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Published by: The Nigerian Institute of Town Planners

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EDITORIAL

The Editorial Board of the Journal of the Nigerian Institute of Town Planners expresses its heart-felt gratitude to Educational Trust Fund (ETF) of the Federal Government of Nigeria for its support. The Board is also profoundly grateful to the National President of NITP, Tpl. (Chief) S. I. Onu, for linking the Board with TETFUND. The Board congratulates NITP for this meritorious recognition. We are deeply thankful the National President and Council and ultimately to God for this rare privilege serve our renowned professional interest group – the Nigerian Institute of Town Planners and the wider society at large.

The Editorial Board is passionate about quality of the journal meeting international standards. To meet international standards, the research must be empirical and must apply requisite theories and methods in the analysis of urban and regional planning problems. All GIS-based maps, multi-colour land-use maps and similar others should be in colour (not black and white). On the coverage of the journal, requirements and format for submission of manuscripts, prospective contributors will do well to consult the guidelines provided in this edition. We intend to get the Flier Leaflets printed out separately in no distant future.

The Board, therefore, calls on seasoned scholars and professionals from within and foreign countries to avail themselves of this unique opportunity to publish papers on urban and regional planning and entrepreneurship in the discipline in our renowned and international journal. The Journal of the Nigerian Institute of Town Planners (JNITP) is published twice a year: in March and October. It is a thoroughly peer reviewed journal. Manuscripts can be sent and are received throughout the year.

Tpl. Dr. K. G. Jiriko Fnitp, Fica, Mrtpi, rtp.
Editor-in-Chief.
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FOREWORD

The Journal of the Nigerian Institute of Town Planners provides a good premise for information dissemination and discussions on all issues relating to the human environment in Nigeria and beyond. Twenty-three volumes of the journal including this issue have been published within the forty-eight years of the existence of the Institute. The Journal has served as a good reference material for researchers in academics and professionals in the entire building industry.

Our purpose here is to direct our resources through this journal to needs of time, to research, educate and promote the use of relevant urban planning knowledge in concert with the total knowledge of our peers in the building industry and the environment in general. We also seek to encourage the effort of many others outside our profession who seek to share ideas with us to improve the urban (human and non-human) environment.

In summary, the Journal of the Nigerian Institute of Town Planners is on the verge of quantum leap in its history of ever changing and advancing pursuit of furthering urban and rural planning and development in Nigeria through knowledge and professional advancement. I believe that the present edition has been rightly focused in this direction. Judging by the thought provoking, stimulating and well researched articles that are packaged, I wish to appreciate the effort of the Editor-in-Chief and Members of the Editorial Board for their careful review and selection of the papers here published.

The Nigerian Institute of Town Planners is also grateful to the ETF for the support it afforded the Institute in this edition

Tpt. (Chief) Steve I. Onu  FNITP, RTP.
President: Nigerian Institute of Town Planners.
AN ANALYSIS OF URBAN PLANNING CHALLENGES IN KADUNA METROPOLIS

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ABSTRACT

Throughout the world, urban planning and planners face challenges. These challenges exist in Kaduna Metropolis, in Kaduna State of Nigeria. The major urban challenges in Kaduna Metropolis include but are not limited to rural urban migration leading to rapid urban growth which far outweighs available resources for managing the Metropolis; poor financing and slow pace of implementing planning schemes and programmes; lack of administrative, political and professional will and firmness to enforce as well as implement plans and planning requirements; inadequate infrastructural services, utilities and facilities; housing problems and illegal changes of land uses. The goal of the paper is to identify the major challenges inhibiting efficient and effective urban planning and management of the Kaduna Metropolis. The main objectives of this paper are to identify and analyze these challenges in terms of how they have been addressed, and how to promote Best Practices in the planning and management of Kaduna Metropolis. The study area is Kaduna Metropolis with a radius of twenty (20) kilometres from the centre. The objective is to look at the types and nature of challenges, their root causes, the administrative and legal provision for planning and managing the Metropolis, and to suggest the way forward on how to surmount these challenges. Urban planning in Kaduna Metropolis along with some socio economic indices were investigated. Data on the study were obtained through random selection of 500 respondents cutting across the three planning zones of the Metropolis. The use of direct interview and application of structured questionnaire was engaged. The data collected was analyzed using simple descriptive methods. The results showed that major challenges of planning and management of Kaduna Metropolis include; increased rural urban migration as well as the immigration of victims of sectarian crisis from some northern Nigerian States like Borno and Yobe; the administrative and political structure of Kaduna Metropolis which is made up of four Local Governments resulting in multiple powers and uncoordinated control and management; the north-south divide and mass movements of residents of the city from one section to the other based on ethnic and or religious leaning; general unemployment, underemployment and poverty to mention a few Recommendations include; the need for the Planning Authority and the State Government to close the gap between physical planning and citizen’s requirements, a review of all legal and administrative instruments for urban planning, implementation of policies and enforcement of urban planning laws and regulations, education of the public on urban planning, rural development and urban poverty alleviation and a conscious effort by Government to disallow the development of the Metropolis along segregated ethnic and religious line, among others.

Key words: Challenges, Urban Planning, Rural Urban Migration, Development
INTRODUCTION

Urbanisation constitutes one of the world’s biggest challenges. Cities serve as centres of economic development, technological innovation and promise but prospects of better lives and expectations in the city are often frustrated. Presently, every third city dweller in the world lives in a slum and in substandard conditions.

In developing countries especially, rapid urbanisation frequently leads to unsustainable results, posing serious urban planning challenges. Cities or urban centres of the world have considerable political, socio-economic and cultural diversity. Managing this diversity and ensuring integration and good quality of life are a huge challenge to urban planners and administrators. These are the challenges that the concept of Good Urban Governance seeks to address by involving urban planners, political and administrative decision-makers, the private sector and civil society in tackling.

The 1996 Habitat II Conference, dubbed “The City Summit”, revealed the massive demographic shift taking place from rural to urban centers. In 1950, 750 million people lived in urban centers. In 2000 the figure shot to about 2.8 billion (47% of the world’s population living in cities), by 2015, it is estimated that about 4 billion people will live in cities, (about 53% of the world population). According to van Western and Klute (2006) the main engine of urban population growth in sub-Saharan Africa is rural-urban migration.

In Nigeria (Kaduna State inclusive), urban population was 9% of the country’s population in 1980, 29% in 1990 and 37% in year 2000. Annual growth rate of urban population was 5.8% in 1990-2000, and 6.2% in 2000-2010; this means man’s future is decidedly urban. The main motivation for this phenomenon is rural urban migration. This fact is buttressed by Mpofu (2013), who said that cities have always been focal points for economic growth, innovation and employment. They are centres of modern living, with better opportunities and living standards. These attributes of urban centres are made prominent because of the neglect of the rural areas and agriculture, resulting in heavy challenges and pressure on the urban centres.

The near neglect of rural areas in Kaduna State in terms of industrialisation, agricultural development, availability of basic infrastructure and the presence of Government establishments are the main causes of the drift of population, especially the youth, to the urban centers like Kaduna Metropolis. The rate of rural urban migration is faster and higher than the pace and resources for planning and development to cater for the population. This coupled with other issues have created urban planning challenges for the planning and management of Kaduna Metropolis.

The paper identifies and explains the issues behind the myriad of unsolved urban problems and the near breakdown of the machinery of urban planning and management. It gives an insight into the reasons why a well-planned city like Kaduna has deteriorated to its present state of filth, planlessness and chaos, leaving it as a huge urban area which is still growing without proper planning and management, threatening its very fabric and that of its environs.
AIM AND OBJECTIVES OF THE PAPER
The paper aims at investigating the urban planning challenges in Kaduna Metropolis with a view to suggesting appropriate solutions to improve the situation. The aim is to be achieved through the following objectives:
(i) Identify the challenges posed to effective and efficient planning of Kaduna Metropolis;
(ii) Identify the causes of the challenges;
(iii) Proffer solutions for tackling the challenges; and
(iv) Recommend future best practices for planning and managing the Metropolis.

SCOPE OF THE PAPER
The paper is limited to identifying the difficulties and problems encountered in planning and managing the Kaduna Metropolis and suggesting best practices as solutions to overcoming them. The spatial scope is the Kaduna Metropolis, defined geographically, as the area within twenty kilometers radius from the centre of the Metropolis.

The paper is beneficial to urban planners, managers, administrators and other stakeholders within the urban planning and management sphere.

THE STUDY AREA
Kaduna is the capital city of Kaduna state, located in north central Nigeria. It was the capital city of the former Northern Nigeria North Central State, respectively. It is an important Military Base in the country. It lies between latitude 10°20"N and 10°40"N, and longitude 7°20'E and 7°28'E. It occupies an area of about 825 Sq. M with a population of about 2.2m (Projected 2006 National Population Census). Kaduna city has a gentle undulating topography with no remarkable highlands. Its prominent physical feature is the Kaduna River which flows through the city, from the north east to a south west direction, almost dividing it into two. The city has a tropical continental climate with two distinct seasons: dry season which commences in November and ends around March/April, and the rainy season from May to October, with some yearly variations. Annual rainfall ranges between 1100-1200mm, with average daily temperature of about 25°C. The vegetation is basically northern guinea savanna, but activities and urbanization has made it to tend towards the Sudan Savanna vegetation type. The soils are typically tropical ferruginous, red-yellowish to red-brownish in color. Within floodable plains known as "Fadama", these soils are darkish-brown and mostly loam/silt.

Fig. 1: Map of Nigeria Showing Location of Kaduna State and Kaduna City
Fig. 1: Map of Nigeria Showing Location of Kaduna State and Kaduna City. Kaduna metropolis encompasses two local governments namely; Kaduna North and Kaduna South, and some parts of Igabi and Chukun. Each of these Local Governments have areas of jurisdictions within the Metropolis, making its administration and planning complex and difficult. It is an important Military Base and a socio-political melting pot in the national context.

Figure 2: Map of Kaduna State showing Kaduna Metropolis

METHODOLOGY
The method used in this research involved a review of related literature on urban planning globally, nationally and locally. Discussions, interviews, and meetings were held off field and in the field, with officials in planning related organizations and other urban stakeholders. A structured questionnaire was administered to 500 people of different ages (18-70 years), ethnic groups, occupational groups, social class etc. The respondents were randomly selected across the three designated urban planning zones of the Metropolis. The study identified key partners in planning such as private firms, community leaders, and some local government officials, who were part of the respondents. Educated and literate respondents filled their questionnaires themselves while the non-literate ones were assisted to fill theirs. The questionnaire sought to know the administrative and legal set up of the Kaduna Planning Authority, its activities in terms of planning, implementation, monitoring and evaluation; the Planning
Authority’s relationship with related Agencies such as the four Local Governments within the Metropolis and other stakeholders. The data collected for the study was analysed using descriptive statistical methods.

CHALLENGES OF URBAN PLANNING IN GENERAL
The root cause of urban problems and challenges is rural-urban migration, which in turn leads to rapid urban growth. The challenges arise due to the fact that the resources available and the technical, administrative, managerial and political will to tackle such challenges are inadequate or sometimes lacking (Onibokun, 1988). Research findings showed that in Nigeria there has not been a commensurate growth rate at which adequate social services and infrastructural amenities are provided. The pace of planning of especially residential land uses and housing provision has lagged behind the population surge. This has led to a decline in the quality of life and the environment (Onibokun, 1987) and the resultant challenges.

Challenges of urban planning in Lagos Megacity according to George (2009) include but are not limited to urban sprawl and encroachment on conservation zone, inadequate basic infrastructure and community facilities, inadequate energy/electricity, inadequate portable water, formation of slums, urban road transport problems, urban violence, change of land use and illegal development. These challenges have similarly been identified by (Jinadu, 2004) and (Onibokun, 1988), as well as other authors writing on urbanization and urban issues including the UNDP/UNCHS/World Bank (2008).

CURRENT URBAN PLANNING CHALLENGES IN KADUNA METROPOLIS
The Kaduna Metropolis has an urban planning board known as the Kaduna State Urban Planning and Development Authority (KASUPDA). This Board is in charge of Physical Planning of the Metropolis and the whole State in general. Planning Authorities at the Local Government levels are yet to be put in place. All planning activities are decided and controlled from Kaduna, through Zonal offices located in settlements next in hierarchy to Kaduna like Zaria, Kafanchan and Saminaka.

The legal instrument for the planning, implementation, monitoring and control of planning and development in the Metropolis and the State is the Nigerian Urban and Regional Planning Law, 1992, (Decree No. 88, 1992 & Decree No. 18, 1999 (as Amended). Administratively, the State Government is at the helm of planning affairs, and does the control through the Ministry of Lands Survey and Country Planning, having its Commissioner or Permanent Secretary presenting the affairs of the Planning Authority to the State Executive Council.

There are four (4) Metropolitan Local Governments in Kaduna. Each of these local authorities claims to have powers to carry out planning activities within the Metropolis, and actually do so despite the laws and regulations restricting them. In reality, the Local Government Laws have not been amended to take care of current situation and overlapping areas with other laws such as the Nigerian
Urban and Regional Planning Law. This situation is one that has compounded the challenges of planning for the Metropolis. Coordination and cooperation between the four Local Governments, KASUPDA and other public and private organizations involved in planning is weak or lacking.

Kaduna, established in 1913, was the seat of power of the Northern Protectorate, Northern Nigeria, North Central State, and now Kaduna State. It was also established as a Military Base. Thus all those who have held Military or political power in the State or city still want to hold sway or have a say in the affairs of Kaduna, especially on land matters. This has led to undue interferences in planning issues by such past and present powerful people, creating administrative and management problems for planning.

One of the current challenges of planning in Kaduna is the recent influx of people from crises ridden areas like Borno, Yobe and Bauchi States. About 2% of respondents for this study were found to have settled in Kaduna Metropolis from that axis within the past two years. Related to this, is the north-south relocation of residents of the Metropolis along ethnic and religious lines. This has led to congestion and unplanned settlement development in areas like Maraban Rido, Kamazo, Gonin Gora and Rigachikun axis, while some volatile areas like Tudun Wada have witnessed a decline in population. Data obtained from questionnaire served on KASUPDA on number of applications for building plan approval and on documentation on land bought within Kaduna, attest to these relocations.

The pace at which the State Government acquires land, plans and implements schemes is too slow, slower than the demand for land especially for housing development by the public. The gap created leads to proliferation of illegal layouts, creation of urban villages or sprawl, distortion and encroachment on layouts (Hussaini, 2012), loss of revenue by government as people by-pass official land transactions Ahmed (2012), cited a study by the DURP(2008) which revealed that in Zaria, the second largest city after Kaduna in the State, only 11% households have Statutory Titles to land, 10% hold Customary titles and 58% have neither. This gives a similar picture of what obtains in Kaduna with 60% of respondents (mostly) living within the illegal and squatter settlements, revealing that they have District/Village Heads papers as the titles for their land. The development of these sprawls also poses threats to security. This study and others on Nigerian urban centers reveal that there is a declining quality and gross inadequacy of urban infrastructure, where about 34% of housing units have no access to electricity, pipe borne water, and safe liquid waste facilities (Onibokun,1987). There is housing shortage, with high rates of overcrowding, substandard buildings, and high house rents. Solid waste is indiscriminately disposed off even in the so called planned Government Reservation Areas. About 13,549kg (13.55 tons) of solid waste is generated in Kaduna Metropolis daily (Kulausa, 2009). Most of this waste is dumped at open dumpsites, drainages and streams, without proper sorting, recycling or treatment, further worsening the situation of the urban environment. Serious problems of inadequate and substandard health, education, transportation and communication
facilities among others, exist in Kaduna. Kaduna, like other urban centres in Nigeria and the developing countries, also experiences other challenges of urban planning, which include, but are not limited to general ignorance of the public about urban planning and Town Planners and what they do, general human and environmental poverty, gross inadequacy of housing, infrastructural facilities, services and utilities, technological and resource limitations especially financial resources, inadequate solid waste disposal and management facilities, poor health and educational facilities, unemployment and under employment, violations of planning laws and regulations, illegal occupation of land leading to development of squatter settlements and illegal change of land uses.

CURRENT URBAN PLANNING CONCEPTS AND BEST PRACTICES
Current urban planning concepts and best practices are important because they not only provide a strong backbone for effective and efficient urban planning, but are crucial in addressing urban planning challenges. Among current planning concepts relevant to this study are: Sustainable Cities, which according to the Programme Coordinating Unit Information booklet of the Sustainable Cities Programme of the Federal Ministry of Works and Housing (Nigeria, 2010), creates cities in which social, economic, and physical development lasts, and where urban poverty reduction strategies are integrated into local development planning. Sustainable Cities depicts aspects of Good Urban Governance, in which, urban planning and development ensures a balance between social, economic and environmental needs of present and future generations, including poverty reduction, sustainable human development and the balancing of available urban resources and population. The Habitat Agenda (2000) sums it up as “a well managed and inclusive City”. Good Urban Governance includes aspects of decentralisation (such as having the Commission, Board and Local Planning organs at the three tiers of governments based on the Nigerian planning Law, instead of what obtains in Kaduna where the authorities at the Local levels are absent), partnership (like KASUPDA partnering with the four Metropolitan Local Governments), and capacity building. The UN-Habitat (2000) sees Good Urban Governance as a tool for combating urban poverty, providing equity, social justice, gender sensitivity, adequate and secure tenure for all urban dwellers and sustainable urban development. These have direct bearing with the urban planning challenges in Kaduna Metropolis.

Other concepts include, Safer Cities in which planning strategies integrate crime prevention and ensure security of urban dwellers; Inclusive Cities, in which planning discourages segregation in all forms (such as the current developing situation in Kaduna where neighborhoods are developing along ethnic and religious lines), and pushing the poor and vulnerable to informal settlements through bad urban policies and practices; Public/Private Partnership, creates an interdependent network of cities nationally and internationally to exchange ideas, knowhow, foster cooperation, partnership, better financial management and services provision. In 2004, the United Cities and Local Governments (UCLG) was formed worldwide, so also the Africa and City Net in Asia, for the same purposes. The Kaduna
Metropolis is not in cooperation or collaboration with any national or international agency to tap the benefits highlighted above. The last concept relevant to this study is the Urban Environmental Planning. Climate change and global uncertainties have brought a new sense of urgency for the sustainable urban development agenda. The concept has to do with helping urban areas to produce less waste and emissions, consume less energy, water, land, and become more sensitive to the consequences of climate change beyond the concept of "green cities". Urban planning should integrate policies and programs that make the urban areas healthier, safer, economically viable, just and equitable.

The adoption and practice of the urban planning concepts outlined above, and adherence to planning laws, regulations and sound policies and programs constitute best urban planning practices.

RESULTS AND DISCUSSION
The study revealed that Kaduna State and Kaduna Metropolis face rapid population growth which constitutes a serious urban planning challenge. Based on the projected National population Census of 2006, using the national growth rate of 5.8%/annum, Kaduna Metropolis had, and is projected to have the following population:

Table 1: Projected Population of Kaduna Metropolis, 1996-2020.

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1,080,671</td>
</tr>
<tr>
<td>2006</td>
<td>1,723,260</td>
</tr>
<tr>
<td>2014</td>
<td>2,229,332</td>
</tr>
<tr>
<td>2016</td>
<td>2,355,850</td>
</tr>
<tr>
<td>2020</td>
<td>2,608,886</td>
</tr>
</tbody>
</table>

The 2014 projected population of Kaduna Metropolis is 2,229,332. Computations (not shown on the Table) indicate that this is about 28.26% of the State population of 7,886,419 (also not shown on the table above). Further calculations, not indicated on the above table, revealed a growth in population of the Metropolis by about 62% between 1996 and 2006, and about 77% between 2006 and 2014. Rural-urban migration contributes about 65% to the urban growth, while other factors like the relocation of victims of crises into the Metropolis, and natural growth by birth make up the remaining 35%.

Factors responsible for the development of urban sprawl include illegal subdivision of land by landowners (with the connivance of local traditional rulers (Jiriko, 2012), and even government officials, "squatter settlements which derive from encroachment on government layouts or land set aside for public use. Examples of urban villages or
sprawls and squatter settlements in Kaduna which developed in the past ten to fifteen years are Hayin-Banki, Hayin-Dannami, Karatu-Tudu, Gonin-Gora and Kakau as sprawls; and Kudenda, Nasarawa New Extension and Danhono, as squatter settlements on government layouts. In fact, the study revealed that about 30% of neighborhoods (mostly squatters and urban villages) in Kaduna Metropolis came into being within the past 15 years (1998-2013). Of these new neighborhoods, only 5% are planned on Government layouts such as Barkalahu, Tsauin-Kura, part of Ungwan Muazu and the Federal Housing Gonin-Gora. In terms of infrastructural services, facilities and utilities, their provision falls far short of the requirements. The study revealed that about 48% of residents of the Metropolis lacks, or has inadequate and erratic supply of portable water. According to FRN (2000), and Yunana, Shat, and Galadimawa (2013), only about 50% of urban populations, and 20% of peri-urban populations have access to portable water supply. In terms of energy such as electricity, 70% of residents in Kaduna have access to electricity, although the supply is irregular. Of this 70%, about 40% still rely on power generators to augment power supply. As for cooking energy, about 69.60% of residents use wood fuel. This agrees with the findings of (Chukwu 2001), and (Yunana, Shat, Galadimawa, and Obasi 2013) that 70% of Nigerians rely on fuel wood as source of energy.

