-2	13	7.1
3-4	44	24.0
5-6	50	27.3
7-8	40	21.9
9-10	32	17.5
Missing system	4	2.2
Total	183	100

Source: Field Survey (2008).

The buildings with 4-6 households take the highest percentage in the study area. This is necessary to determine the degree of congestion. The average household size of 4-6 takes the highest aggregate of 38.3%. The Bungalow type of building is mostly common in the study area with 51.9%. This has specified the model type of building required by the residents in case of any re-development of the area. The buildings are also mostly occupied by tenants (72.1%).

It was observed from the field that most buildings have their ages greater than 20 years. These have brought out depreciation of structures and thereby affect the value of the structures due to wear and tear. Majority of the buildings are bungalow. The high rates of buildings are due to the low income level of the residents and even there is little competition for land in the study area. The average household size of 4-6 takes the highest aggregate of 38.3%.

The habitable rooms are between 5-6 occupied in the study area and account for 27.3%. The numbers of habitable rooms determine the functionality of the buildings. Most of the buildings are constructed with mud wall, corrugated iron sheet that are fair in condition. The floors are made of sandcrete. The accessibility to the building is through footpaths. Most of the buildings have kitchen facilities with pit latrines. It should be indicated at this juncture that the use of pit latrines is obsolete and unhygienic for human habitation. The infrastructural facilities are grossly inadequate. There is problem of drainage system, non-availability of refuse disposal method, street parking and a host of others.

It was observed from the field that most of buildings used to be repaired through appropriate renovation programmes. However, it was also obtained from the field

Table 17. Wall materials.

Wall materials	Frequency	Percentage
Mud	86	47.0
Burnt brick	79	43.2
Cement Block	10	5.5
Others	2	1.1
Missing system	6	3.3
Total	183	100

Source: Field Survey (2008).

Table 18. Floor materials.

Floor materials	Frequency	Percentage
Earthen	58	31.7
Sandcrete	90	49.2
Tiles/Terrazzo	23	12.6
Others	5	2.7
Missing system	7	3.8
Total	183	100

Source: Field Survey (2008).

that the study area did not feel the impact of Ibadan North Local Government. Even the two agencies, that is, Ibadan North Local Planning Authority and Community Development Department could not indicate the meaningful projects carried out by the government in the study area.

Recommendation

The results of the findings indicated that the area needs urgent attentions. Therefore, certain sustainable measures should be offered such as preparation of action plan, the involvement of stakeholders and phasing programmes towards the development of the area.

Conclusion

The need for the creation of functional and viable environment, warrants the production of Action Plan, especially the improvement of housing characteristic of Mokola. It is expected that all the earlier stake holders should work together in order to actualize the aim of the projects. This would prevent further deterioration of the settlement and even making the area more conducive and hygienic.

It is also certain that Mokola has been turned to slum and needs urgent attention in order to improve the environmental quality of the area.

However, Mokola is a community that requires adequate

facilities and services for its functionality. It is therefore necessary for all the concerned stakeholders to involve in the development of the area. This would make life conducive for the residents and even creating functional relationship between the area and its adjoining settlements.

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