There is a declining quality and gross inadequacy of urban infrastructure, where about 34% of housing units have no access to electricity, pipe borne water, and safe liquid waste facilities (Onibokun, 1987). There is housing shortage, with high rates of overcrowding, substandard buildings, and high house rents. Solid waste is indiscriminately disposed of even in the so-called planned Government Reservation Areas. About 13,549kg (13.55 tons) of solid waste is generated in Kaduna Metropolis daily (Kulausa, 2009). Most of this waste is dumped at open dumpsites, drainages and streams, without proper sorting, recycling or treatment, further worsening the situation of the urban environment. There is physical evidence of air pollution from emissions from motor vehicles especially by the large presence of motorcycles in Kaduna. Their ban from parts of Abuja the FCT and neighboring Kano has swelled their number while in Kaduna (where their ban in the near future is also likely) the Licensing Office estimated the number of motorcycles to be over ten thousand (10,000). Other sources of air pollution include the NNPC gas flaring which affects Sabon Tasha, Romi and Maraban Rido areas. Serious problems of inadequate and substandard health, education, transportation and communication facilities, among others, exist in Kaduna.

CONCLUSION
Rapid rate of urbanisation in Kaduna State is the genesis of the challenges faced by the Kaduna Metropolis. In order to deal with these urban challenges there is need for the development of the rural areas to check rural-urban drift. There is need for accurate socioeconomic and population data and projections which will assist in physical planning and handling of the rapid urban growth and its consequent problems. Successful and effective planning and management of Kaduna Metropolis will
require adequate funding, acquaintance with modern trends in urban planning, capacity building and training of staff, and use of modern planning tools such as computer-aided planning/design and computerised land information system, digital maps and other modern tools.

Above all, successful urban planning will require strong and firm government will power, and backing. In addition, planning in Kaduna State should be viewed as a welfare package to the people, involving initial huge Government investments which in the long run will bear fruits in terms of the wellbeing of the people and the environment, rather than viewing it as a revenue yielding affair where KASUPDA is given revenue targets to achieve.

RECOMMENDATIONS
The following recommendations are suggested for tackling the major urban planning challenges in Kaduna metropolis; According to Mpofu (2013), eliminating urban environmental challenges should start from the basics, by improving rural areas through sound rural development by establishing cottage industries, providing potable water, electricity etc. so that the urban centers will no longer be attractive to the rural people. There should be improvement on capacity building and training for urban planners and managers in Kaduna. They should be abreast with current urban planning concepts that would move them away from the traditional concepts of planning.

Government should support the planning authority in Kaduna to implement urban development policies, laws and regulations, in addition to timely implementation of schemes which will in turn boast development control. The Kaduna Urban Planning Authority should encourage participatory urban planning, public/private partnership, inclusive planning, cooperation and integration between the Kaduna urban planners, other urban stakeholders, collaboration with other cities within the country and without as well as with international agencies. The urban planning authority should take advantage of agencies like the Cities Alliance to tap from their experience and know how on urban planning. The bottom-up approach to planning should be adopted, to create a sense of "our city" by the urbanites, and to make planning/projects sustainable. Kaduna used to be an industrial city. The textile industries thrived up to the early years of 2000. Today most of the industries are shut down, leaving large populations of unemployed people. The Kaduna state government should create an enabling environment for investment to attract investors who will revitalise the failed industries and set up new ones. This will boost the urban economy and absorb the teeming unemployed and also reduce poverty.

According to Ahmed (2012), Land policies, laws and administrative reforms are required to remove the encumbrances in land acquisition and documentation. This is crucial considering that land is a factor of production, and land and property values are key determinants of prosperity and poverty. Additionally, the process of land management affects urban planning and development and control. Transparency, accountability and responsiveness to urban planning problems, as well as land issues are requirements for attracting urban investments. Improved
access to land and security of tenure provides security for investors, social stability and facilitates, urban economic growth and infrastructural development.

Good urban governance is crucial for a successful urban development. The Kaduna State government and the Town Planners should ensure the appointment of credible professionals to handle the planning and development of the city. Professionals and urban administrators should ensure that best practices are put in place.

The state government should facilitate the availability of housing finance and projects towards assisting the poor and medium income groups in the urban center develop their houses. This will reduce the menace of slums and squatter settlements within the metropolis. The state government and possibly the urban authority (KASUPDA) should work out an efficient public transport system, like the current SURE-P buses. These should replace the commercial buses and motorcycles which constitute the main traffic congestion problems and generate air pollution. The State Planning Authority and the Kaduna Transport Authority can cooperate to make this achievable.

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DETERMINANTS OF RESIDENTIAL WATER DEMAND IN ENUGU, NIGERIA.

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Incessant shortage of residential water supply in the city of Enugu, Nigeria has become a chronic problem, due to inability of public water supply to meet the demand. However, there is currently no reliable information on the city's residential water demand. The objective of this study was to determine the factors of residential water demand in the city. Enugu urban was stratified into 3 residential densities namely: low, medium and high. Twenty two neighbourhoods were randomly selected for sampling. One thousand six hundred and fifty (1,650) questionnaires were administered to households in the selected neighbourhoods in Enugu. Multiple linear regression was used for the analysis. The results showed that three of six key research variables namely, average price of water, income and number of toilets were significant determinants of residential water demand (R2 = 0.96 significant at p < .01 level). The elasticities of demand were 0.40, 0.38 and 0.39 for the respective three variables. This implies that price of water and incomes of the household were the most significant factors that influence residential water demand. They were followed by number of toilets. The standard error of the analysis was 0.02.

Keywords: Residential, Water, Demand, Determinants.
1. INTRODUCTION
The city of Enugu is experiencing phenomenal increase in demand for water. The need to meet the dynamic water requirements of the population is a very crucial issue facing the government. With urban expansion, population increases and life-style changes, urban water demand is unlikely to remain constant. Forecasts for water consumption was prepared by the then Anambra Water Board but the forecast according to Master Plan for Enugu (1982), are consumption targets since they were based on studies conducted for similar towns in Nigeria and other West African countries. These it used as basis for determining short-term incremental capacity enhancement needs. Thus, lack of information on actual quantities of water demand in the city of Enugu has made water provision by the State Water Corporation a guess work. For instance, in 1984 with the commissioning of Ajali River water intake and treatment plant, the residents of Enugu were assured that water scarcity would become a thing of the past. However, within a few years of its commission, it was discovered that the water plant did not have the capacity to supply enough water that would meet the demand of the residents of the city. This indicated that actual residential water demand was not known. It also suggests that the estimated residential water demand was based on wrong forecast. The wrong forecast was attributed to the inability of policy makers to satisfactorily identify the factors that influence residential water demand in the city. As a result, all efforts to meet residential water demand in the city proved abortive.

This unfortunate situation has hampered purposeful planning in terms of water resource management and contributed largely to the persistent pipe borne water shortages in the city (Jiburum, 2007). This is a situation that needs to be reversed. Studies have shown that price of water, rent, household size, number of rooms, income and numbers of water closets (toilet facilities) are determinants of residential water demand (Schleich and Hillenbrand 2009; Wentz and Gober 2007; Mazzanti and Montun, 2006; Domene and Sauri 2006). However, it is uncertain to what extent these aforementioned factors are relevant to the situation in the city of Enugu. The objective of this study was to determine the extent to which these variables were the factors of residential water demand in the city of Enugu. It is hoped that the outcome of the study would facilitate the enhancement of measures towards eliminating urban water shortages that have bedeviled the city of Enugu and similar urban centres in Nigeria.

2. LITERATURE REVIEW
A lot of studies have been carried out in many countries on the determinants of residential water demand. Domene and Sauri (2006) examined the factors that influenced the relationship between urbanization and water consumption in metropolitan region of Barcelona, Spain. The results showed that income, housing type, household size, the presence of outdoor uses (garden and swimming pool), plant species planted in a garden and consumer behaviour towards conservation practices play a significant role in explaining variations in water consumption. Schleich and Hillenbrand (2007) used an econometric model to analyze the impact of several economic, environmental and social determinants on the capita demand for water in about 600 water supply areas in Germany. The results showed that the price elasticity of water demand in Germany was around -0.24.
The income elasticity was positive and decreased with higher income levels. It was at least three times higher in the new federal states than in the old federal states. Household size and share of wells have a negative impact on per capita water demand, and water use increased with age. The findings also provided some evidence that rainfall pattern rather than total rainfall affect water consumption. Temperature appeared to have no impact at all.

Wentz and Gober (2007) confirmed the statistical significance of household size, the presence of a water pool, landscaping practices, and lot size as determinants of water consumption in the city of Phoenix, Arizona USA. They also reported an improvement of results from a geographically weighted regression (GWR) model over ordinary least square (OLR) model in the study. This suggests that there are spatial effects above and beyond the effects for household size and water pool (two of the four determinants of water demand). This means that census tracts exhibit water consumption behaviour similar to neighbouring tracts for these two variables. They recommended the use of the model parameters to investigate the effects of policies designed to regulate lot size, water pool construction, and landscaping practices or water consumption, and to forecast water demand in areas of new construction.

Zhang and Brown (2005) studied residential water use in Beijing and Tianjin, China. Their results showed that socio-economic background, water use appliance and usage, water habit and behaviour, and water perception influence water use in both cities. The study also showed that water was both price and income inelastic. They concluded that water use was more in Beijing than in Tianjin. Hoffmann et al (2006) used suburb-level quarterly data to model residential water demand in Brisbane, Australia from 1998 to 2003. The findings not only confirmed that residential water price and income were inelastic, but also that price and income elasticity of demand in owner-occupied households was higher than in rented households. Furthermore, the results showed that weather, particularly summer months and number of rainy days, exerted a strong influence on residential water consumption.

Arbues, et al (2004) estimated residential water demand for the city of Zaragoza, Spain. The result suggests that the residential users are more responsive to a lagged average price satisfaction. The price was a moderately effective tool in reducing residential water demand within the present range of prices. The estimated value for income elasticity and elasticity of consumption with respect to family size reinforces their conclusion. According to Enugu Master Plan(1980), water consumption rates are dependent on many factors but the more obvious ones it highlighted are; climate, culture/technology, user costs, metering of users, age and maintenance of distribution system. It observed that it was difficult to determine water consumption rates in the city because of lack of metering and inconsistent population statistics. Abaje et al (2009) identified factors that control water demand in Jemaa in Kaduna State. Jiburum (2011) found that factors that influence water demand differ in neighbourhoods in Enugu, Nigeria. While rent and income were very significant for the low income neighbourhoods, they were not very significant for the medium and high income.
neighbourhoods. Griffin and Chang (1991) estimated a series of residential water demand equation using aggregate community-level data to test whether price elasticities were sensitive to seasonal and/or functional form. The results showed that residential water demand was sensitive to both. There was a consensus that increases in temperature or evapo-transpiration rates generate higher residential water demand, while increase in precipitation has the opposite effect.

Hansen (1996) modelled the residential water demand in Copenhagen, Denmark. He found that price elasticity were very small and insignificant. Nauges and Whittington (2009) discovered that the main determinants of water demand from literature suggests that despite heterogeneity with place and time of studies, most estimates of own-price elasticity of water from private connections were in the range from -0.3 to 0.6, close to what was usually reported for industrialised countries. The empirical findings on decision relating to household water sources are much less robust and should be a high priority for future research. Arbues et al (2010) carried out an empirical estimation of urban water demand in Zaragoza, Spain, disguising between households with different sizes using data at the individual level. The analysis suggests that all households were sensitive to price regardless of size. However, small households were more sensitive to price change. Rosenberg (2010) supplied an existing deductive model of residential water use for the intermittent supply in Amman, Jordan. The result showed inelastic piped water demand responses for all rate structure at historically low prices similar to findings from prior economic study in Amman. However, piped water demand becomes more elastic when prices rise above $0.50/m³ with uniform rates showing the most elastic response. But results also highlight several complications to determine and interpret price elasticity of demand under different rate structure. They also illustrate trade-off among rate structure and rate structure components for key rate. Setting objectives inlude to encourage water conservation, recover costs, promote efficiency, and more adequately allocate costs among users. Mazzanti and Montini (2006) presented empirical evidence on the determinants of residential water demand for Emil-Romagna region of Italy, using municipal panel data. The estimated water demand price was negative, showing values between -0.9 and -1.33. Income results were associated to appositive elasticity, though less than one. The role of other socio-economic territory-specific determinants was less relevant, with exception of altitude. The relative high value of price elasticity was deemed consistent with the higher level of regional water price compared to national average.

Renwick and Green (2000) used an econometric model to determine the effectiveness of residential water demand side management (DSM) policies in California, USA. The result suggests that both price and alternative DSM policies were effective in reducing water demand. However, the magnitude of the reduction varied among policy instruments. Nieswiadomy (1992) used three types of models namely a marginal price model, an average cost model and shin price perception model to estimate urban residential water demand in USA. The results showed generally that price elasticity is high in the south and the west. Conservation does not appear to reduce water use, but public education appears to have reduced water usage in the west.
The problem with residential water demand has been the appropriate definition of price. That is whether average price, marginal price, shine price, the difference variable, etc should be used in the specification of water price (Griffin and Martin 1981; Nauges and Thomas 2000; Saleh and Dinar 1997; Nordin 1976). Taylor et al (2004) investigated the price specification controversy (marginal price versus average price) using a new model formulation and data from a sample of Colorado utilities USA. The results showed the improved statistical fit using average as the price was shown to be an artifact of the unitary elastic identity created when monthly rate schedules contain a fixed price. When the fixed fee was purged from the data, average price was not significant, but marginal price remained significant. In the preferred double-log marginal price model, estimated price elasticity was -0.3 and conservation programs had no significant effect on water use. The shin test in Nieswiadomy (1992) study in USA indicates that consumers react more to average than marginal prices in all regions.

In summary, the types of database used for residential water demand estimation has evolved over the years. Early demand studies relied upon single period, cross sectional aggregate observations. A once-common view held that cross-sectional databases reflected long run trends better than time series data and could be expected to produce better results. However based on a meta-analysis of residential water demand literature, Espey et al (1997) concluded that the results produced by the two types of study were not statistically different. The base of many models is constructed from regression line since regression is considered superior to others for fitting actual consumption and forecasting future consumption (Weber 1989). Scholars have argued for and against the use of regression as base for forecasting water demand - see Billing et al (1998) and Zhou et al (1996).

The study by Ayanshola et al (2010) took advantage of the superiority of regression model for prediction of water demand in Ilorin, Nigeria using income level, education, household size, occupation, years of staying, type of house lived in and sex of water user. Their results showed that income, educational level and sex of water users were significant factors in explaining individual water demand. The R square value of 0.41 showed that only 41% of the variations in their water demand is explained by the model. The standard error of their model was equally high and a sample size of 85 is small for generalization of the model. Thus the need for this study.

3. METHODOLOGY
The study area Enugu is the oldest city in south eastern Nigeria. It represents a typical example of a rapidly growing state capital in Nigeria. It is an administrative urban centre with a high population of literate residents. Residential land use takes the lion share of existing land use. Water supply to the city as currently being done, comprises five water schemes, constructed at the various times from 1924 to date; one within the city and the others outside the city with a daily supply of 280 thousand cubic meters. Yearly, 10 million cubic meters of water is pumped to residents. The data used for the analysis for this study were from primary sources. They include the following variables: residential water consumption, number of rooms occupied by the household, rent, price of water, income,
household size and facilities in the building. These variables were got from literature and are considered to be variables that can be readily obtained in this environment. Questionnaire administration was used for collection of the data. The William (1978) formula, adopted in Kerlinger and Lee (2000), was used to determine sample size of the study. This method was used because the distribution of the sample frame was normal. The sample was for a finite quantity and without replacement.

The formula is given as: \( S = \frac{n}{1+n/N} \)

Where: \( S = \) sample size; \( n = \) the proportion of households that will be sampled which is 1.3 percent;
\( N = \) the total number of households in Enugu.

Applying this formula, 1650 households, representing 1.3 percent of the sample frame of 127,983 households for the city of Enugu were drawn and sampled. Enugu has 32 neighbourhoods. The city was stratified into three strata namely high, medium and low densities consisting of 10, 10 and 12 neighbourhoods respectively. However, 22 neighbourhoods were randomly selected and sampled in the ratio of 7:7:8 according to densities. A breakdown of the sample size showed that for low, medium and high density neighbourhoods, the sampled size were 525, 510, 615 households respectively. Out of a total of 1,650 copies of the questionnaires that were distributed, 1,504 questionnaires representing 91 percent of the total were returned (see Table 1).

<table>
<thead>
<tr>
<th>Density of neighbourhoods</th>
<th>Number of neighbourhoods in Enugu</th>
<th>Number of neighbourhoods sampled</th>
<th>Population of household</th>
<th>Number distributed</th>
<th>Number properly filled and returned</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>10</td>
<td>7</td>
<td>62,712</td>
<td>615</td>
<td>575</td>
<td>93.5</td>
</tr>
<tr>
<td>Medium</td>
<td>10</td>
<td>7</td>
<td>38,395</td>
<td>510</td>
<td>449</td>
<td>88.04</td>
</tr>
<tr>
<td>Low</td>
<td>12</td>
<td>8</td>
<td>26,876</td>
<td>525</td>
<td>480</td>
<td>91.43</td>
</tr>
</tbody>
</table>

Source: field study,

The model specification for this study was the multiple linear regression (MLR) technique. It was used to test the hypothesis which states that there is no significant relationship between residential water consumption (dependent variable) and the household attributes (independent variables). These include the following: price of water, rent, household size, number of rooms occupied by household, income of household and facilities in building (toilet). Average price of water from all sources for each household (public and private) was used for the study. This is because more than 70% of households' water supply in Enugu is through water vendors (Jiburum 2007). Each vendor sells
water to the consumer according to the bargaining power of the buyer. The average price of water was thus easier to estimate. The equation of the model is as follows:

\[ WC = a + b1PW + b2R + b3HHS + b4NR + b5IN + b6T + \ldots + e. \]

Where

- \( WC \) = quantity of water consumed by household,
- \( a \) = the constant,
- \( b \) = regression coefficient,
- \( PW \) = average price of water,
- \( R \) = rent paid monthly on accommodation,
- \( HHS \) = household size,
- \( NR \) = number of rooms occupied by household,
- \( IN \) = monthly income of household,
- \( T \) = number of water closet toilets in accommodation
- \( e \) = standard error.

4. RESULTS

The results of the hypothesis of this research suggest that residential water consumption is significantly related to identify household attributes at 0.01 level. The parameters are as shown on table 2. The results show that three of six household attributes (independent variables) namely average price of water, income and number of toilets were significant at 0.05 level as shown on table 3.

Table 2: The parameters

<table>
<thead>
<tr>
<th>( R^2 )</th>
<th>0.96</th>
<th>( F-cal )</th>
<th>110.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted ( R^2 )</td>
<td>0.95</td>
<td>( P )</td>
<td>0.00</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.02</td>
<td>Significance</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

Source: SPSS Analysis
Table 3: The relationship between residential water consumption and various six household attributes.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standardized coefficient</th>
<th>Standard deviation</th>
<th>T</th>
<th>P</th>
<th>Sig.</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.141</td>
<td>.07</td>
<td>.11</td>
<td>3.04</td>
<td>.01</td>
<td>&lt;.01</td>
<td>Significant</td>
</tr>
<tr>
<td>Average price of water</td>
<td>.40</td>
<td>11676</td>
<td>-.09</td>
<td>.07</td>
<td>-.37</td>
<td>.92</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Rent paid on accommodation per month</td>
<td>6.38</td>
<td>9445</td>
<td>.03</td>
<td>9445</td>
<td>.45</td>
<td>.66</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>Household size</td>
<td>2.6</td>
<td>.043</td>
<td>.76</td>
<td>.309</td>
<td>.76</td>
<td>&gt;.05</td>
<td>Not significant</td>
</tr>
<tr>
<td>Number of rooms</td>
<td>34386</td>
<td>.38</td>
<td>.93</td>
<td>3.34</td>
<td>.01</td>
<td>&lt;.01</td>
<td>Not significant</td>
</tr>
<tr>
<td>Income</td>
<td>1.5</td>
<td>.39</td>
<td>.86</td>
<td>3.48</td>
<td>.03</td>
<td>&gt;.05</td>
<td>Significant</td>
</tr>
<tr>
<td>Toilet available to household</td>
<td>.86</td>
<td>16672</td>
<td>.86</td>
<td>.86</td>
<td>.03</td>
<td>&gt;.05</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Source: SPSS Analysis

5. DISCUSSIONS
The results of the hypothesis suggest that there was a very strong relationship (96.2 percent) between household water consumption and three of the six household attributes identified in this study. These are average price of water, income and number of toilets. This implies that the three significant household attributes are the determinants of residential water consumption in the city of Enugu. Table 3 also shows that price of water responds positively to residential water consumption at less than 0.01 significant level. Secondly, the result shows that at less than 0.01 significant level, there is positive relationship between residential water consumption and income of the household. Thirdly, number of toilets available for a household also responds positively and significantly to water consumption at less than 0.05 significant level. The elasticities of demand for price of water, income and number of toilets were 0.40, 0.38 and 0.39 respectively. This is illustrated in fig.1.
However, the investigation showed that household size was not significantly related to quantity of water consumed by the household in Enugu. This is quite consistent with the findings of Espey et al. (1997) that reported insignificant relationship between household size and water demand in the United States of America. Number of rooms occupied by households and rent paid on accommodation were also not significant. The results of the three significant factors were consistent with the existing studies.

6. Conclusion
This study modeled urban residential water demand in the city of Enugu. The result of the hypothesis suggests that three of the six independent variables accounted for 96.2 percent of water demand. These are average price of water, income and number of toilets available for the households. This implies that the three aforementioned variables are the determinants of urban residential water in the city. The study recommends for adoption of the three significant factors in the estimation of residential water demand in the city of Enugu. This is capable of enhancing policies towards eliminating residential water shortages in similar urban centres in Nigeria and other developing countries.
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THE BUILT ENVIRONMENT AND URBAN SECURITY: EXPLORING SECURITY FACILITIES AND THEIR IMPACTS ON NEIGHBOURHOOD PATTERN AND URBAN FORM IN ENUGU, NIGERIA

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ABSTRACT

In recent years, there has been an increase in security challenge in Nigerian urban centres. This has been attributed largely to a number of factors including poverty and poor environmental conditions. Concerns arising from this security challenge have over time reshaped environmental psychology and social values in urban centres, with direct impact on urban form and the physical outlook of neighbourhoods. High wall fences surrounding residential houses often choke off the aesthetic value and physical functionality of neighbourhoods. Using Enugu as a case study, this paper examined urban security challenge in Nigeria and the environmental impacts of design strategies aimed at enhancing security in urban neighborhoods. It emphasized neighborhood design interventions that can enhance natural surveillance. The interventions should be tailored toward physical design of a neighbourhood and its various settings to offer informal surveillance of houses.

Key words: security, surveillance, neighbourhood, defensible space
Introduction

Many countries in Sub-Saharan Africa (SSA) are experiencing rapid urban expansion in recent years. From early 1970s, the region has had the highest urban growth rate in the world, averaging 5 percent per annum (Todaro, 2000). This has translated to a total urban population of about 250 million in 2012 (Hove, Ngwerume and Muchemwa, 2013). The United Nations Population Fund (2007) projects that at this growth rate, urban population in SSA will double before 2030. The huge population and its rapidity of growth have some social and environmental implications in the region. The provision of shelter and basic services such as water and healthcare is very low relative to the increasing demand from the population. Moreover, the region is experiencing high rate of insecurity, resulting from poverty and collapse of laws and order (UN-Habitat 2008). The urban poor suffer extreme deprivation and exclusion (Obeng-Odoom, 2011). This group includes rural-urban migrants who find shelter in slums and areas lacking basic services, and street children and destitute who survive through begging, casual work or crime (Rakisits, 2008) (UN Department of Economic and Social Affairs, 2011).

Over the years, the incidences of crime have increased tremendously in these cities, making some areas literally no-go areas. Although provision of security is a primary responsibility of government, this has always been denied adequate political attention in some cities, thus tackling public security has remained highly challenging in many SSA countries. In Nigeria the sources of urban insecurity include armed robbery, burglary, kidnapping, bomb blasts and traffic accidents. Crimes are also facilitated by institutional weaknesses and deficiencies in essential infrastructure (Ogbuii and Eze, 2013). With the inability of government to provide adequate security, individuals and communities engage private security measures. In some neighbourhoods, security measures such as high residential wall fences and gates, armed guards and manned barricades along streets are common features. Other defensive measures such as bullet-proof structures, military installations and special security facilities are used in public buildings and places (Lipton and Glanz, 2002; MCEER, 2002). Although these physical measures are popular in Nigeria, they have not addressed adequately the urban security problem. They are not cost-effective and environmentally compatible. They are not properly planned thus they impact seriously on the form and aesthetics of the cities. Using Enugu as a case study, this paper examined the emerging features in urban security in Nigeria and the ways neighbourhood design can improve security in urban centres.

Methodology

Data for the study were collected primary and secondary sources. Primary data were collected through direct field observations and questionnaire survey. Questionnaire was used for house survey. From the projected total number of houses in Enugu Metropolis, the sample size was determined by applying Williams’ formula as follows:

$$S = \frac{n}{1 + \frac{n}{N}}$$

Where $S$ = sample size, $n$ = the proportion of houses representing 1.1 percent of sampling frame; and $N$ = the total number of houses. Through stratified sampling and systematic sampling process the questionnaires were administered to 1,500 houses (1.1% of the
sampling frame of 139,940 houses). The 25 neighbourhoods in Enugu were classified into inner city neighbourhoods and peripheral neighbourhoods as identified by Enugu State Ministry of Lands and Town Planning, and 8 neighbourhoods (5 inner city neighbourhoods and 3 peripheral neighbourhoods) were selected for the survey. The questionnaires were distributed relative to the number of houses in each selected neighbourhood. Some 1,080 copies of the questionnaires, representing 72 percent of the sampled houses, were analysed as returned.

A hypothesis was formulated for the study and it stated that the use of physical design features for security does not differ significantly between inner city neighbourhoods and peripheral neighbourhoods in Enugu. T-test statistic was used to test the hypothesis. T-test is used to test hypothesis concerning difference between two sample proportions as:

\[ t = \frac{(x_1 - x_2) - D}{SE} = \frac{(d - D)}{SE} \]

where \( x_1 \) is the mean of sample 1, \( x_2 \) is the mean of sample 2, \( d \) is the mean difference between paired values in the sample, \( D \) is the hypothesized difference between population means, and \( SE \) is the standard error.

Theoretical Framework and Literature Review

Webster's abridged dictionary defines security as "the state of feeling of being free from fear, care, danger, etc.; safety or a sense of safety; freedom from doubt or uncertainty; and something that gives or assures safety; protection; safeguard" (Webster, 1966). In this broad perspective security therefore refers to both psychological and subjective feeling of being secure and safe, as well as objective and legally defined status of being protected (Olurin, 2008). Security in ancient times had applied to the State in terms of measures against external aggression and invasion. In his chronicle of city culture and development, Mumford (1965) showed how, for many centuries, security occupied a central position in influencing urban design. The great walls and gates of old cities were evidences of security consciousness in city designs. But with the increase in population, technology and economic development, cities assumed different status and challenges, and the dimension of their security demands changed with city walls and gates losing their relevance in urban security (Gyuse, 2009).

The concept of urban security became more diverse as scholars bring in more considerable factors in ensuring that cities remain safe. From the 17th Century, security as a concept broadened to apply to security of the individual with the development of social security (Kaufman, 1970), internal security (police) and external security of the state (armed forces and military alliances). This shift influenced contemporary debates on security, thus as a social science concept it became more elastic in meaning (Art, 1993; Hintermeier, 2005). In the western thinking security as a political value also assumed similar meaning as it relates to societal value systems (Brauch, 2005a). The disciplinary conceptualization accordingly broadened and multiplied the dimensions of the debate, leading to its reconceptualisation particularly following the emergence of constructivist approaches (ideas, reality and knowledge socially constructed) and reflective modernity (Giddens, 1990; Beck, 1999).

Over time, new global experiences, changing international order on security and theoretical re-evaluation of the approaches led to the
development of new concepts such as human security, environmental security and livelihood security (Brauch, 2005a). In the 1990s emerged a paradigm shift on the United Nations referent object from national to human centred security concept (Brauch, 2005b). Borrgadi and Brauch (2005) further conceptualized human security within the environmental dimension by emphasizing the interactions of the individual with his environment. While the debate on environmental security influenced the policy agenda of several international bodies, human security concept triggered further global actions. Human security emphasizes individual’s well-being, including freedom from wants, natural disasters, attack and torture; and the opportunity and capacity to satisfy needs of water, food and shelter (Brauch, 2005b).

UN-Habitat (2007) emphasized urban security and placed it within the wider perspective of human security, encompassing a wide range of concerns and issues. It identified urban crime and violence, insecurity of tenure and forced eviction, and natural and man-made disasters as the 3 major threats to the safety and security of cities. Global trends indicate that crime rates have increased over the last 3 decades. From 1980 to 2000, recorded crimes increased from 2300 to 3000 for every 100,000 persons (UN-Habitat 2007). Some 60 percent of urban residents in developing and transitional countries have been victims of crime, over a 5-year period, with victimization rates reaching 70 percent in parts of Africa, and Latin America and the Caribbean (LAC). In homicide, Africa and LAC recorded double-digit figures. Cities in Africa had the highest reported rates of burglary, with victimization rate of over 8 percent of the population.

Robbery also poses a major threat to urban areas in developing countries, resulting not only in injury and property loss, but also increase in fear and feeling of insecurity. In Nairobi, more than half of the citizens worry about crime all the time; and in Lagos, 70 percent of a surveyed people reported fearful of being victims of crime, with 90 percent being fearful of being killed in an attack. Residents of these cities have to contend with increasing rates of youth gangs, organized crimes and terrorist attacks. Today, terrorist attack has become the major source of insecurity in cities in northern Nigeria, with a record of death of thousands of people and loss of household assets (Ogboi, 2014).

Forced eviction is the most visible outcome of tenure insecurity. UN-Habitat (2007) showed that in Nigeria, an estimated 2 million people were forcibly evicted from their homes between 2000 and 2007. The main causes of official forced evictions are public infrastructure and urban beautification projects. Moreover, disasters including armed conflicts and civil strife cause urban insecurity yearly (Ogboi, 2014). The trends in crime and violence are attributed to a number of related factors including poverty, inequality, unemployment, intergenerational transmission of violence, poor urban planning and management, structure of political power and corruption. The urban poor are exposed to high rate of insecurity due to their geographical location mainly in slums, which are areas prone to disasters, where tenure is least secure and many crimes occur. The slums represent what UN-Habitat (2007) called ‘the geography of misery’.

A number of scholars examined the poverty hypothesis, drawing a strong link between
Urbanization, population growth, poverty, environment and security (Brainard and Chollet, 2007). Urban security is treated as an inevitable outcome of poverty and environmental decay (Brennan, 1999). But Gilbert (1999) observed that a city's success or failure to create a secure environment depends on specific policies adopted by the city government rather than urbanization. Urban security, therefore, is primarily an outcome of government policies while urbanization is a secondary factor. Clearly urban insecurity is more than just a symptom of poverty but an outcome of urban policies, thus it should be treated in the context of urban management, rather than within the poverty hypothesis.

Urban insecurity is also often associated with an anti-urban bias, a belief that cities are at best scenes of violence, social disorder and tension (Leo, 2009). In response to security need, planning concepts and designs deliberately encourage fragmentation of urban areas into neighbourhoods that can be best described as hostile camps, barricaded off from each other. Therefore what began as mere response to perceived social ugliness of the city has become a deep architecture depicting high fragmentation of urban landscape into mutually hostile camps, walled off against each other, in an atmosphere of fear. In reality most cities in SSA countries have both well planned neighbourhoods and unplanned communities of the poor.

Security has become a major determinant of household choice of residence. Security causes value to change and demand shifts in response to that, thus determining household mobility. Households relocate within a city to maximise utility. Grigsby (1963, 7) used the term locational obsolescence to describe such neighbourhood change i.e., the process by which shared attributes of a neighbourhood (owing to location and housing characteristics) make the entire neighbourhood obsolete. In inner city and peri-urban neighbourhoods with such identity are the poor including deviants who have the tendencies to commit crimes thus such areas are prone to insecurity. Moreover, there is the institutional factor that works in combination with the demographic and economic forces to facilitate such neighbourhood decay (Ogboi, 2006). When government intervention to provide services is not available, the rate of decay escalates. Such disinvestment in neighbourhood upkeep foreshadows contagious spread of urban decay (Dear, 1976). Grigsby (1963) employed game theory (the prisoner's dilemma) to predict the response of people to such situation. People in such residential areas characterized by insecurity tend to migrate, but many of them are trapped in a location decision dilemma as they lack the resources required to move. Those who are unable to relocate but are conscious of their insecurity tend to employ personal measures for self security, but even with the efforts their security still remains not guaranteed (Ogboi, 2009, 49). Criminological theories established a link between environmental conditions and safety; as well as how neighbourhood settings and morphology affect behavior towards outdoor activities (Laukaitou-Sideris, 2003). Ecological model assumes that elements of the physical and socio-cultural environment interact to influence an individual's behaviour and propensity to engage in active lifestyle (Ball, Bauman and Owen, 2001). According to the model, neighbourhoods with incivilities and disorder, and exposure to violence and crime can have negative influence on an individual's
inclination to public environment (King, Bauman and Abrams, 2002). But the presence of strong social networks and cohesion can generate and encourage support (Klønenberg, 2002). The physical ecology of a neighbourhood, defined by its built environment, open spaces, street network and land use mix greatly influence physical activity and security (Sallis, et al, 1997).

Urban planning literature viewed security within a spatial context, by examining design and policy interventions that create defensible space (Frank and Engelke, 2001; Handy, et al, 2002). Attention focused on the neighbourhood as a unit for intervention because the neighbourhood setting presents environmental constraints (physical and social disorder such as litter, crime, loitering) as well as opportunities (surveillance, defensible space). Neighbourhoods with high physical and social disorder generate stress and fear; while safe and clean neighbourhoods attract outdoor activity (Ross and Mirowski, 2001). Residents in old areas of a city where social unity is high feel more secure. Suburban typically have quiet streets with less traffic but have fewer “eyes on the street,” which limits level of security. Environmental barriers to safety are higher among low-income people, who typically live in poor environments characterized by physical and social disorder (Craig, et al, 2002). Residents of poor neighbourhoods have high levels of fear of being victimized, yet out of necessity they walked more than residents of rich neighbourhoods (Ross, 2000). An environment can be termed unsafe based on objective measurement or subjective perceptions (Laukaitis-Sideris, 2003). Weinstein, et al, (1999) observed high prevalence of inactivity among people who perceived their

neighbourhoods as unsafe. But such a physical environment can be modified thus some studies tried to assess how the manipulation of urban design, transportation and land use can promote security (Booth, et al, 2000; Frank and Engelke, 2001; Greenwald and Boarnet, 2002).

Some scholars argue that security infrastructure often has effects on the physical environment. While some people believe that security risk must be minimized, to others cities require functional urban designs with concern for security (Hames, 2002). Protecting neighbourhoods, the buildings and residents from any form of security threat have been handled through various ways, including limiting access to certain places, urban patrol, event security, security management service, incident investigation, executive security services, private security, hazard-resistant design for structures and other urban engineering works (Petroski, 1992; NRC, 2002; Mileti, 1999). But despite the value of these approaches, they have limits. They are strategic measures based on decision makers' individual interests.

Beside the value of technology, institutions and people are required to manage the system. Perrow (1999) highlights the importance of people as “circuit breakers” in security systems and in managing security measures. But often many of the critical institutions are inactive. Using social autopsy model Klønenberg (2002) identified the notable factors contributing to institutional lousiness in security management. They include delegation of key security and support services to agencies (police and security organizations) which often do not involve the people as partners; lack of an effective system for organizing and coordinating urban and
state agencies; lack of public will or ability to provide basic resources; expectation that urban residents will respond as ‘smart consumers’ of public services; and the increasing role of public propaganda, as opposed to real response, in managing urban security problem. A comprehensive security strategy can be developed based on realistic estimate of risk for a community and not as precautionary measures based on the vulnerability of an individual to a certain type of threat. This suggests that it may be more effective and economical to think of urban security in holistic or neighbourhood terms considering cost, ease of implementation and effectiveness (Little, 2004). Over the years, there have been changes in urban form based on neighbourhood concepts including the shift from gridiron pattern towards more closed forms with cul-de-sacs and small scale gated communities with controlled entry (Cozens, Hillier and Prescott, 2002).

The idea of crime prevention through environmental design attracted attention first with the work of Jacobs (1961) who argued that modern city designs undermine residents’ ability to view public streets, thus breaks down informal social control of criminal activity. She defined “eyes on the street” as a natural surveillance that is a good deterrent of criminal activity. Jeffrey (1971) collaborated this by noting that crime prevention strategy with the greatest potential involved reliance on design and physical changes to minimize opportunities for crime in the environment. Later Newman (1972, 1976 and 1981) came up with the most influential empirical studies on urban design and security link. He developed the concept of defensible space, with some principles of spatial planning that can provide increased safety. The concept showed that a neighbourhood environment through its layout allows residents to assume the position of ensuring their safety. According to Newman (1972, 50), defensible spaces display three basic characteristics namely, territoriality, defined as “the capacity of the physical environment to create perceived zones of territorial influence”; natural surveillance, defined as “the capacity of the physical environment to provide surveillance opportunities for residents and their agents” and proper location, which involves the juxtaposition of space with “safe zones” (clean and well maintained spaces).

Years after, this approach which aims at decreasing the possibility of crimes through creating good environment was named Crime Prevention through Environmental Design (CPTED) (Cozens, 2008). The basic elements of CPTED are:

1. Visibility and surveillance: places that are prone to crimes should be monitored by people. The arrangement of buildings is of great significance in this regard (Minnery and Lim, 2005)
2. Defensible space or territoriality: Each space should be monitored by specific controllers who are in charge of maintaining the security of the space. Urban design can prevent crime via appropriate arrangement of daily activities as well as making spaces accessible (Reynald and Elffer, 2009)
3. Legibility: Legibility makes people easily choose their path and prevents them from being lost in the city, thus residents and pedestrians are less likely to face criminals in indefensible spaces (Kelly and Dian, 2009).
4. Size of spaces: A huge urban space is difficult to monitor, thus the possibility
for seeking help gets lower as people get more distant from each other. Therefore, special measures should be considered to secure large urban spaces such as open spaces between buildings.

5. Mixed Land Use: Mixed use of urban lands is one of the tools used in CPTED. It seeks to produce a lively and active atmosphere in urban spaces during day and night time. The activity of a space during different hours eschews the possibility of crimes in urban spaces (Lyon, 2007).

Ogboi and Eze (2013) examined the possible application of CPTED in urban neighbourhoods in Enugu. It identified the basic elements of the city design that can be considered and the design tools to permit effective implementation of CPTED in urban security and safety. Meanwhile in prioritizing the elements of the Sustainable City Programme for Enugu a number of works identified issues relating to environmental safety and security. These include insufficient infrastructural facilities and services; and unplanned and uncontrolled development in some parts of the city resulting in urban slum and sprawl (Ugwu, 2003; Okoh, 2003). All these presumably contribute to environmental degradation and security challenges in residential neighbourhoods.

Data Presentation and Analysis
The respondents rated security as a top priority in their neighbourhoods. The three main security arrangements in the city were police patrol, neighbourhood watch and private security. Neighbourhood watch had the highest patronage with 57 percent of the respondents, while police patrol and private arrangement had 7% and 26% percent respectively. Those who did not patronise any of these security arrangements account for only 10 percent as shown in figure 1.

![Figure 1: Security Arrangements in the Metropolis](image)

Source: Researchers’ Field Survey, 2012
Beside the security arrangements mentioned above, some physical structures are provided to enhance security. The study examined the use of physical security facilities and related structures among the neighbourhoods. As presented in Table 1, the facilities/structures include wall fences around houses, other types of fence—iron/wire/wood, projectiles/razor wires on high walls, security house attached to wall fence, dog house, private street lights, trees and shrubs, burglary proof on doors and windows, gates at the entrance of housing estates, gates on streets and blockades at neighbourhood security posts. Other physical environmental conditions with challenge on urban security are street parking, block of street shops, other structures that impair natural surveillance, surrounding vacant plots and un-tarred streets (see Table 2).

**Table 1: Sampled Houses with Design Related Security Facilities/Structures**

<table>
<thead>
<tr>
<th>Design related security facilities</th>
<th>Inner city neighbourhoods (%)</th>
<th>Peripheral neighbourhoods (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Houses with wall fence above 2.5 m</td>
<td>28.0</td>
<td>68.0</td>
</tr>
<tr>
<td>2 Houses with wall fence below 2.5 m</td>
<td>40.0</td>
<td>12.5</td>
</tr>
<tr>
<td>3 Houses with other types of fence—iron, wire, wood</td>
<td>21.5</td>
<td>17.5</td>
</tr>
<tr>
<td>4 Houses with high walls topped with razor wires/projectiles</td>
<td>25.5</td>
<td>65.0</td>
</tr>
<tr>
<td>5 Houses with watch dogs/dog house</td>
<td>11.5</td>
<td>27.0</td>
</tr>
<tr>
<td>6 Houses with security house attached to wall fence</td>
<td>15.0</td>
<td>52.5</td>
</tr>
<tr>
<td>7 Houses with private street lights</td>
<td>12.2</td>
<td>24.0</td>
</tr>
<tr>
<td>8 Houses in neighbourhoods with gated streets</td>
<td>2.8</td>
<td>27.5</td>
</tr>
<tr>
<td>9 Houses with burglary proof on doors and windows</td>
<td>96.4</td>
<td>99.7</td>
</tr>
<tr>
<td>10 Houses in gated developments (housing estate)</td>
<td>11.2</td>
<td>12.7</td>
</tr>
<tr>
<td>11 Houses in neighbourhoods with blockades at security posts</td>
<td>0</td>
<td>17.5</td>
</tr>
<tr>
<td>12 Houses with other physical security features/facilities</td>
<td>11.5</td>
<td>87.0</td>
</tr>
</tbody>
</table>
Table 2: Physical Environment Facilities and Conditions that Minimize Natural Surveillance Opportunities for Houses

<table>
<thead>
<tr>
<th>Physical Environ. Facility</th>
<th>Inner city neighbourhoods</th>
<th>Peripheral neighbourhoods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Houses with street parking</td>
<td>32.8</td>
<td>5.2</td>
</tr>
<tr>
<td>2 Houses with block of street shops</td>
<td>46.7</td>
<td>12.2</td>
</tr>
<tr>
<td>3 Houses with other structures that impair natural surveillance</td>
<td>42.5</td>
<td>21.0</td>
</tr>
<tr>
<td>4 Houses with surrounding vacant plots</td>
<td>2.2</td>
<td>33.3</td>
</tr>
<tr>
<td>5 Houses with trees and shrubs</td>
<td>12.5</td>
<td>68.4</td>
</tr>
<tr>
<td>6 Houses along un-tarred streets</td>
<td>12.0</td>
<td>82.8</td>
</tr>
</tbody>
</table>

The hypothesis of the study states that there is no significant difference in urban security facilities/structures and associated physical environmental challenges between the inner city and peripheral neighbourhoods in Enugu. The test carried out using the data in table 1 and 2 showed $t = -2.209$ significant at $P = 0.041$ (see table 3). Since the $t$ value is higher than the critical value of 2.11 at a degree of freedom of 17 and $P < 0.05$ significant level the null hypothesis was rejected, suggesting that there is a significant difference in urban security facilities/structures and associated physical environmental challenges between the inner city and peripheral neighbourhoods in Enugu.

Table 3: Result of the Paired Samples T-Test

<table>
<thead>
<tr>
<th>Inner city Neighbourhoods \ Peripheral Neighbourhoods</th>
<th>$t$</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner city Neighbourhoods \ Peripheral Neighbourhoods</td>
<td>-2.209</td>
<td>17</td>
<td>.041</td>
</tr>
</tbody>
</table>
Discussion
Though security challenge appears to be high in the inner city and peripheral neighbourhoods in Enugu, the nature of the challenge differ between the two. In the inner city areas, neighbourhood were designed based on the gridiron concept which allowed neighbourhood expansion but lacked the quality of defensibility because of high level of porosity. In terms of security the areas lacked restrictive mechanism. In the peripheral neighbourhoods most houses are surrounded by high wall fences often topped with razor wires or other projectiles designed to impede intrusion. Fence has become a very visible feature of the urban landscape in these places. Figure 2 shows types of fence in Enugu. Some 74.8 percent of the sampled houses had block wall fence, 0.56 percent had barbed wire fence and 0.46 percent had wooden fence; while 12 percent had no fence.

![Figure 2: Type of Fence in Enugu](image)

**Source:** Researcher’s Field Survey, 2012

Moreover, there is increase in investment in security facilities such as burglary proof gadgets on doors and windows. Some 96.4 percent of the sampled houses in inner city neighbourhoods and 99.7 percent in the fringe had burglary proof facilities on doors and windows. In some homes private security men were engaged and security /gate houses were developed and attached to wall fences near the entrances of premises. In some houses watch dogs were kept with dog houses /cage attached to wall fence. For some places particularly in the low density neighbourhoods security covers detailed design of front yards, gates and other features for controlling access. Some owners of such high-profile buildings militarized surrounding spaces with metal fences, concrete bollards and signposts. Similarly, in some areas, the direction shifted to neighbourhood security facilities such as street blockages and gates, and small scale gated developments.

Due to limited presence of government security agents, including the police, in the
urban fringe, informal mechanisms played a key role in service provision in the area. Residents take control of their infrastructure needs informally. Land ownership/transfers followed the same informal mechanisms, making residential development sporadic in nature. This placed greater part of decision-making on physical development on the people. As such landholders dispensed parcels of land without plan on what form the neighbourhoods should take, thus they developed as unplanned areas. This challenged not only physical planning and development control but also security mechanisms. In the absence of layout plans the environmental implications are numerous. Among the major issues are increase in crimes and incivilities, and high levels of contravention of planning regulations and standards arising from residents' actions towards security. Consequently 'new modes' of interaction emerge among residents in the attempt to address the security challenge. Residents employ security guards or participate directly in community vigilante. Neighbourhood security has gained recognition from government in the name of community policing, but in the past community vigilante had suffered rejection and resistance by the government because of its arbitrary and extra-judicial ways of operation. But with increase in crime rate and inability of the police to handle the urban security challenges, community vigilantes has been integrated into the security system (Thuo, 2010). This informal mechanism has implications on urban landscape. Gates and barricades are mounted on neighbourhood streets and security posts are developed.

Parking arrangements particularly in the low and medium income areas are sources of security challenge in the urban neighbourhoods. The survey showed that 62 percent of the respondents lived in houses with parking space, and 38 percent of them practiced street parking. Street parking in Enugu does not only challenge the security life and safety of vehicles, but constitute undue congestion and disorderliness. Ross (2000) and Eyler and Vest (2002) hypothesized that density, adequate sidewalks and streetlights facilitate walking and counteract fear because of the many "eyes on the street." There is an appreciable improvement in provision of streetlight in recent years in the city especially along the major roads in the residential/commercial zones. The streetlights enhance aesthetics and security in the areas where they exist.

While fence is seen as very important in providing complementary services of security and privacy for residents, on the contrary they are barriers in the context of defensible space. They compound the security challenge by hindering natural surveillance. Similarly other features including parked and abandoned vehicles, street shops, kiosk and canopies, uncompleted buildings and trees block sightlines to buildings and that impair natural surveillance (see figure 3). These have some implications, most deeply attached to urban physical development. What is very glaring on the urban landscape is that the personal or community efforts on security run the danger of being individually inappropriate and collectively contradictory. Many of the facilities were not part of the initial designs of the houses. Concern for security over time had reshaped the environmental psychology and social values in urban centres, which undoubtedly has direct impact on urban design and physical development. This reflects on the physical outlook of the neighbourhoods.
In residential houses the surrounding high wall fences choke off the aesthetic value and physical functionality of the neighbourhoods. Other ways the physical and social landscapes of the neighbourhoods are influenced by security measures include lose of social cohesion as well as community and neighbourly - living among the residents. Some of the measures appeared as temporary measures to address strategic needs, but they often turned out to become and remained as permanent structures. For example, in some cities temporary street barricades have become permanent gates. From the urban planning perspective such ‘temporary’ facilities should be granted planning permit on condition that they would be replaced with permanent structures within an agreed stipulated future date.

Conclusion
Through urban planning, appropriate designs can be developed to minimize the cost of providing security and safety in Nigerian cities. Urban security requires an integrated community-based framework and spatially-based approach. Security in this setting is a community issue rather than an individual pursuit. The central issue is to structure the urban neighbourhood such that the physical design, layouts and landuses allow residents to have control over the areas. Investment in neighbourhood security approach is cost-effective. The ancillary benefits from it are that it will also promote community living and sense of belonging in the people. On the other hand, well-designed and maintained infrastructure systems could support the system and provide better services.

Recommendations
The principle of defensible space has been an integral part of the traditional settlement designs. It builds in informal surveillance to
keep all areas under observation at all times and provide security to home and neighbourhood spaces. In Nigeria therefore, to build urban safety and security, neighbourhood planning should incorporate defensible space concept. Neighbourhood and housing designs including orientation of buildings should create opportunities for surveillance by allowing adequate front views. Building designs and constructions should provide and observe rear and side setbacks standards to facilitate such views. Neighbourhood street designs should encourage pedestrian activities with provision of sidewalks and pedestrian paths. Reduction of wall fences and heavy landscaping that block sightlines can promote security.

Neighbourhood land use plans and development control mechanisms should discourage the so called bad neighbours. Negative land uses such as liquor stores and night clubs that encourage antisocial behaviour, and serve as lucrative targets for crime and attract potential criminals should be discouraged in residential neighbourhoods. Neighbourhood road networks need to be controlled through design to allow security management. Some essential facilities such as nursery and primary schools, shopping centre and health centre that allow community social interactions should be provided within neighbourhoods. In the process of using or sharing such facilities residents will have their eyes on the streets at all times. Comprehensive urban security strategy developed by International Centre for Prevention of Crime (2005) can be put in place by cities. This includes technical expertise to build the capacity of cities in developing crime prevention programmes. GIS can serve effectively in urban security surveillance and crime detection, and provide such information as neighbourhood street maps, traffic data, housing and land use maps which are relevant for security plans. Planners with GIS skills can develop a database in form of urban security information system for local governments.

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RAINFALL HARVESTING: PANACEA FOR DOMESTIC WATER SUPPLY IN THE PERI-URBAN AREA OF KADUNA METROPOLIS, NIGERIA

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ABSTRACT

In 1999, the World Commission on water issued a statement on world water day warning that humans are currently facing global water crisis. The World Bank argues that accessibility to basic supply of potable water is too costly for developing countries faced with large debts. The traditional approach of treating water as a public service should be changed to favour a more economical approach. As it is often the case, the wealthier communities and industry, rather than the poor communities which need water most but are not connected to piped water network, benefit more from the publicly subsidized supply. Data and information for this study were sourced from relevant literature and a primary survey of peri-urban area of Kaduna. Rainwater harvesting is one of the techniques of conserving water resource. Findings in this research work have shown that harvested rainwater can be used for washing toilets, cooking, laundry services, drinking, construction, and building services. It is recommended in this paper that synergy is needed between the government, communities and private individuals in the provision of structures for rainwater harvesting in peri-urban area of Kaduna metropolis. Bore-holes and motorized boreholes should be provided in every ward in the study area. This will reduce the problem of water scarcity in the area during the dry season.

Keywords: Rainwater harvesting, peri-urban area, water resource, rainy season and dry season.
INTRODUCTION
Rainwater harvesting (RWH) means different things to different people. Rainwater harvesting can generally be described as collection of rainwater where it falls or capturing the runoff in one's village or town (Oluwasanya, 2006). Akoh and Oyeyemi (2009) defined rainwater harvesting as the gathering and storing of rainwater. Rainwater harvesting has been used to provide drinking water, water for livestock and water for irrigation or to refill aquifers in a process called ground water recharge. Rainwater collected from the roofs of houses, tents and local institutions, or from specifically prepared areas of ground can make an important contribution to drinking water. 

Kaduna metropolis and its peri-urban area have problem of domestic water supply owing to increase in population. The city is greatly expanding and many of the settlement areas are not connected with pipe borne water. Rainwater collected from the roofs of houses, tents and local institutions can make an important contribution to the availability of drinking water in Kaduna metropolis and its environs. Rainwater harvesting systems can be simple to construct from inexpensive local materials, and are potentially successful in most habitable locations. Some rooftop materials may produce rainwater that is harmful to human health, it can be useful in flushing toilets, washing clothes, watering garden and washing cars.

There are a number of types of systems to harvest rainwater ranging from very simple to the complex industrial system. The rate at which water can be collected from either system is dependent on the plan of area, its efficiency, and the intensity of rainfall i.e. annual precipitation (mm per annum). In the third world countries, both rural and urban dwellers lack sufficient water supply for domestic use (Akoh and Oyeyemi, 2009). It is cheaper to obtain water from the rain than boreholes when considering the cost of drillings. Sometimes in urban areas where there is shortage or minimum supply of pipe borne water as it is the case of the study area, rain water harvesting is necessary.

Rainwater harvesting system has three basic components namely a collection area, the conveyance system, and the storage area. Rainwater harvesting dates back to a very long time ago in the history of mankind. This is done in order to bridge the gap between rainy season with plenty water supply and the dry season with limited water supply. The main problem that necessitate this study is that there is shortage of domestic water supply due to increasing population resulting from the socio-economic activities of peri-urban dwellers.

THE STUDY AREA
The study area is the entire peri-urban area of Kaduna Metropolis. The peri-urban areas of the city lie within a 500m corridor from the outskirt of the city (Adewuyi, 2008). The study area therefore circles the city and forms an irregular shape. These zones are transition areas from rural to urban and they lack adequate infrastructure in comparison to the main city. Inadequate pipe-borne water supply is one of the characteristic features of the area. The peri-urban areas of Kaduna metropolis fall within latitudes 10° 22’ 00” – 10° 40’ 00” N and longitudes 7° 20’ 00” – 7° 28’ 00” E with the elevation ranging from 650m above mean sea level. The approximate size of the study area is 24,000m² (24 km²) about 12.5
percent of the total area coverage of the metropolis. It falls within Igabi, Chikun, Kaduna North and Kaduna South Local Government.

Table 1: Population of the Four Local Government Areas (2006) in Kaduna State within Kaduna metropolis

<table>
<thead>
<tr>
<th>S/N</th>
<th>L.G.A</th>
<th>2006 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kaduna South</td>
<td>402,731</td>
</tr>
<tr>
<td>2</td>
<td>Kaduna North</td>
<td>364,575</td>
</tr>
<tr>
<td>3</td>
<td>Chikun</td>
<td>372,272</td>
</tr>
<tr>
<td>4</td>
<td>Igabi</td>
<td>430,753</td>
</tr>
</tbody>
</table>


METHODOLOGY
Survey-research method was adopted for the study. The study was carried out during the rainy season in 2013. Structured and Semi-structured interviews were conducted. Water practices were observed while measurements of RWH system storage were taken. Site selection was based on the main criteria of no access of restricted access to public water supply.

REVIEW OF RELATED LITERATURE
The collection of rainwater is one of the oldest means of getting water for domestic purposes. The historical background of the use of rainwater as a source of water supply is as far back as 400 years ago (Agarwal and Narrain, 1997). Many countries across the world today still engage in large scale rainwater harvesting, especially in rural areas where settlers use it for productive purposes such as farming, fishing and mining. Currently in China and Brazil rooftop rainwater is being practiced for providing drinking water, water for livestock, water for small irrigation and a way to replenish ground water levels. Gansu province in China and Semi-arid North-East Brazil have the largest rooftop harvesting projects ongoing. In Rajasthan, India rainwater harvesting has traditionally been practiced by the people of the Thar Desert (Agarwal and Narrain, 1999).

In Bermuda, the law requires all new construction to include rainwater harvesting adequate for the residents. The U.S. Virgin Island has a similar law.

In the Indus Valley civilization, Elephanta caves and Kanheri caves in Mumbai rainwater harvesting alone has been used to supply in their water requirements. In Senegal/Guinea Bissau, the houses of Diola people are frequently equipped with home brew rainwater harvesters made from local organic material.
In rural Australia, South Africa and Nigeria, most especially in the south, it is a common practice to collect water from roofs of buildings and store in rainwater tanks (Oluwasanya, 2006). Presently, Island states such as Hawaii and the entire continents such as Australia promote rainwater harvesting as the principal means of supplying household water.

The community in peri-urban area of Kaduna metropolis lacks adequate well water, boreholes and sufficient pipe-borne water. During the rainy season they make use of rainwater. The harvesting technique is such that rainwater from rooftops is collected into buckets, basins and other storage facilities for collecting water. The first flush of rainwater after a dry season should be allowed to run to waste as it will be contaminated with dust, bird droppings, etc storage tanks should be covered to prevent mosquito breeding and to reduce evaporation losses, contamination and algal growth. Rainwater harvesting systems require regular maintenance and cleaning to keep the system hygienic.

Other features of rainwater harvesting structures include:

- **Surface Embankment**: this is a brick wall of about 4 feet (1.3m) high around the mouth of the underground reservoirs. This is particularly important to prevent splashing of soil particles into the stored water when it rains.

- **Aeration Pipes**: these are ½ inch diameter plastic pipes fitted into the brick/block wall serving as surface embankment to the underground reservoirs. They are 3 to 4 in number and they function to keep the water aerated and to serve as over-flow.

- **Reservoir Roof**: the underground reservoirs are roofed in most cases like house roof tops with corrugated iron sheets in a pyramidal shape. This shape is very typical and preferred to flat or horizontal roofing. The shape allows some slope, to discourage people from sitting and children from climbing. It also discourages collection of dust and accumulation of debris.

On this roof is located both the inlet and outlet of the reservoirs. The inlet, which is smaller than the outlet serves as the entry point to collected rainwater into the reservoirs. Part of the channel material is allowed through the roof into the reservoir, but completely sealed up and airtight at the point of entry. The outlet is the roof door, completed with lock and key (the lock and key is to prevent fetching without permission by outsiders or non-household members). It is located on any side towards the base of the pyramid. The door is made wide enough to allow passage. This size is necessary for the reservoir maintenance, to allow for repairs and washing (Oluwasanya, 2006). The door also functions as the point of drawing out the stored water.

The technology involved in the construction of the rainwater harvesting structure as described above is basically indigenous. It requires four to five workmen to set up. These include carpenters, bricklayers and diggers. House roofing experience is required of the carpenter for the fixing of water channels to roof hedges, especially when the rooftops are on a storey building. The mode of water collection from the reservoirs is by rope and bucket system. This method is claimed to be convenient for all users (Akoh and Oyeyemi, 2009).

Storage is maintained by cleaning. Wooden ladders are lowered into the reservoir.
The sidewalls and the floor are washed and the dirty water bailed out by the cleaners. The cleaning work is usually the duty of young adult members of the households. At the onset of the rainy season, around April/May, the first few rains are led to waste and not directed into the reservoirs. This is done to allow the cleaning of the rooftop.

During the period of dry season, specifically within the months of January, February, March, April, November and December when the stored rainwater has been exhausted, the peri-urban dwellers of Kaduna metropolis survive on the following sources of water:

- **Rivers /Streams:** women, youths and children move in groups to fetch water from River Kaduna and streams within the metropolis. Streams in Romi and Rido are good sources of water for the inhabitants of the study area.

- **Boreholes:** motorized bore-holes are normally provided to the inhabitants of semi-urban dwellers by Kaduna State Government. In 2001, a total number of 20 motorized bore-holes were provided. This, according to Akoh and Boye (2009) were grossly inadequate. The number went up a little to 25 in 2002. In 2003 and 2004 there was drastic reduction in the number of motorized boreholes provided throughout Kaduna State.

- **Wells:** Local Government Areas in Kaduna State were solely responsible for the digging of wells throughout the state in 2001 to 2005 (Akoh and Boye, 2009). The four local government areas (Kaduna North, Kaduna South, Chikun and Igabi) which form the peri-urban area of Kaduna metropolis are not left out in the responsibility of providing wells to the community. In fact, core urban dwellers make use of wells in Kaduna and other places like Kano, Sokoto, Maiduguri, Jos, Yola and Bauchi. Wells are a good source of domestic water supply to urban dwellers in semi-arid and arid regions of Nigeria (Akoh and Boye, 2009).

A number of factors affect rainwater harvesting in Kaduna Metropolis. These include:

**Rainfall:**
The outset date of rains, cassation period, length of rainy season and rainfall amount determine the amount of rainwater harvesting in Nigeria (Akoh and Oyeyemi, 2009).

Rainfall is generally high in Southern Nigeria but low in the north. It is advisable that rainwater be harvested during rainy season as a way of conserving water resource.

**Local geology**
The local geology of a place is one of the main determinants of rainwater harvesting. Residents in communities where water table is very low always have difficulties in digging wells or boreholes. People in such environment will have high demand for rainwater harvesting. In Kaduna metropolis and its environs, water table is neither too high nor too low but the cost of digging wells/boreholes is not within the reach of common man. This has made the demand for rainwater harvesting to be very high.

**Construction and Maintenance Costs**
It costs to construct and maintain rainwater harvesting systems. The cost of setting up rainwater harvesting system from channel to storage ranges between N70,000.00 and N300,000.00 (Akoh and Oyeyemi, 2009). It is only very few people that can afford this in the peri-urban areas of Kaduna metropolis.
Water uses
In urban centres as well as rural areas, water is used for all the household utilities, drinking, cooking, bathing, sanitation and laundry. Harvested rainwater can be used for all these.

DATA ANALYSIS, DISCUSSION AND FINDINGS
Tables 2 and 3 below present the results of the analysis of the primary survey conducted.

Table 2: Analysis of rainwater harvesting in peri-urban areas of Kaduna Metropolis.

<table>
<thead>
<tr>
<th>S/n</th>
<th>L.G.A</th>
<th>Peri-urban Area</th>
<th>No. of Household interviewed</th>
<th>No. of household involved in RWH</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Kad. South</td>
<td>Ungwan Muazu</td>
<td>20</td>
<td>12</td>
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<td>2</td>
<td>Kad. North</td>
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<td>Kad. North</td>
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<td>Kad. North</td>
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Source: Field Survey, 2013
### Table 3: Analysis of Purpose of rainwater harvesting in peri-urban areas of Kaduna Metropolis

<table>
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<tr>
<th>S/n</th>
<th>L.G.A</th>
<th>Peri-urban Area</th>
<th>Purpose</th>
<th>No. Interviewed</th>
<th>No. of household involved in RWH</th>
<th>%</th>
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Source: Field Survey, 2013
The results in Table 2 show that most people in the peri-urban area of Kaduna metropolis harvest rainwater. The researcher observed during the field work that most households harvest rainwater mainly from rooftops. Ground catchment system that channel water from a prepared catchment area into storage was not available, nevertheless, it was observed that a farmer has been in the business for quite some time and is the only person who practices the ground catchment system for agricultural purposes and at households level. Rainwater harvesting in the study area is occasional. Small containers like buckets, drums and aluminum pots are used in storing the harvested rainwater. Other means of water supply in the study area are rivers/stream, wells, boreholes and pipe-borne water. The results in Table 3 indicate that the main purpose of rainwater harvesting in most peri-urban areas is sanitation services. This is expected as most people use pipe borne water for drinking and cooking.

With the exception of the pipe-borne water, other sources of water supply in the study area are not chemically treated. The community in peri-urban area of the community are at the risk of water borne diseases.

CONCLUSION
Clean, fresh water is essential for nearly every human endeavor. Perhaps more than any other environmental factor, the availability of water determines the location and the activities of humans on earth. In the peri-urban area of Kaduna metropolis, there is gross inadequate potable water supply for the residents of the community, hence, the need for rainwater harvesting in the study area. Local geology, water use, length of rainy season, and poverty are some of the factors that influence rainwater harvesting in the study area. Finally, up-scaling, and adopting rainwater harvesting scenarios as presented in this study, would serve a cheaper, effective, timely and more sustainable investment than waiting for government to meet household water needs in the peri-urban areas of Kaduna metropolis.

RECOMMENDATIONS
There is need for joint efforts of the community, local governments, Kaduna state government and private individuals to partner together in the provision of structures for rainwater harvesting in peri-urban area of Kaduna metropolis.

In view of the available data from National population Commission, Kaduna North, Kaduna South, Chikun and Igabi Local Government Areas which form the study area, there is no doubt that the population is increasing rapidly. There is serious need for the teeming population to be provided with clean and affordable potable water. Boreholes and motorized boreholes should be provided in every ward. This is because this finding has shown that rainwater harvesting in the study area is limited to rainy season.
REFERENCES


URBAN GREEN INFRASTRUCTURE AS A DRIVER OF DEVELOPING LIVABLE CITIES IN NIGERIA

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Department of Urban and Regional Planning,
College of Environmental Studies,
Kaduna Polytechnic, Kaduna, Nigeria.
ABSTRACT

Author's personal and working experience and observations on the invaluable functions and natural services urban greenery or green infrastructure performs and provides for city dwellers and environment in Nigeria and overseas countries generated a concern on the state of urban green spaces in Nigeria. Part of this concern is the belief being held in some quarters that urbanisation is responsible for much of the removal of forest/green cover. That concern triggered this investigation. The paper set out to examine the theory and practice of urban greening/green infrastructure (UGI) in terms of provision/planning, development and management including the components and benefits of UGI and how it drives the development of livable cities. It also investigated the provision for UGI in urban development plans and its implementation in Nigeria and determined the livability or otherwise of Nigerian cities. A review of related literature and observations were the methods used in generating data/information for the paper. It is found that components of UGI/Urban Greenery have social, economic and environmental benefits that include production of oxygen for urban dwellers and serving as carbon sink, places of outdoor relaxation/recreation, access to nature/appreciation of nature, climate change and adaptation (flood alleviation, weather moderation, etc), urban food production/food security, medicinal values, beauty/aesthetics, physical activity/health advantages, etc which, cumulatively, can make cities livable. Urban development plans in Nigeria provide for open spaces and green spaces (UGI) in lump sum, and only Abuja Master Plan provides nearly 33% for open spaces and monuments combined, compared to Singapore which is 50% green; implementation of open space provisions is either virtually nil or marred by distortions, conversion to other land uses, etc. The paper concludes that Nigerian cities are generally not livable in their present state. Appropriate measures and recommendations are made to turn the situation around for good.

Keywords: urban green infrastructure, driver, livable cities, Nigeria.

"Urban green infrastructure the lungs of cities"
1.0. Introduction
Literature on urban dynamics has indicated that the number of people around the world who live in and around cities had already attained the 50% mark and is increasing. In fact, it is predicted that by 2030, 60% of the world’s population would live in cities (UNCHS 1996, 2009; UN-HABITAT (2004)). Nigeria has one of the fastest urbanisation rates in the world. Consequences of such rapid urban growth/dynamics include unemployment, urban poverty (or urbanisation of the poor (UN – HABITAT, 1996) and its linkage to the environment, squatter slum settlements, slum settlements, poor environmental and human health condition, lack of or overstretched urban infrastructure, lack of or inadequate planning, etc. Slum/informal settlements’ population in urban areas in developing countries, for instance, has been estimated by UN – HABITAT at 870 million in 2001, and is expected to increase by an average of 29 million per year up to 2020. In Nigeria the informal sector apparently drives the urban economy as it employs some two-thirds of the urban labour force (Jiriko, 2012). This sort of rapid urbanisation is and cannot be said to be sustainable. Specifically fast urbanisation is often blamed for removal of natural vegetal cover, i.e. greens, especially trees or forests, and replacing them with mostly concrete surfaces. This development often deprives the natural vegetation/greens of performing their function which, in turn, create problems for the living and non-living components of the city environment. In particular, it makes the city not livable for the human dwellers. Urban infrastructure generally is an indicator of the level of development of a city. The natural and culture greens in our cities are referred to as urban – green infrastructure. The thesis of the paper is that urban green infrastructure, if sustainably planned, developed and managed, will make our cities thriving, healthful and aesthetically delightful, salubrious, nature – friendly and, hence, conducive for living, working, quality leisure enjoyment and recreating. These attributes would make our cities livable, thus, fulfilling the philosophy of man – living - with- nature. The study, therefore, looks into the mechanics of how urban green infrastructure drives the development of livable cities; examines the theory and practice of urban green infrastructure planning and development in Nigeria; and determines whether or not Nigerian cities are livable. This is with a view to recommending appropriate measures to enhance their livability.

The following proximate goals (objectives) form the stepping stones to the realisation of the target.

i. To analysis the components of urban green infrastructure;
ii. To explore Healthy Cities’ Programme requirements that make cities livable;
iii. To outline the contributions of the components of urban green infrastructure to the livability of Nigerian cities;
iv. To find out to what extent urban development plans in Nigeria provide for urban green infrastructure and its level of implementation;
v. To determine the livability or other wise of Nigerian cities; and
vi. To suggest strategies for enhancing the potency and potentialities of urban green infrastructure in driving the development of livable cities in Nigeria.

2.0 Methodology of the Paper
Data and information for the paper were sourced from an extensive review of pertinent literature, internet search and retrievals as well
as observations recorded in the course of travels and attendances of conferences, seminars and workshops held in several different cities across Nigeria—including international urban fora that include the World Urban Fora in Rio de Janeiro (Brazil) and Naples (Italy) in 2010 and 2012, respectively, and of course a township planning study tour to Singapore (under the auspices of the Nigerian Institute of Town Planners) in 2011.

3.0 Review of Related Literature
3.1 Definition of Terms and Benefits of UGI: 
“Infrastructure” generally is considered as the support networks of the built environment (Daniels and Daniels 2003) such as sewers and water facilities, roads, and streets, schools and parks. The World Bank (1994) defines “infrastructure” to include services from Public utilities, works and other transport sectors, namely, power (electricity), telecommunications, piped water supply, piped gas, sanitation and sewerage, solid waste collection and disposal and piped gas; roads and major dam and canal works for irrigation and drainage; and urban and inter-urban railways, urban transport, (sea) ports and water ways and airports, in that order. To these must be added piping systems or networks (Jiriko, 2007).

These definitions make no mention of open spaces or greens, except that of Daniels and Daniels (2013) which include “parks” as a component of infrastructure. Currently another form of infrastructure, though not totally new, code named “green infrastructure” has become topical. According to UN-HABITAT (2009: 220),

There has been a positive trend in planning in the direction of an expanded notion of urban infrastructure that includes the idea of ‘green infrastructure’ based on photosynthetic processes. Green infrastructure refers to a variety of green and ecological features and systems, from wetlands to urban forests, that provide a host of benefits to cities and urban residents—clean water, storm water collection and management, climate moderation and cleansing of urban air, among others...

Since the concern of this discourse is limited to the urban scale, “urban green infrastructure” is defined as “a strategically planned and delivered network of high quality urban or city (-region) green spaces, working landscapes, parks, wetlands, forest preserves and native plant vegetation, playing fields and private gardens” (England: Centre for Neighborhood Technology, 2013), or “urban vegetal islands” (Akintola-Arikawe, 1985). “Open (green) space” ranges from the small back gardens in homes to bigger and more functional types, e.g., school playing fields, recreational grounds, green race courses, golf courses, public parks, botanical gardens, arboreta, and regional parks (Falade, 1998).

“Driver”, as used here, denotes an enabling force, an underlying ‘motive’ power in developing livable cities.

A “livable city” is one that is maximally habitable; conducive to living, working, recreating, and eco-friendly; possessing all the attributes of felicity—call it a sustainable city.

The concept of “Garden City” could be considered as one of the earliest formal embodiments of the concept of urban green infrastructure. Prior to this in England (U.K) intra – urban greens appeared to be the
exception rather than the norm. Unwin’s early writings provided a glimpse into this in the following words:

In the old town which we admire when we chance to come on them, we notice that the country (rural area) comes up clean and fresh right to the point where the town proper begins – in the oldest cities we sometimes find a wall with the country coming right up to the gates which adds to this effect

“(Parker and Unwin, 1901:84).

The Garden City idea/concept was initiated by Ebenezer Howard. To him, the Garden City was the ideal community. Conceptually, the Garden City was to have its population pegged at 32,000 surrounded by a permanent green belt, eventually forming part of a social city cluster of six Garden Cities and a larger Central City linked by rapid transit, and with population of 250,000. As Miller (1981) puts it, “He (Howard) visualised the Garden City arrangement in conformity with the land ... giving impressions of dignity to those who come, leaving with those who go a remembrance of beauty” (Cherry (ed.), 1987:80). According to Miller (1981), “... for if the Garden City layout stands for anything, surely it stands for this – a decent home and garden for every family that come here. This is the irreducible minimum” (Cherry, ed.), 1981:81).

The first Garden City was Letchworth built in 1903 (Fig. 1). Similar others followed afterwards. Later on Garden City layout standards were adopted for planning suburban development, which resulted in producing salubrious suburbia; Hampstead Garden Sub-urban (England)/U.K. being a classic model. One could reasonably argue that green infrastructure was a critical driver that made the Garden Cities and Garden Suburbia livable.

The pursuit of happiness can be considered a universal concern (Bartetzky and Schalenberg, 2009, the process of achievement of which can be driven by consciously planned/designed and delivered urban green infrastructure. According to McMahon (2006), the idea that all human beings could achieve happiness did not strike until the Enlightenment; from then on felicity was established as something to which everyone could aspire not only in the afterlife, but also during life on earth. This further leads on to the idea that people can and should be happy and are, in fact, destined for happiness in this life and thereby have a natural right to it. Bartetzky and Schalenberg (2009: 1), therefore, posits that “if happiness on earth is considered to be the natural destiny of mankind, ... it is not primarily personal misfortunes and incapacities that cause people to fail in their pursuit(s) of happiness, but the inadequacies of their living conditions (emphasis mine) ... change the living conditions ... and people will invariably be happy”.
Over the last few centuries the impact of cities/city planning on the pursuit of happiness has grown at the same immense rate as the urbanisation has progressed: cityscapes reflecting ideas of public happiness; urban projects conceived and staged as “model islands” in anticipation of a bright(er) future city; and the pursuit of happiness has taken a wide variety of forms, which may not be explicit vocabulary of “happiness” and implied by terms such as “Ideal City”, “Well-policied Space”, “Public Sphere”, “New Homes” and, currently, “Sustainable Urban Development”, “Sustainable Cities”, “Healthy Cities”, “safer cities” and, of course, “Livable Cities”, or “Living Cities”. It is the conviction of this paper that urban green infrastructure (policies, plans, projects or programmes or its components) is a non-negotiable driver (‘motive’ power) of all the city-level attempts at positively changing the city-scale living conditions to achieve for the urban man his natural right to happiness – i.e. development of livable cities.

The characteristics or hallmarks of livable/sustainable cities include:

i. Placing a high value on quality of life: This is done by accepting, first and foremost, that cities or communities are people and that the fundamental objective of the planning and development process is to improve the quality of its inhabitants.

ii. Respecting the natural environment: A
livable city/Community recognises the relationship to nature’s system and components as essential to its well-being, through providing access to nature in the form of metropolitan parks, urban gardens and other open (green) space zones (emphasis mine); and understanding the sensitive interdependence between the natural and built environment, thereby develops in a manner which supports and complements—not interfere with—nature, and avoids ecological disasters.

iii. To be livable/sustainable, a city/community must be planned and designed (i.e. planning and design are essential). Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources, reduce waste but encourage reuses of the resources (UN, 1997).

Infuse technology with purpose: Livable/sustainable cities/communities apply appropriate and environmentally sustainable technology; encourage learning and

iv. research and understand how existing and new technology can serve and improve cities/communities, not vice versa.

v. Maintain scale and capacity: This is regarding natural and human environment, by ensuring that the environment is not overdeveloped, overbuilt, overused, or overpopulated; recognise signs of stress/overstress and adjust appropriately (Geis and Kutzmark, 2006)

Hart (2012) contends (and rightly so) that a sustainable community seeks to maintain and improve the economic, environmental and social characteristics of an area so its members can continue to lead healthy, productive, enjoyable lives. Jiriko (1999) provides further hallmarks of livable cities.

The Healthy Cities programme – initiated by WHO in 1986 – is the best-known example of successful healthy settings programmes. A Healthy City is one that is continually creating and improving those physical and social environments and expanding community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum endowment. A Healthy City’s aim is to create a health supportive environment, achieve a good quality of life, and provide access to health care. UGI contributes immensely by driving the activities/programmes directed at achieving these set goals.

Urban planning or place-making is the planning and development approach of a specific (urban) area and its adjacent areas that should primarily promote specific lively elements that will effectively enhance livability, sustain meaningful and continuous community development and attract and retain more people. Place-making has to be participatory; effectively engaging the citizens in a planning and design process that synthesises local experience and technical expertise. Participation is a critical part of planning for effective place-making, i.e.
sustainable communities (Loudier and Dubbois 2001:9). A qualitative participation strategy is needed to address and successfully implement a bottom-up approach to ensure the planning of functional and usable urban green spaces (or infrastructure) that can be regarded as lively. To create such a place requires that the community plays a bigger role in discussions with authorities, policy formalisation, and creating solutions.

A major identity of a livable community/city is the quality of its parks, gardens and green open spaces; i.e., its green infrastructure (Cilliers & Schlebusch, 2013). This raises a sense of accomplishment and delight in the people of that community, among other benefits/ values. These must have informed Perth and Kinross Council (2013) in the U.K. to evolve the following 3 key principles to achieve its objectives and realise their vision of green spaces.

i. **Provide for nature** – environmental sustainability; provide for a range of habitats within the green space; link habitats together.

ii. **Provide for people** – economic and social sustainability; face the green space; provide for access to and within the green space; encourage activity; provide amenity and interest.

iii. **Maintain** – physical sustainability; design and build to last; good maintenance – funding of up keep is better than capital; involving the community and encourage use.

For UGI to maximally drive urban development, it has to be planned. Green infrastructure planning has to do with provision for and the organisation/arrangement (spatial location and distribution) of urban green spaces according to their hierarchy and based on accepted standards in a given city, backed up by the required resources for their actualisation. Planning facilitates the capabilities/abilities of the UGI in driving the development of livable cities.

It is ideal to integrate public green open space networks with high (quality) utility services like major storm water management systems (retention and retarding ponds and solid waste disposal sites) in order to enable these (green) spaces perform numerous functions – e.g., green public open spaces acting as overflow facilities in the events of severe storms, and storm water storage facilities providing landscape features, etc. An interconnected network of urban green open spaces is more a method of land/space preservation and the greening of other city or metropolitan infrastructure systems. The first core content of UGI planning is the **basic concept**: this is the idea of using green infrastructure to guide (drive) urban development - treating the natural environment and green space as one part of UGI to be constructed as a first step (Ren, 2013). This is also called green indicator content. Through protecting the rationality and integrity of green land system, the continuity of the natural and biological processes could be guaranteed, sufficient development space reserved, etc.

Next, emphasis should equally be on eco-efficiency: that is, the planning of UGI should pay attention to the interconnection and ecological efficiency of green land. Perfectly planned network of green spaces could make those green land spaces both visible and usable. Recognising fully the economic contribution value of urban green spaces is the third. Full recognition and stress on the
holistic benefits that urban green land could produce, evolving a sound UGI system and improving ecological environment characterised by efficient management of urban green land could make the environmental benefits translate into economic advantages that will drive a city's future economic development. The fourth core content is that planning should emphasise the combination of passive preservation and positive development in a manner that a network which addresses both the protection of urban green spaces and urban development is evolved. Planning should stress a transformation from a simple only protection of green space to a more systematic and guiding framework for overall future urban development network.

Finally, there is the research perspective of UGI planning. For purposes of improving the veracity and comprehensiveness of the planning, the research prospects of green infrastructure should either be initiated or expanded to a higher scale. Possible, relevant research arenas include using UGI to guide sustainable urban development of livable cities; basic principles about valuing the ecological benefits of UGI; advocating urban green infrastructure promotion; how to combine the passive protection and positive development dimensions of UGI; harnessing the tangible and intangible (economic, etc) value of UGI/green spaces; evolving a functional diversification / hierarchy of green spaces/land: e.g. parks and gardens, urban agricultural landscape belts based on produce (forestry vegetables fruits, cereals etc); exploring the significance of UGI becoming not only urban green space system but also a (basic) functional carrier which could coordinate multiple urban infrastructure such as urban open space system, transportation system, water supply and drainage system, under and through urban agriculture. The scope of this study fills in some of these gaps.

UGI can provide many social, economic and environmental benefits close to where people live and work. These include places for outdoor relaxation and play; spaces and habitats for wildlife with access to nature for people; climate change adaptation, e.g. flood alleviation and cooling urban heat islands; environmental education; urban food production—in allotments, gardens,

![Fig. 2(a): Planned/Geometrically Designed Landscapes of Lavenders in Mediterranean Region. Source: Brookes (1998), p. 29.](image-url)
floodable river plains/stream verges; improved health and well-being; lowering stress and improving opportunities for exercise.

UGI projects foster community cohesiveness by engaging all residents in the planning, planting and maintenance of the sites (Center for Neighbourhood Technology, 2013). By improving the environment and preserving open green space, green infrastructure supports sustainable communities (USEPA, 2013).

The Brief to prepare the Greater Norwich New Growth Point Area agreed infrastructure strategy (Norwich Council, BLAF 19, 2007) lists the benefits of (U) GI-which is well – designed and integrated and often in combination, to include the fact that it contributes to a high quality natural and built environment and is required to enhance the quality of life for present and future residents and visitors, and to deliver “livability” for sustainable communities; improve health and mental well – being; promote a sense of community; help reduce crime, fear of crime and anti–social behaviour; provide opportunity for exercise, sport, active recreation, spiritual well-being and quiet contemplation; improve health as a result of increased physical activity, such as walking; provide community resources for learning and training; provide opportunities for community involvement; provide a leisure focus and attraction for people of all ages from the existing and the growth communities; help establish (urban) local identity or sense of place; improves environmental quality, e.g. better air and water quality, (urban) local climate control noise attenuation; contribute to sustainable drainage and flood mitigation; provide the opportunity to protect, recreate and rehabilitate landscapes and habitats damaged or lost by previous development or agricultural change; help maintain and enhance biodiversity; contribute to the protection, management and enhancement of historic and natural sites and areas; improve and sustain land values; reduces land management costs, and provide an enhanced environmental backdrop that will assist in attracting business and inward investment. The reader may observe that a few of these may be paraphrases of some of the benefits of UGI earlier enumerated. The Cairo’s green belt along with green belts for all the surrounding satellite cities are planned and being developed as part of a carbon neutral goal (UN-HABITAT, 2009).

3.2 Components of UGI
The components of UGI- also referred to as UGI assets – include the under listed:

i. High quality green spaces
ii. Working landscapes
iii. Open spaces
iv. Parks and gardens (urban and city – region)
v. Wetlands/Swamps
vi. Forest reserves/nature reserves
vii. Native plant vegetation
viii. Playing fields
ix. Wood lands
x. Allotments.
i. Private gardens
xii. Amenity spaces (e.g. communal green spaces within housing areas)
xiii. Green corridors (hedgerows ditches, disused railways, stream verges)
xiv. Brown and Green field sites
xv. Natural and semi-natural wild life habitats
xvi. Pocket parks
xvii. Historic parks and gardens and historic landscapes
xix. Sites of special scientific and scheduled moments
xx. Water ways and floodable river plains
xxi. Development sites with potential for open space and green corridors
xxii Land in agri-environmental management
xxiii. Public rights- of- way, cycle-ways and other recreational Linear Corridors.

The components of UGI have some specific contributions to the livability of cities.

Due to limitations of space and length requirements of manuscripts, the contributions of only some of the assets/components of the UGI (again some in combination) are outlined in this subsection.

**Urban Forests / Native Plant Vegetations/Woodlands:** Supply of oxygen in exchange for carbon dioxide from man; serving as carbon sink: facilitating man-living-with-nature; moderating city micro-climate; shade; cool breeze (cooling effect) prevents heat island effects; improve air quality; serve as ambient noise buffers; and serve as green belts to check unwieldy urban expansion. Other benefits are fruits for food; medicinal benefits (herbs, roots, tree bark- as source of medicine); provide porous soil situation that absorbs rain water and prevent urban flooding or storm water; promote biodiversity; habitat for birds/animals; and aesthetic appeal of the tree cover/canopy greenery (beauty).

**Urban Open Green Spaces:** These are land spaces not built on but designated/planned and developed (organised) as urban green open spaces). Their uses include leisure and relaxation; access to nature; reduction of stress; sunshine and production of vitamin; high quality open spaces/greens are dignifying just as they are cleanliness-promoting; and walkways round / through them promotes physical activity which is beneficial to health, especially where public access is freely allowed. Public, urban open green spaces refer to land/space laid out (organised) as green spaces essential for public use. These differ from communal and institutional/open green spaces where public access may be limited or denied in some cases. Fig. 3(a) shows Singapore City's Green Cover (46.75%, as at 2007), as compared to "The Greening of Lagos"- Fig. 3(b).

**Parks and Gardens (Metropolitan/City-region and Neighbourhood):**
Recreational uses, holding of social functions, provide children facilities, swimming pools and related facilities, some as wildlife parks, e.g. Jos (Miang Road), zoological gardens (e.g. Jos zoo;
Audu Bako Zoo, Kano), botanical gardens, flower gardens, school gardens, neighbourhood gardens/parks and family gardens. Generally, an ideal garden expresses the link between man and the world in which he lives. Fig. 4 (a) and (b) show some examples of Urban Green Infrastructure (Recreational Park) in Tehran City, Iran.

Playing grounds/Sporting Green Spaces: Well-grassed and maintained stadia, school football pitches, games spaces facilitate physical activities that promote healthy living among students/teachers, community etc. city – level stadia for soccer, other games and sports; golf and polo grounds’ greens as promoters of physical activity; and leisure and entertainment, etc. “All work without play makes Jack a dull boy”, it is said.
Fig. 3(b): The Greening of Lagos.


Fig. 4(a)

Fig. 4(b)

Fig. 4(a) and (b): Urban Green Infrastructure (Recreational Park) in Tehran, Iran.

Source: General Public/International Relations Department, Tehran Municipality (undated).
Linear Greens/Green Corridors: Trees, specifically ornamental trees, planted along our urban highways and streets (rights of way) are a source of beauty to behold along such roads' corridors; they also play the roles of providing shade and cooling effects that pedestrians enjoy along the side road walks, in addition to absorbing some of the exhaust pollutants from combustion engines of fossil fuel-driven vehicles. Hedges, shrubs and soft landscaping along the highways and city roundabouts are a visual delight to those plying the corridors or nearby residents who tap the recreational values of such roundabouts. This is enhanced when and where other relevant hard landscape components are integrated and developed. Linear/corridor greens equally increase property value. Fig. 5(a) shows Linear/Adjacent Green Infrastructure along a High Way in Tehran (Iran).

Fig. 5

Fig. 5(a): Linear/Adjacent Green Infrastructure along a High Way in Tehran, Iran.

Urban natural landscapes: These are natural sceneries such as rivers / river courses and their integral characteristic features of meanders, turbulent flows, floodable plains, riparian vegetation / greens, waterfalls, etc. They also include rolling topographic together with their associated river/stream systems, valleys and greens, picturesque mountains / rock out crops with their attendant vegetation / greens, among similar others. They are areas of leisure and relaxation; have scenic value; places of quiet meditation and appreciation of nature; riverside landscapes and agriculture; picnicking and tourism; providing vistas for viewing the cityscape; physical activity; mountain climbing; and serving as aquatic and mountain habitats. Fig. 6 is an example of a natural landscape in Nasarawa area of Nasarawa State.
Fig. 6: An Example of a Natural Landscape in Nasarawa Area of Nasarawa State.

Source: Nasarawa State Tourism Development Corporation.

Science Parks and Gardens: Research/study of nature; educational value; relaxation and quiet meditation; and beauty of the greenery are some of their importance.

Wetlands/Urban Marshes/Swamps: They are aquatic habitats; have agricultural potential; perform urban storm/flood water absorption functions and, have aesthetic appeal.

Historic parks/gardens and historic landscapes: They serve as Heritage Sites, asset for posterity, contribute to urban beautification, have educational value, and serve tourism functions.

Green Roofs (especially in inner Cities): They play significant roles in urban greenery, beautification, and depending on rain intensity and soil depths, run off can be absorbed 15 - 90%. In the area of weather moderation, green roofs' natural thermal insulation properties make structures cooler in summer (hot season in Nigeria) and warmer in winter (cool/cold season in Nigeria). They also protect roofing materials from inclement weather and prolong the life span of the roof structure. Fig. 6 is a Singaporean example of rooftop and high-rise buildings' greening.

Floodable urban river plains, wetlands, land in agri-environmental management, allotments, rooftop gardens are fundamental to urban agriculture which, in turn, plays a significant role in urban greening. There is a relationship between urban food security and livability of cities: a city where the individual residents or households are hungry and malnourished or
starving cannot be a livable city. Urban "food security", as used in this write-up, is associated with food intake at the individual level and food availability at the levels of the household and the city (Alamgir and Arora, 1991:6).

The development of urban agriculture has been found to be a viable response to the problems of urban dynamics. "Urban agriculture" refers to the growing of plants and raising of animals for food and other uses in and around cities (i.e. within cities and peri-urban areas or city-regions).

Fig. 7: Singaporean Examples of Rooftop and High-Rise Building Greening

Source: Centre for Urban Greenery/Ecology & Housing and Development Board, Singapore.

The most important distinguishing character of urban agriculture is the fact that it is an integral part of the urban economic, social and ecological system: it uses urban resources; produces for city dwellers; is strongly influenced by urban conditions; and impacts the urban system - has impacts on urban food security and poverty, ecology and health (Van Veenhuizen, 2006).

The contribution of urban agriculture to food security, healthy nutrition, and quality environment is, perhaps, its most important asset: a food - secure, healthy community/city, with a highly qualitative environment is a livable community/city. Urban agriculture is one of the strategies urban citizens develop to improve their livelihoods.

Currently, there are many vacant open spaces/un-built allotments, floodable river plains, land under power lines, parks, land in nature conservation areas, and rooftops in especially inner cities that are either not or inadequately put into urban agricultural use. However and from observation, the urban floodable plains,
wetlands/swamps and stream verges are the most relatively used for urban farming/food gardening (in Nigeria). Also, in the Nigerian urban context, green roofs and rooftop gardening is a neglected but vital urban agricultural potential. The advantages of rooftop gardens to the development of livable cities are that they are an excellent example of incorporating passive, eco-friendly technology into new or existing urban development; they help ameliorate the negative impacts of cities on the environment through conserving energy and water, improving air and water quality, assisting in storm water management, absorbing solar radiation, becoming a source of local food production, providing habitat restoration and creating natural retreats; rooftop gardens/green roofs have and do help many cities recover "lost" green and space that could or can help them communicate with nature or breeze better through good weather; take advantage of under-utilised /unused urban roof space and reduce the city environmental footprint, increase sustainability of urban areas, and improve quality of life. Moreover, green roofs/rooftop gardens use sustainable technologies and create jobs in the course of producing membranes and in the light weight growing mediums and filters as well as in research, design, construction and landscaping (RGRG, 2002; Fattahi and Bazrkar, 2013).

Environmental benefits of rooftop gardens include exposure to green space reduces stress and increases wellness and belonging (Wong, 2008; Bremer et al, 2003:55): “a ten percent increase in a nearby (green) space was found to decrease a person’s health complaints in an amount equivalent to a five-year reduction in that person’s age” (Sherer, 2006:16; Meletist and Webster, 1999). Again a food self-sufficient city where the citizens are well-fed and healthy with an eco-friendly environment is livable city (GRHC, 2002).

Fattahi and Bazrkar, (2013), in a study, reveal that (rooftop) gardening is a favoured past time for many city residents (e.g. in Shiraz) and constitutes an outlay for relaxation, creative expression and beautification. They advocate rooftop gardening as a method of permaculture (permanent agriculture) and list its general benefits to include international reputation of cities, human well-being, and increased life of the roofing membrane (Fattahi and Bazrkar, 2013), e.g. exposed flat roofs may require renewal after as little as ten years, but roofs under rooftop gardens can be in perfect condition for 50 years and more.

From the foregoing discussions on urban agriculture, it is clear that it certainly contributes immensely to the solutions to many aspects of the problems attendant to urban dynamics and it is increasingly been used as a tool for sustainable city development. However, currently the challenge is its permanent integration into city planning and facilitation of its multiple benefits for urban residents.

3.3 Provision for Urban Green Infrastructure in Urban Development Plans in Nigeria and Extent of its Implementation.

The importance of and some limited provision for urban green spaces were realised and done even before and continued since the introduction of modern or formal city planning in Nigeria. Traditional forms of open (green) spaces included village/city squares, chiefs’ gardens, evil forests, sacred/shrine
groves, etc. The advent of colonial administration saw the dual city management and the creation of European Reservation Areas (ERAs) that were well-laid out and well landscaped and maintained, hence, the introduction of formal open green space provision and planning in Nigeria. After independence, the ERAs translated into Government Reservation Areas, However and according to Falade (1998), Nigerian cities grew without adequate parks. From the 1960s onwards formal city – wide planning and development started taking roots in Nigeria. Below is a sketch of master plans and the extent of provisions made for open green spaces or UGI as a percentage of the land use budgets of the plans.

**Table 1: Provision for Urban Green Infrastructure in Some Selected Urban Master Plans in Nigeria**

<table>
<thead>
<tr>
<th>Name of Master Plan</th>
<th>Duration</th>
<th>Nature of Green Infrastructure</th>
<th>As % of Land Use Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Kaduna Master Plan</td>
<td>1967-2017</td>
<td>Road (main) and open space *</td>
<td>19.0</td>
</tr>
<tr>
<td>2 Akwanga Master Plan</td>
<td>1978-1995</td>
<td>Open space + road *</td>
<td>12.3</td>
</tr>
<tr>
<td>3 Keffi Master Plan</td>
<td>1978-1995</td>
<td>-</td>
<td>7.96 (20,000pop)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21.0 (1978)</td>
</tr>
<tr>
<td>4 Gaya Master Plan</td>
<td></td>
<td>Road and open space *</td>
<td>25.5 (1978)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>21.0 1978-2010</td>
</tr>
<tr>
<td>5 Nasarawa Master Plan</td>
<td>1978-1995</td>
<td>Recreation and open space *</td>
<td>4.0</td>
</tr>
<tr>
<td>6 Enugu Master Plan</td>
<td>1980 -2000</td>
<td>Recreation and open space *</td>
<td>5.0</td>
</tr>
<tr>
<td>7 Jos – Bukuru Metropolitan Master Plan</td>
<td>1980- 2000</td>
<td>Recreation and Open Space *</td>
<td>4.0</td>
</tr>
<tr>
<td>8 Metropolitan Lagos Master Plan</td>
<td>1980- 2000</td>
<td>Open Space *</td>
<td>2.8</td>
</tr>
<tr>
<td>10 Abuja Federal Capital City Master Plan</td>
<td>1980-2000</td>
<td>Parks, open space + rock outcrops, monuments *</td>
<td>32.87</td>
</tr>
<tr>
<td>11 Nigerian Cities Residential Development Only</td>
<td>1981</td>
<td>Parks, playgrounds, other open space (recreation) *</td>
<td>10-12</td>
</tr>
</tbody>
</table>

* All Master Plans provide for Open Spaces generally which makes it difficult to ascertain the actual proportion of total land use budget allocated specifically as “Urban Greens” i.e. UGI.

**Source:** Author's Survey of relevant literature/master plans, 2014.
From the table, the merging of green spaces with open spaces generally creates a confusion that needs to be clarified. According to Falade (1998), the different land uses in any city can be grouped into two broad landscape elements: buildings which house the various uses such as industry, housing, commerce, education, etc, and their surrounding open spaces such as parks, private yards, roads, paths, undeveloped land which may be natural or man made or land developed as gardens and recreation grounds or undeveloped land which has value for recreational purposes, amenity, conservation and other natural resources, historic or scenic land scapes, or areas of outstanding natural beauty. He expatiates further that open space is of different types, and covers anything from the small front and back gardens in private residences, to the larger and more functional types such as school playing fields, recreation grounds, race courses, golf courses, polo grounds, public parks and regional parks. He concludes that open space also embraces rivers, valleys, mountains, lakes, oceans and bays. This categorisation of city land uses corroborates the author's observation that urban green spaces are lumped together with other urban open spaces.

By way of emphasis, this write up is concerned with only the urban soft spaces or greens and embraces other urban landscapes that are awash with green such as mountains, valleys, scenic rock outcrops, zoological gardens, wildlife parks, linear greens along highways / streets and rivers / streams, green squares and similar other green spaces.

Based on the foregoing clarification, it is reasonable to conclude that the proportion of the land use budget allocated to actual urban greens in our urban development plans in Nigeria is certainly, far less than what is indicated on Table 1 above. This development is indeed worrisome in the light of the crucial importance of UGI in driving the development of livable cities in Nigeria. Of all the master plans cited in Table 1, Abuja has the highest allocation to open space (32.817%) because it was conceived with the Garden City principles (Mabogunje, 2001). On a comparative basis, this provision is still far below Singapore City’s green cover which, as far back as 1986, stood at 35.7% (much higher than that of Abuja) and rose to 46.5% in 2007 (Soon, Jean, and Tan, 2009) – see Fig. 2(a) – and currently stands at 50% of the land space of the city. Yet, even some professional town planners in Nigeria have expressed the view that the Abuja Master Plan provision for open space is on the higher side. Ago (2001), for example, observes that the 32.55% (32.87%) of the total land budget for the City zoned for open space appears somewhat abnormal and that the usual figures of 10 - 15% (Onokherhoraye, 1981) of the total land to be covered by the city development should have been maintained. On this, Jiriko (2008) asks to know: if normal standards and requirements for planning and development of (new capital) cities are to be maintained in the case of Abuja, in what respects will the city be a model for other countries to emulate? Singapore City is certainly a world model to be emulated in respect of its green cover proportion of the total land use budget.

Problems of changes, distortions, contraventions, etc have acted to further diminish the stated proportion of the Abuja Master Plan’s land use budget allocated to open space. Two instances will suffice. One, a total of 105 cases of change of use/conversion
from green areas (open space and parks) to residential were identified covering Garki I and II, Maitama and Asokoro Districts. Two, some 41 cases involving change from green areas/parks/recreation to commercial and office uses were uncovered in Wuse I/II, and in Maitama and Asokoro Districts (Ministerial Committee and Abuja Urban and Regional Planning Tribunal Report, 1997; Ministry of Federal Capital Territory, 1998; Jiriko, 2008).

On the open space and recreation in Kaduna the city's master plan states that Kaduna is splendidly endowed with open space by virtue of the wide floodable plain of the River Kaduna, the narrower streams (e.g. the Mashi River) and gullies and the prevalent rocky outcrops on the high land giving fine views over the city and the Savannah. Another great green feature of Kaduna is its trees, giving it its aristocratic park-like character. This has been enhanced by the Government's wisdom in the past in conserving two great prongs of open space that sweep down from the head and heart of the Government Centre (Lugard Hall) along a 3.2 km southward course to the river taking in the Race Course (later called Murtala Square), the golf course (currently just south of Hamdalla Hotel) and the Government Garden (now General Hassan Katsina Park) by the Kaduna River. Here at the southern end of this system the plan proposed at Kabala (Doki) a large Botanical Garden, flanked by Zoological Gardens to be carved out of the dramatic rocky terraces of the existing (then) quarry. Further west, near the (now Ahmadu Bello) Stadium and the Bridge, will be the Sports Centre. New road bridges over the River and footbridges leading across from 'island' to 'island' will connect this great central system of open space on the north bank with those that come up the smaller stream valleys (of Romi, Kakuri, Barnawa, and Narayi Streams) from the south. These divide but also link the communities and provide site for schools, playing fields and practice pitches away from the road traffic. This canalised system of open space occurs also in the North, e.g. the rocky outcrops south of Kawo. The system favours past time horse riding, provides large pockets of fadam' (swamp/marsh) land suitable for leguminous market garden foods/vegetables and other crops for Kaduna both in the north and south. Another green area is that surrounding all but the entrance to the Defense Factory in Kaduna south. Initially, this area enclosed about 81 ha. (200 acres) unfenced and contained the most dramatic rocky outcrop in form of a high land plateau rising sheer out of the ground and constituting a vista point from which some of the best views of the City, its River and the savannah can be had. Regrettably, for security reasons, this public amenity had to be cordoned off and barred from public use (Kaduna Master Plan, 1967: 204-5).

It is to be noted that an open space can be either green space or for recreational purposes, conservation of land and other natural resources or historic or scenic beauty or great natural scenic beauty but the focus here is on the green components.

In terms of actual implementation of the provisions of the open spaces, especially the green components, the author's experience and observations as an academic with the Kaduna Polytechnic for well over two decades, point to 25% or much less of the proposed open/green spaces in Kaduna Metropolis still available. A greater percentage has been either converted to other uses or encroached upon. The green verges of the tributary streams of River Kaduna and the floodable plain greens
of the River itself, and the incidental open green spaces are the greatest culprits. Also the linear green plantings along major urban High Ways planted by the colonial administration have been removed in the name of road dualisation/expansion, but replacement has been as difficult as a “camel passing through the eye of a needle”. Equally saddening, is the fact that the roundabouts have been concreted instead of soft landscaped. The most visible green infrastructure in Kaduna Metropolis today are the Golf Course, the General Hassan Katsina Park and the Children’s Park (opposite the “44” Army Reference Hospital) and the negligible remnants of the much-encroached-upon floodable plains of the River Kaduna.

The amount of open spaces provided in other Nigerian cities varies from 0.3% for Ilesa, to 23 ha. (public and private) in Zaria, raised to 559 ha. in the Zaria Master Plan so as to offset the deficiencies found in public open spaces; some 47 ha. of land in Ile-Ife were allocated to public open spaces in the various private sectors – led residential layouts between 1960 and 1983, but none of them was developed, while all the public open spaces approved in the Land Use Plan for Festac Town (Lagos) have either been encroached upon or misappropriated by the authorities (Falade, 1998).

Despite these deficiencies in the provision for and implementation of UGI components of open spaces in Nigerian cities, the recent efforts of the Parks and Recreation Department of the Abuja Municipal Management Authority (AMMA) regarding the development and management of Parks and Recreation in the Federal Capital Territory (FCT) are worth emulating in terms of Policy, Legislation, Implementation and Maintenance (Abuja Municipal Management Authority : “Draft Policy for the Development and Management of Parks and Recreation in the FCT”, undated; ’Abuja Park Regulations, 2005”).

4.0 Current State of UGI and Livability of Nigerian Cities.
Explicitly or implicitly the benchmarks of a Livable sustainable city have been brought out in the foregoing analysis. A livable city is one which has a high level of well-planned, coordinately developed and maintained UGI. Singapore is green, this is a livable city. It is a city where the natural environment is respected and development is carried out in a way that supports and complements nature and avoid ecological disasters, where the dwellers are well – fed (not hungry, starving or malnourished), a health city (healthy inhabitants and environmentally healthy), a safe and secure city (personal/family safety/security, community/with environmental generally. In the same vein, UGI and urban infrastructure are often lumped together – e.g. roads, open spaces, parks and gardens, and monuments and rock outcrops are grouped together as one category of land use in a city’s development plan land use budget. The provisions for open spaces/green spaces are either not implemented at all, dismally executed, distorted, misappropriated by the concern authorities, or converted to other land uses. All these, put together, have worked to rob all Nigerian cities from attaining the livable city status. The question, then is from here where do we go, and how?

Conclusion
The paper has confirmed the immeasurable benefits of UGI generally and as a driver of the development of livable cities, in particular. It is found that there is gross under provision for
UGI in Nigerian urban development plans just as there is no clear differentiation between Urban Green Spaces and Open Spaces generally in the cities' development plans. Even the negligible provision for Open Spaces/Green Spaces is either not implemented at all, dismally executed, misappropriated by the concern authorities, or converted to other land uses. All these, put together, have worked to rob the Nigerian cities of the "Livable City" status. The conclusion, therefore, is that Nigerian cities in their present state generally are not livable. The question, then, is "from here where do we go, and how?"

Recommendations.
The significance of UGI or components of urban green cover, the gross negligent provision or non-provision for UGI in city development plans, and the non-separation of UGI from general urban infrastructure and urban green spaces from urban open spaces generally point to the need for the initiation of an UGI movement that will re-awaken and propel the affairs of UGI.

A national, sole-purpose UGI policy should be put in place for the country (tapping from, particularly, the Singaporean, and the Abuja city experiences, among others). The proposed National UGI policy should then serve as a guide for the formulation of State UGI policies and so on down the federal governmental structure. A similar pattern should be followed in evolving UGI laws/regulations in our federalism. These UGI policies, laws / regulations, etc should specify the proportion of the urban land use budget that should be allocated to strictly enforced. All spaces designated for greenery in existing urban development plans but which have been converted to other uses should be recovered and developed as UGI. Participatory, community-based policy and decision making, planning, implementation, and management of all UGI policies, plans, projects, programmes, etc must be the norm rather than the exception. Further spirited research on UGI, especially, in the areas identified in this paper, including the role of urban blue (water) resources infrastructure in facilitating the building of livable cities should be undertaken to complement this one. Urban planning's role in UGI, including the greening of roofs and high-rise buildings generally, and in entrenching urban agriculture as one of the recognised land uses in cities' development plans land use plans (while encouraging roof greening) has to be actualised with the immediacy it deserves. The paper is convinced that if these steps are taken and the measures are put on ground and concertedly implemental, UGI as a driver of the development of livable cities would have been set in motion and the dream of Nigerian cities attaining the "Livable Cities" status hatched.


Norwich Council (2007) Brief to prepare the Greater Norwich New Growth Point Area Green Infrastructure Strategy. BLAF 19, Agenda item 5, June.


AN ASSESSMENT OF SERVICE PROVIDERS' COMPLIANCE WITH TELECOMMUNICATION MASTS SPACE STANDARDS IN ENUGU SOUTH LOCAL GOVERNMENT, ENUGU STATE

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ABSTRACT

Mobile telephony is a relatively new phenomenon in Nigeria and has brought a rapid development in other sectors of the economy. In order to check the negative effects of GSM revolution on our environment, government stipulated guidelines for various activities carried out by the service providers to ensure a safe and healthy living environment. The aim of this paper is to determine the compliance of existing service providers with the specific guidelines for the erection of base stations in Enugu South Local Government Area, Enugu. Primary and secondary data were used in this study. Simple random sampling technique was used in the collection of data for the study. In testing the hypothesis postulated, a set of variables was chosen as indices for measurement and analysis. These variables are Nigerian Communications Commission (NCC) guidelines on installing base stations, standard setbacks to residence, height of fence and mast to mast spacing. The result of the hypothesis indicated that there is a significant difference in the NCC guidelines on siting base stations and the observed specifications of existing base stations. The paper, therefore, recommended, among others, the involvement of physical planners and allied professionals in the location of communication masts in Nigerian cities. The recommendations would also help the policy makers in their efforts at promoting a good urban image and meeting global environmental challenges.

Key words: Space Standards, Compliance, Global Environmental Challenges and Telecommunication Masts
INTRODUCTION

Nearly over a decade ago (precisely September, 9, 2001), the Global System for Mobile Communications (GSM) kick-started its engine in Nigeria. Prior to this time, the inefficient and moribund Nigerian Telecommunications Limited (NITEL) was the only body saddled with the enormous responsibility of providing Nigerians with telephones. Today, things have changed for the better as mobile telephony in Nigeria has brought a rapid development in other sectors of the national economy. As Ikhemuemb has observed:

Perhaps the most prominent way in which the sector has affected the economy is the amount of foreign investments that have poured into the country since 2001. Available records indicate that Foreign Direct investment into the sector in Nigeria in the past four years is in excess of $5 billion. This means that apart from the Oil and Gas sector, telecommunications remain the most attractive for investment in the country” (Ikhemuemb, 2006).

In order to ensure sustainable environment for GSM operation, the Federal Government of Nigeria has made concerted effort at setting up the Nigerian Communication Commission (NCC) in 1992 “to regulate telecommunications with specific guidelines for the location of masts and lattice towers constructed and installed in the country” (Agukoronye, 2005). Furthermore, the government empowered the Town Planning Authorities to use police power instruments of zoning and line setbacks, as well as Site Analysis Report and Plans (SARP) in locating masts and towers in urban areas.

Today, however, many telecommunication masts do not meet the setback standards recommended by NCC and the Town Planning Authorities. Evidences abound in Nigerian cities where many of the GSM masts are located indiscriminately on the ground and they threaten safety of health and the environment. Masts/Base stations of the key players in the GSM business are not only improperly located but their proximity to peoples’ residences with demarcating distance of about four meters away is a serious source of worry and poses a serious health risk in the short, medium and long run of ionized and non ionized radiation (Onu, 2005). For instance, there are some of them that are located less than three metres from the edge of major roads with the implication that they will be affected in the event of road expansion (Agummadu, 2011).

Enugu hosts over sixty masts/base stations belonging to the various GSM operators. It is one of the Nigerian cities that are seriously beset with health and environmental problems due to indiscriminate location of masts/base stations. According to Paul-Humphery (2006), many telecommunication base stations/masts are seen in Enugu urban and doubts have arisen as to whether these masts conform to the location standards. The aim of this paper is to determine the level of compliance of service providers with the location of base stations/masts standards in Enugu South Local Government Area, Enugu. The study is done with the aim of consolidating on the gains of the telecommunications sector and ensuring sustainable development.
Literature Review

Telecommunication is an essential infrastructure that promotes the development of a nation's economy such as education, agriculture, industry, banking, tourism, and transportation. National Telecommunication Policy [NTP] (2000) observes that telecommunication considerably minimizes the risks and rigours of travel and rural-urban migration. For instance, Andzenge (2005) affirms that there is no denying the fact that the Nigeria's economy and indeed Nigerians have benefited from GSM operations. Egesi (2011) asserts that telecommunication plays an important role in the worldwide telecommunication industry's revenue generation, estimated at $3.85 trillion in 2008. The service revenue of the global telecommunication industry was estimated to be $1.7 trillion in 2008 and is expected to have reached $2.7 trillion by 2013.

However, Onu (2005), asserts that the inherent gains in GSM business in Enugu State in particular and Nigeria at large are gradually diminishing due to the negative impact of the sector on the physical, socio-economic, biological and cultural environment. According to him, the indiscriminate location of masts/base stations not only violates land-use regulations but also poses an aesthetic nuisance and visual intrusion which is at conflict with city beautification.

Jamaican Planning Authority (2003) observes that the towers/masts are an attraction for lightening an area on ground that is required to discharge electrical charge. Furthermore, the towers pose a danger to aircraft, and at times aesthetically and visually obtrusive, depending on their locations. Agukoronye (2005) cites an incident in Anambra State where a mast under construction collapsed and caused havoc to properties in the vicinity. In a similar vein, the Sunday Sun (2000) reports an incident of a collapsed mast located in Iyano Ipaja area of Lagos. The incident instilled fear in the residents about masts and towers.

Ijezie (2005) indicated that intensive exposure to Electro Magnetic Fields (EMFs) increases the risk of cancer in people residing in the vicinity of mobile phone base station transmitter masts. He gave example of Wishaw village in the United Kingdom where a 74ft mobile mast was pulled down on November 6, 2003 by a protester who blamed the mast for causing a cluster of cancers in the area.

Vanguard (2005) notes that service operators do not consider the safety of lives and property of their numerous clients, pointing out that indiscriminate laying of cables and installation of masts by the operators causes monumental damage of public infrastructure and health of residents. NTP (2000) states that the protection of life and property right as well as the promotion of national security is vital for the overall economic development. Accordingly, government should ensure that telecommunications operators comply with generally acceptable standards, for the provision of special services for safety and national services. Hence, the Vanguard (2005) stresses the need for dynamism and practicality when promulgating development control laws. Burgess (2007) observed that cellular antenna masts pose a hazard to low flying aircraft. Therefore, towers over a certain height or towers that are close to the air port are normally to have warning lights. However, these warning lights on cellular masts and
other high structures can attract and confuse birds. As he put it, US authorities estimated that millions of birds are killed near communication towers in the country each year.

Agukoronye (2005) reckons that to address the problem of indiscriminate location of masts and towers, the NCC needs the assistance of Town Planners since evidence has shown that the regulatory functions of the former can easily be integrated with the resources allocation functions of the latter. This is more so as Town Planners operate in all local government areas, in rural and urban areas where NCC does not cover. Despite the problems of indiscriminate location of telecommunications masts or base stations, the gains of telecommunications cannot be overemphasized, especially in transforming the world into a global village. This underscores the need for planning intervention in proper location of towers/masts to ensure sustainable urban development in Nigeria.

Guidelines for the Location of GSM Masts and Towers

The Nigerian Telecommunications Commission (NCC) is charged with the responsibility of regulating telecommunications in the country. The Commission has specific guidelines for the location of masts and lattice towers that are constructed and installed in Nigeria.

A permit must be obtained from NCC for erection of any mast and tower whose height exceeds 20 meters (66 ft). Such structures must be registered with NCC. The permit application will be submitted along with evidence of property ownership, site plan, design of the structure, NCC certificate of the proposed installation, among others.

Each complete mast or tower must have a name plate firmly attached to each of its legs, showing name, address including owner’s telephone numbers, and permit number issued by NCC for erection of the mast at the station. In addition, it will give antenna particulars of date of erection, height, number of antenna, among others. NCC recommends that a log book showing inspection dates and types of inspection performed must be displayed.

Siting of telecommunications towers and masts must be based on minimizing their number, protecting and promoting public safety and mitigating the adverse visual impacts on the community while promoting the provision of telecommunications services to the public. To this end, the following environmental requirements are considered:

i) Height: The maximum height of 150 meters (492 ft) may be approved for telecommunications towers/masts in Nigeria. NCC may approve a tower higher than 150 meters provided the increased height will not be detrimental to public safety, health and general welfare of the neighbourhood. The height should be in conformity with the intent and purpose of the planning of the area and the general plan of the community.

ii) Setbacks and Service Space: All telecommunications towers, their guys and guy anchors shall be located within buildable (coverage) area of the property and not within the front, rear or side building setbacks. Towers in excess of 150 meters in height should be set a minimum of 50 meters from the right-
of-way of all controlled access, as well as federal and state roadways. The implication of these setback standards is that no towers/masts should be located any distance where it would fall on and damage adjacent property. For instance, telecommunications towers above 25 meters in height are not permitted in residential neighbourhoods. Where they are allowed by exception, they must be located at a minimum ratio of 3 to 1 distance to height to the nearest residential property.

State governments in Nigeria are complementing the efforts of NCC in enacting laws to checkmate the environmental consequences of indiscriminate location of telecommunications masts or towers in the country. For instance, Enugu State Government through the Ministry of Environment has promulgated a law for all GSM operators to conduct an Environmental Impact Assessment (E.I.A.) before any new mast/base station is constructed. For the existing ones, there will be Environmental Audit to determine their level of compliance with statutory regulation (Onu, 2005).

However, it was observed that some service providers' circumvention of these laws has often led to indiscriminate location of towers or masts in Nigerian cities like Enugu. According to Onu (2005), the indiscriminate siting and mounting of masts/base stations by the operating companies across residential, commercial and industrial layouts run counter to zoning laws under the Town Planning regulations in Enugu State.

The Study Area
Enugu is the capital city of Enugu State. It lies between latitudes of 6°27'N and 7°28'N and longitudes 7°30'E and 8°19'E. Enugu urban covers a land area of about 72.8 square kilometres and it is located at the foot of the Udi Escarpment.

Enugu urban is made up of three Local Government Areas (L.G.A.s); namely: Enugu North, Enugu East and Enugu South Local Government Areas for the purpose of planning and development control functions (see Fig. 1). Fig. 2 shows the Study Area—Enugu South Local Government. Enugu is mainly inhabited by the Ibos. However, due to rapid urbanisation and subsequent influx of people from across the country into the city, its population has been on the increase in the last three decades. The 2006 census put the population of Enugu at 733,664 (National Population Commission, 2006). At present, the population is projected to be over one million people.

The annual temperature of Enugu is about 30.8°C. The relative humidity fluctuates between 40 and 80 per cent. Enugu has rainy and dry seasons like other cities in Nigeria. The rainy season usually lasts from April to November with a short break in August. The dry season is between December and March.
Figure 1: Map of Enugu State Showing the Study Area
NB: Swap the words "WEST" and "NORTH" on the map.
Source: Great Enugu People’s Movement Organisation, 2008

The soil is predominantly reddish brown in colour. The underlying rock has a high load bearing capacity which is suitable for building construction. The soil is a coal rich formation known as the lower coal measures. The vegetation is principally guinea savannah as it is characterized by deciduous trees and grasses.
Figure 2: Map of Enugu South Local Government Area.
Source: Researcher’s Lab, 2014.

Methodology
Enugu South Local Government Area (the case study) consists of nine residential layouts serviced by three major service providers – MTN, Glo and Airtel. The L.G.A. has a total of 29 existing telecommunications base stations/masts located across the layouts. For the purpose of this study, 8 existing base stations/masts were selected, by simple random sampling.

Data Analysis
A null hypothesis was postulated for the study. It states that there is no significant difference between NCC guidelines for erection of base stations/masts and the observed specifications of the existing base stations/masts (as measured by setback to buildings, height of fence and mast-to-mast spacing) in Enugu South L.G.A. Tables 1, 2, and 3 show the two variables used in the test. These are NCC guidelines for erection of base stations/masts (Y) and the specifications of the existing base stations/masts (X) as measured by the setback from buildings, height of fence and mast-to-mast spacing. T-test technique was used to test the hypothesis.
Table 1: Setback of Masts to Residence in Enugu South L.G.A.

<table>
<thead>
<tr>
<th>Existing base station</th>
<th>NCC approved standard</th>
<th>Observed Setbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police College (Uwani L/out) to residence (Uwani L/out)</td>
<td>10 m</td>
<td>4 m</td>
</tr>
<tr>
<td>50 Zik Avenue (Uwani L/out) to residence (Uwani L/out)</td>
<td>10 m</td>
<td>6 m</td>
</tr>
<tr>
<td>50 Zik Avenue (Uwani L/out) to residence (Uwani L/out)</td>
<td>10 m</td>
<td>4.5 m</td>
</tr>
<tr>
<td>Police Station (Uwani L/out) to residence (Uwani L/out)</td>
<td>10 m</td>
<td>3 m</td>
</tr>
<tr>
<td>Ugwuaji Rd. (Maryland L/out) to residence (Maryland L/out)</td>
<td>10 m</td>
<td>12 m</td>
</tr>
<tr>
<td>Prince Okam (Maryland L/out) to residence (Maryland L/out)</td>
<td>10 m</td>
<td>8 m</td>
</tr>
<tr>
<td>Kenneth Street (Awk. L/out) to residence (Awk. L/out)</td>
<td>10 m</td>
<td>4 m</td>
</tr>
<tr>
<td>Real Estate (Uwani L/out) to residence (Uwani L/out)</td>
<td>10 m</td>
<td>18.3 m</td>
</tr>
</tbody>
</table>

Source: Researcher’s fieldwork, 2011

Table 2: Setback to Fencing Height in Enugu South L.G.A.

<table>
<thead>
<tr>
<th>Existing base station</th>
<th>NCC approved standard</th>
<th>Observed Setbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Police College (Uwani L/out) to fence (Uwani L/out)</td>
<td>1.8 m</td>
<td>2.4 m</td>
</tr>
<tr>
<td>50 Zik Avenue (Uwani L/out) to fence (Uwani L/out)</td>
<td>1.8 m</td>
<td>2.4 m</td>
</tr>
<tr>
<td>50 Zik Avenue (Uwani L/out) to fence (Uwani L/out)</td>
<td>1.8 m</td>
<td>2.0 m</td>
</tr>
<tr>
<td>Police Station (Uwani L/out) to fence (Uwani L/out)</td>
<td>1.8 m</td>
<td>2.4 m</td>
</tr>
<tr>
<td>Ugwuaji Rd. (Maryland L/out) to fence (Maryland L/out)</td>
<td>1.8 m</td>
<td>2.4 m</td>
</tr>
<tr>
<td>Prince Okam (Maryland L/out) to fence (Maryland L/out)</td>
<td>1.8 m</td>
<td>2.4 m</td>
</tr>
<tr>
<td>Kenneth Street (Awk. L/out) to fence (Awk. L/out)</td>
<td>1.8 m</td>
<td>2.0 m</td>
</tr>
<tr>
<td>Real Estate (Uwani L/out) to fence (Uwani L/out)</td>
<td>1.8 m</td>
<td>2.0 m</td>
</tr>
</tbody>
</table>

Source: Researcher’s fieldwork, 2011
Table 3: Mast to Mast Spacing in Enugu South L.G.A.

<table>
<thead>
<tr>
<th>Existing base station</th>
<th>NCC approved standard</th>
<th>Observed Setbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1,000 m (1 Kilometre)</td>
<td></td>
</tr>
<tr>
<td>MTN mast Police College (Uwani L/out) to Airtel mast at (Uwani L/out)</td>
<td>1,000 m</td>
<td>1,040 m</td>
</tr>
<tr>
<td>MTN 50 Zik Avenue (Uwani L/out) to MTN mast at (Uwani L/out)</td>
<td>1,000 m</td>
<td>40 m</td>
</tr>
<tr>
<td>MTN 50 Zik Avenue (Uwani L/out) to GLO mast at (Uwani L/out)</td>
<td>1,000 m</td>
<td>40 m</td>
</tr>
<tr>
<td>MTN Police Station (Uwani L/out) to MTN mast at (Uwani L/out)</td>
<td>1,000 m</td>
<td>400 m</td>
</tr>
<tr>
<td>MTN Ugwuaji Rd. (Maryland L/out) to MTN mast at (Maryland L/out)</td>
<td>1,000 m</td>
<td>300 m</td>
</tr>
<tr>
<td>MTN Prince Okam (Maryland L/out) to GLO mast at (Maryland L/out)</td>
<td>1,000 m</td>
<td>300 m</td>
</tr>
<tr>
<td>MTN Kenneth Street (Awk. L/out) to GLO mast at (Awk. L/out)</td>
<td>1,000 m</td>
<td>1,040 m</td>
</tr>
<tr>
<td>MTN Real Estate (Uwani L/out) to Airtel mast at (Uwani L/out)</td>
<td>1,000 m</td>
<td>1,030 m</td>
</tr>
</tbody>
</table>

Source: Researcher's fieldwork, 2011

Interpretation of Result and Finding

The result of the test suggests that there is significant difference between NCC guidelines for erecting telecommunications base stations/masts and the observed specifications of the existing base stations/masts in Enugu South L.G.A. The statistical proof indicates that since T-significant level is less than the level of significance at 0.05 with T value of 4.45, the null hypothesis is therefore rejected. The result implies that the service providers are not effectively complying with the NCC guidelines and the Town Planning regulations on proper location of base stations/masts in the study area. For instance, Table 1 shows that the NCC approved setback standard for mast location is 10 metres. However, apart from the masts located at Ugwuaji road in Maryland Layout and Real Housing Estate in Uwani Layout, the rest contravened the setback standards. In Table 2, the NCC approved standard for setback to fencing height is 1.8 metres while the observed setback shows that all the sampled existing base stations contravened the NCC standard. Similarly, in Table 3, the NCC guideline for mast-to-mast spacing is 1 kilometre. However, with the exception of masts located at Police College, Kenneth Street and Real Housing Estate, others contravened the NCC guidelines (see plate 2). Plates 1, and 3-4 show locations of other masts in the study area. It therefore, means that most of the existing base stations/masts in Enugu South L.G.A. have violated NCC guidelines for location. Among the prominent factors responsible for the problem is high level of non-compliance with NCC guidelines by the service providers.
Plate 1: Mast located close to residence at Akpo Street, Achara Layout, Enugu

Source: Researchers’ fieldwork, 2013

Plate 2: Masts located very close to electricity pole at Metu Street, Achara Layout, Enugu

Source: Researchers’ fieldwork, 2013
Plate 3: Masts located close to Residence and School at Umubie Street Achara layout Enugu

Source: Researchers' fieldwork, 2013

Plate 4: Masts located close to electricity cables at Ngolaba Street, Achara layout, Enugu

Source: Researchers' fieldwork, 2013
Recommendations and Conclusion

The study showed that high level of service providers' non-compliance has led to indiscriminate location of telecommunications base stations or masts in Enugu South L.G.A. The consequences are deleterious to the dwellers and aesthetic quality of the area. In an era of sustainable development and globalisation, there is the urgent need to evolve workable physical development measures, aimed at ensuring harmonious relationship within and between land uses in Nigerian cities. It is in realization of this aim that the following recommendations are made: Today, many existing base stations and masts in the study area do not meet the setback standards set by NCC. To redress this problem, NCC should collaborate with the Town Planning Authorities since these Authorities are concerned with the location of public utilities without conflicting with other existing or planned land uses. Besides, town planners are empowered to enforce development control regulations that will help to checkmate service providers' circumvention of the stipulated guidelines for locating GSM masts in Nigerian cities.

The provision of adequate and modern equipment will act as a catalyst for quick and effective service delivery in telecommunications enterprise. For instance, the provision of computers, modern machine and vehicles will enable NCC officials to easily access relevant data and help the surveillance team to embark on field inspections for early detection of contraventions. Equally important is adequate funding of NCC to effectively perform their statutory functions. In a bid to have wider coverage, many service providers' compromise standards and construct GSM masts in any available incidental open spaces. In order to keep a good urban image, the NCC should encourage service providers to subscribe to co-location arrangement whereby about three providers can share one structure for location of their masts. The structural and technical requirements of installing and constructing base stations or masts must conform to professional Civil Engineering specifications. This is to avoid collapse of masts due to violent wind and improper construction work. Furthermore, NCC with the assistance of the Federal Ministry of Environment should enact planning law for all GSM operators to conduct an Environmental Impact Assessment (E.I.A.) before any new mast is constructed. This is to mitigate the harmful effects of improper location of masts in our cities.

Existing master plans in Nigeria did not make provisions for the location of base stations or masts, probably, because GSM telephony was introduced in the country in the last few years. We recommend that future master plans or schemes should provide for them so that development will be patterned according to complementary land uses to avoid conflict which our cities are known for.
REFERENCES


BOOK REVIEW:
HOUSING POLICY AND THE
DYNAMICS OF HOUSING
DELIVERY IN NIGERIA-LAGOS
STATE AS CASE STUDY

Author: Towry-Coker, L. (Ph.D.)
Date of Publication: 2011

Place and Publisher:
Ibadan, Makeway Publishing Limited

ISBN: 978-1-907925-17-7 (HARD BACK)
No. of Pages: 276
Price: N2,000 OR approx. USD12.12

Book Reviewers:
LAWAL, M. O. and ALIU, I. R. (Ph.D)
This book on Housing Policy and the Dynamics of Housing Delivery in Nigeria with Lagos State as Case study is a 276-page publication which is composed of nine distinctive major chapters.

The key tenets of each chapter which constitute the crux of this review are brought out in the subsequent sessions of the text.

The prolegomena chapter has provided the background to the study in which housing in Nigeria in general and Lagos state in particular has been described as an event or a situation that is a complete failure and causes embarrassment. The author, quoting Agbola (2005), regarded the situation as a “debacle”. There are so many factors that have been responsible for this state of housing which, according to the author, range from finance, collapsed structures, poor building materials, to high cost of urban land prices, unaffordable housing, and a host of other factors (p.1).

Towry-Coker (the Author) informs and shows his readers the importance of housing to national development in general and that of Lagos state in particular. In this regard, he expresses some of the problems that are associated with housing. He regarded Lagos as a “Magnetic Centre” that is attracting people from all walks of life. He observes that migration to the “economic nerve center” of the country as well as the rapid growth of Lagos over the years as causal factors of rapid urbanization. One of the consequences of this rapid urbanization is housing shortages. The rapid increase in population has not been commensurate with the provision of housing in the state. The overwhelming need and demand for housing in the State cannot be over-emphasized.

This demand for housing in the state has not been met by the supply. From the questions posed by the author (p.3), it is possible to surmise that he is more concerned and interested in the policy issues that are connected with housing in the state. Such questions as “Is there any policy framework that guides Housing in Nigeria? Secondly, if there is one, how does it operate and where? Thirdly, on what basis is the Nigerian Housing policy formulated and implemented? Is the Housing policy politically, economically and operationally feasible and visible”? These and many more are questions which the author tried to address in his book.

The various housing programmes that have been embarked upon by the various successive governments, such as the Low-cost Housing scheme, Low-Income Housing, Cooperative or Aided Self Help and the Site and Services Programmes were examined. The author was able to categorically state his problems bearing in mind what is operating in other countries of the world, most especially the developing countries vis-à-vis Nigeria where housing is seen, regarded or perceived as a welfare issue by some scholars.

The author was able to trace the historical evolution of the Lagos Executive and Development Board (LEDB) to 1928 as sequel to the bubonic plague. There was also the establishment of housing and finance houses, such as the Nigerian Building Society (NBS) established in 1956 which later metamorphosed into the Federal Mortgage Bank of Nigeria (FMBN) in 1977.

In the preamble to his book, the author informs his readers that the Land Use Decree was promulgated in March 1978 (to be precise) and the various government policies that are
concentrated on Land, funding construction and infrastructural services provision (see p.6). However, while these are key problems facing adequate housing delivery in Lagos, they are neither exhaustive nor properly resolved. He suggests that the answer or solution to the myriad of problems confronting Lagosians is through the Holistic enforcement of all policies concerning the identified problems.

The author examines Housing Policy formulation and enforcement from the socio economic and demographic perspective attributes of Lagosians. The aim and the specific objectives of the study are provided (p.7). Also, the research questions on urban policy, land policy, finance policy, and Housing policy which the author has focused his search light can also be found on p. 7. He has also stressed in his treatise that there had been an insufficiency in the number of housing units that is being provided in Lagos urban centre as a result of the teeming population and the rural–urban migration/drift.

It is most probable that as a measure of solving this problem, the Federal Government established the Federal Ministry of Urban Development and Housing (FMUDH) at the federal level and directed that its state level counterparts be established.

It is pertinent at this juncture to state that the author is particularly interested in examining the policy failure in housing – (see p.11). Similarly, it is also pertinent and fascinating to note the dexterity with which the author brought to bear as well as the statistical techniques used in the computation of his data which were obtained through the primary and secondary sources. The mean, mode, standard deviation, frequencies, percentages have been used to analyse the data that were collected from the field, (see p. 16). However on p. 14, there is no title to the table provided, to convey the message which the author is trying to convey to his numerous readers.

Chapter Two, provides insightful perspectives into some of the works that had been carried out or done in the area of housing in Nigeria, a developing country and their relevance to Towry-Coker's work. Prominent Nigerian Geographers and Housing pundits including Mabogunje (1974), Adeniyi (1972), Abiodun (1976), Agbola (2005), Onibokun (1985), Anusonwu (1982), Odumosu (1991), Hay (1990) and a host of others were mentioned and their contributions to research works on Housing in Nigeria cited. The position of the Third National Development Plan 1975-1980 on housing was extensively examined and discussed (p.21). Perhaps, this is the aspect in which the government was trying to play her role in housing, having perceived housing problems that are associated with housing shortages in some major Nigerian cities like Lagos, Benin, Kaduna, Ibadan, Kano, Warri and Ilorin. A prominent and renowned housing expert, Koenigsberger (1970), according to the author, had remarked that the problems facing housing in many developing countries were as a result of lack of the implementation of the housing policy - a fact emphasized by the author in his beautiful and fascinating treatise. In the course of the author's review of related literature, he has been able to cover the length and breadth of the gamut of literatures on housing which both the local and foreign authors had already written on the subject. Specifically, the review was done in the area of housing shortages, rent control, building materials, policies, the needs for and supply of shelter, loans and mortgage financing of
housing programmes, housing values and prices, low cost housing, housing conditions and infrastructural provision, living conditions and environmental conditions. Examples of both exotic and local researches that had been carried out by researchers were thoroughly and carefully examined. Issues on housing subsidies are strongly discussed on pages 49 through 50 with particular reference to the poor masses in the developing countries. The resultant effect of being poor is the "culture of poverty" which has been generated. Land for building by the poor has become inaccessible in most major urban centres as pointed out by the author on p.55. Most government policies have been focused on residential segregation, urban renewal and slum clearance according to the author (p.56). Most of the time, this urban renewal has been turned to be urban removal. The case of Maroko and Makoko in Lagos (1990 and 2011) are some of the urban renewal which has been turned into urban removal. Most of the time, the poor are the most affected.

Housing has been variously defined. However, the author defines housing from the physical, organic, socio-economic and socio-cultural point of view. The author made his readers to understand that housing is more than the physical shell (p. 58). He also regards housing as a symbol of prestige and status (p. 58). From the economic perspectives, housing has been regarded as an economic good which is traded or exchanged in a market. The multiplicity nature of housing definition has made the author to regard housing as being more than a "mere shelter". In a chronological order, the author demonstrates to his readers how cities have evolved in time and space. In other words, the spatial structure and arrangement of cities started or began in the early 20th century according to the author.

Such theories as the Ecological Theory as put forward by Burgess (1925), the Sector Theory as proposed by Hoyt (1939) and the Multiple Nuclei Theory propounded by Harris and Ullman (1945) were used by the author to buttress his theoretical framework.

Chapter Three examines the geographical location of Lagos State in (Figure 3.1, provided on p. 90). Here, the delimitation of the State is depicted i.e. what borders the state in the North, East, West and South and the longitudes and latitudes. The true perspective of the state can be gleaned from pp. 89-90. Lagos State is the smallest state in Nigeria, representing about 0.4% of the country's landmass. Avid readers who might be interested in more details on the Geographical location of Lagos State should consult Odumosu (1999). In this chapter, Towry-Coker (the author) refreshes the memory of his readers on the elementary geography of the state as he delves into the geology and topographical relief of the state, the climate and micro-climate of the state including elements of climate (humidity, rainfall, temperature and winds, etc) are discussed.

Apart from the geological formations and climate, the author discussed the historical background of Lagos, peoples and demography, ethnography and culture as well as the economy of the state. Lagos has been regarded as the economic nerve centre of the country, the former capital of the country before the seat of the Federal Government was moved to Abuja in 1991. Some of the infrastructural facilities provided and available in the state include water, electricity as well as the various forms of transportation in the state. Such modes of transportation include the road, rail, water and the air transportation. All these facilities can be seen
in Towy-Coker’s book (Pp. 103-112). In the penultimate section to the concluding part of chapter three, the author briefly discussed the housing situation and policies in Lagos (State). Chapter Four discusses and examines the analysis of the demographic and the socio-economic attributes of Lagosians. These include the demographic aspects of the respondents, such as age, sex, marital status and size of households. On the socio-economic aspects of the respondents, the author examines occupational, educational attainment of the respondents, income, money spent on such items, as food, school fees paid for children and saving propensity towards housing. The author made ample use of both simple percentages and pie-charts and graphs (illustrations) in presenting analysed data/information from his demographic and socio-economic attributes’ surveys.

Chapter Five provides an analysis of the National Housing Policy at different periods of time. Three phases of housing policies have been identified and recognized by the author, viz:

- The colonial housing policy (1914-1960)
- The post-colonial housing policy (1960-1985)

During the colonial period, the colonial masters were able to carve out a niche for themselves by building residential houses for themselves named the European Reservation Areas (E.R.A.) which were exclusively meant and built for the colonialists. Some of these residential houses can be found in Ikeja, Ikoyi and Apapa. Upon the departure of the colonialists, these houses were renamed Government Reservation Areas (G.R.A.’s) and transferred to the indigenes or the native Nigerian officers like the Super-Permanent Secretaries, Ministers, Commissioners, Police Officers and Captains of industries, upon the country’s attaining independence in 1960. Apart from the E.R.A.’s built for the colonialists, the Lagos Executive Development Board (LEDB) was established in 1928 sequel to the bubonic plague which broke out as a result of the unsanitary condition of the city, as rightly pointed out by the author. The author pointed out that in 1956, the Nigerian Building Society (NBS) was established as the pioneer mortgage institution to provide loans for housing construction. The African Staff Housing Fund (ASHF) was established to encourage Nigerian civil servants to possess their own houses. Similarly the Western Region Housing Corporation (WRHC) was established, Eastern Region Housing Corporation (ERHC) and the Northern Region Housing Corporation (NRHC). As the author pointed out, all these housing policies were not directed at meeting the housing needs of Nigerians but to suit their own purpose.

The Post Colonial Policy (1960-1985) Phase: This period witnessed the various National Development Plans which were five-year development plans. These Plans development plans were the First National Development Plan (1962-1968); the Second National Development Plan (1970-1975); the Third National Development Plan (1975-1980) and the Fourth National Development Plan (1980-1985) as well as the three-year Rolling Plans of (1985-1999) which the author did not mention. The author narrated that “all but the last two Development Plans (five year plans) paid little or no attention to the housing sector”. Towy-Coker (the author) recognizes that “the first sectorial development plan treated the housing sector with incredible levity and a sense of absolute neglect” quoted from Koenigsberger (1970: 137), and Adedibu,
1984:51-68). The country witnessed the civil war which lasted for three years (1967-1970). The author agreed that the housing situation during this period “deteriorated particularly in the war-affected areas as resources were deployed to the execution of the war and the defence sector received the lion’s share of every sectorial allocation henceforth. In fact, the period between 1960 and 1970 could be described as the time of inactivity a sort of hiatus, except for activity of the organized private sector” (Towry-Coker, 2011:137).

Immediately after the war, in 1971, to be precise, the National Council on Housing was established, comprising all State Commissioners responsible for housing. The Federal Government intervened significantly in the provision of housing for the poor. During the second National Development Plan (1970-1975), the Federal Government, according to the author, proposed to build 59,000 housing units with 15,000 in Lagos and 4,000 in each of the other eleven state capitals. In 1973, the Federal Housing Authority (FHA) was established to provide a stronger focus to the public housing scheme. The third National Development Plan (1975-1980) was a radical departure from the earlier two Development Plans, as it gave an unprecedented priority to the housing sector. The objective of the plan regarding housing involved more direct participation of governments in the provision of housing. The author observes the radical changes that took place between 1979 and 1983, when the civilian government took over the administration of the state and the government’s efforts to the construction and provision of low-cost housing units that are strategically constructed in the nooks and crannies of the State by Alhaji Lateef Kayode Jakande, the then civilian governor of Lagos State.


The contemporary National Housing Policy represents the third phase of housing policies. In this regard, Towry-Coker presents two policy drafts (the 1991 and 2003) National Housing Policies. The National Housing Policy Goal and Objectives can be gleaned on pages 139 through 144. The specific objectives of the National Housing Policy are succinctly presented on p. 140. The strategies and stratagems of achieving these aims and objectives are summarized or epitomized on pp. 141 and 142. These objectives are quite comprehensive but inerhaustive. The government has a major role to play in the successful achievement of the National Housing Policy as observed by the author on p. 141.

A call has been made for the:
- Establishment of the Ministry of Housing and Urban Development through which housing issues could receive priority.
- Empowerment of the financial system for housing delivery and;
- Re-organization of the building industry to give better service in housing provision.

Apart from the Federal Ministry of Housing and Urban Development, the States and the Local Government also have their respective ministries of housing and works department at their levels. The Federal Housing Authority (FHA) was transformed into the Festival of Arts and Culture (FESTAC) that was organized in 1977. The functions of the state and local governments are explicitly spelt out on pp. 148-149. Emphasis was made on the provision of funds through financial houses such as the Federal Mortgage Bank of Nigeria (FMBN) which was an off-shoot of the Nigerian Building Society (NBS). The functions of the private sector participation
(PSP) and the Primary Mortgage Institutions (PMIs), building societies, thrift and credit societies, co-operative societies and a host of other societies that could contribute immensely to the construction of houses for the inhabitants of Lagos.

The importance of land as one of the factors of production cannot be over-emphasized. It is a fixed asset and commands values and respect among the various ethnic groups in Nigeria in particular and among Africans in general. Land is owned by the community both living and the dead. However, the advent of the colonialists brought in the commercialization of land. The Land Use Decree of March 29, 1978 vested land in the hands of the Governor in which an individual who wants to build is entitled to one and a half hectare (in the urban area), farming/cropping 500ha. and grazing, 5,000ha. (in the rural area) (see Flyod and Sule; 1979: 52-54), (Ola; 1984: 60-62). The Land Use Decree has been criticized by Nkah (2013) as it is not serving its purpose, and so it should be repealed. Our concern in this review is to focus on the role of land in housing construction. An allusion has been made into the housing finance in which both the mortgage housing finance and the National Housing Fund (NHF) are enumerated"(pp. 152-157), as well as the Primary Mortgage Institutions (PMIs), building materials and construction cost/and the Low Income Housing Scheme. The policy on the Low Income Housing is made to provide shelter for the low-income groups.

Of paramount interest in this work is the author’s consideration of both the urban and rural housing. More often than not, researchers often focus their research interest on urban housing while the rural housing is being neglected. Kudos to Towy-Coker on this write-up (though brief) on rural housing (pp. 162-164). The discussion on the Private Sector Participation (PSP), both formal and informal, has been tremendous, as this sector has been able to provide or contribute about 90% of the housing needs of the people. Within this framework are the various Non-Governmental Organizations (NGOs) and the Community Based Organizations (CBOs). This can be found on p. 167 while the Monitoring and Evaluation of the policy can be gleaned on pp. 169-170. The monitoring and evaluation of the policy are very important and crucial to housing provision in any society.

Chapter Six presents the authors analysis of and discusses the housing survey outcome on housing delivery in Lagos. In this chapter, the author has made use of simple percentages to express his thoughts and ideas which he put forward when administering his questionnaire on the subjects of the study. Housing characteristics, house ownership and security of tenure, house ownership/Tenancy according to Gender, housing type and occupancy ratio analyses are presented in tabular manner. Some hypothesis were tested, both the (null and alternative) the first hypothesis states “that there is a significant association between the respondent’s income and housing status as $X_2 = 1419.87$ was found to be greater than the tabulated value of $X_2 = 37.57$. The second hypothesis states that the educational attainment of respondents determine their housing status thereby invalidating the null hypothesis; the calculated $X_2 = 1030.53$ was greater than the tabulated value of $X_2 = 20.09$. the ANOVA analysis was employed to determine the variation between the performances of LCHS,SAS and ASH show that there is no significant variation between the three programmes and in fact, none of them had really improved the housing situation in Lagos overtime. This was buttressed by the $F(0.05=1.5$
which was significantly less than the tabulated value F=4.6 at 0.05 alpha level. Those has led to the acceptance of the null hypothesis which states that there is no significant variation in the three programmes in Lagos state (see p. x). In testing these hypothesis, chi-square X² were used to test the validity of these hypotheses. For details, reference is hereby made to tables 6.4 and 6.5 on pp. 178-179. Other analyses carried out include those on house rentals and mode of payment, occupancy ratio in each locality, house rent paid by respondents in Lagos, mode of rent payment by residents as well as housing amenities, infrastructure and facilities provision as can be seen in table 6.10. the house material quality and neighbourhood conviviality. The percentage composition of the material types used in housing construction is presented in table 6.11, based on the author's survey that had been carried out in 2004. Table 6.12 shows, the percentages of those houses that have available Parking Space and those houses without Parking Space. The need for providing adequate parking space has been stressed by the author.

Chapter Seven concentrates on Government policy and the Dynamics of Housing delivery in Lagos. Specifically, the chapter examines the role of various governments, both Federal and State, in the provision of housing in the state. The author looked into government housing programmes and its evaluation most especially the Low-Cost Housing Scheme (LCHS). The efforts of the governments in providing houses for the poor masses cannot be over-emphasized. In this section, the author devoted some attention to the provision of Sites and Services Schemes in which the Government would provide such services as electricity, pipe-borne water, roads and a host of other services on planned housing layout before allocation to applicants. What is now left is for the (prospective) landlord or allottees to build on his/her land since those services have already been provided.

Another important programme that people have embarked upon is the Aided Self-Help Housing (ASH) and Cooperatives in which members contributes certain amount of money and receives loans on a rotational basis which the author called ESUSU (in Yoruba language). This idea can be likened to a popular saying that "you scratch my back and I scratch your back". Details of the author's rating of this programme is contained in table 7.3 p. 197. The author was able to make use of the Analysis of Variance (ANOVA) to make a comparative evaluation of government housing programmes and also tested the hypotheses that had been put forward. Pp. 198-200. Such housing programmes include the Aided Self-Help Housing (ASH), Low-Cost Housing Scheme (LCHS) and Sites and Services Programme (SAS). This chapter equally focuses on housing finance, mortgages and loans. Also, the issues of high cost of building materials, high cost of construction and the land factor, method of acquisition are treated. Table 7.17 shows the Prices of some building materials in Lagos. It should be noted, however, that these prices have continued to rise from time to time. In other words, the prices of these materials are not stable as they continue to fluctuate. For instance, the current price of cement is about N1,800.00 (One Thousand Eight Hundred Naira) per bag of 50kg, as against N2,000.00 (Two Thousand Naira) in 2011-2012. This applies to other housing materials.

Chapter Eight examines the Architectural building designs, building codes, as well as the Town Planning standards in the state. The
author aptly explains to the readers the relationships that exist between man and his environment in terms of various material components that are being used in housing construction in the traditional housing system as well as in modern day housing system. He cites Onibokun (1985) who referred his readers to the use of Adobe in which mud mixed with straw is dried in the sun and used as a building material. The author’s emphasis here is the traditional/indigenous housing system. The contemporary building design standards; The importance of standards in the contemporary building construction/developments cannot be over-stressed. Yet there is a limit to which a developing country like Nigeria can go bearing in mind “this age of reckless influences of globalization, the developing world is still under the influence of western cultural shows and housing standards – it is in fact caught between two civilization” – (p. 229). The author concludes in this chapter by saying that “standard codes for housing construction in the state are available but the issues of non-compliance is the major obstacle or barrier” p. 233.

Chapter Nine provides a conclusion to the book by summarizing all what had been written from chapters One-Eight. Essentially, the chapter examines the Low Cost Housing scheme, Occupancy ratio, Aided Self-Help Scheme, the Mortgage Scheme house rental. The author, again observe that amenities and necessary facilities provision in these houses are lacking or even not provided in most houses in Lagos State – some of these facilities that are lacking include pipe-borne water, electricity, drainage and a host of others. The author looked into materials that are used in housing construction. The implication of all this is that, the housing condition in Lagos is not only quantitatively but also qualitatively. Towry-Coker did lose focus on housing policies which he has continued to emphasize in his work. He also observed that the Low Cost Housing Scheme (L.C.H.S) has never met its target as many of the low-income earners are precluded from benefiting. He was able to identify the problem of funding in the housing sector.

Again, the author regards the housing sector as a market and also defines the housing policy objectives. He recommends that there should be provision of affordable housing to all Nigerians. He also recommends that there should be both Public and Private Participation Strategy (PPPS) and Housing database Bureau (HDB). The author called for the review of land policy and also suggested that data on housing should be made available as contained on p. 243. He finally recommended that there should be integration of the entire housing sector into the general economy.

The appendix section covers about eight pages that summarises the research Hypotheses (pp. 246-253). The copy of the field survey questionnaires are on pages 254-257. The notes about the authors that are consulted are contained on pages 258-263.

OUR OBSERVAITONS AND COMMENTS ABOUT THE BOOK
Our Observations and comments about the book include the few spelling mistakes that dotted the book. For instance, on p. 18, Onibokun was spelt as “Onibukun” under the literature review paragraph 1 line 2. Another error in the spelling of Onibokun can also be seen in paragraph 3 line 1. There is another lacuna on p. 23 line 5. On p. 25, Nkalagu was spelt “Ukalaga” paragraph 2, line 13. On p. 30, line 8, the author referred to the Land Use
Decree/Act of “1980”, as opposed to the Land Use Decree of 1978. (see Floyd and Sule 1979). The same mention of Land Use Act was also referred to as “1980” whereby the author said “In Nigeria, the Land Use Act “1980”, has been the land control and regulatory policy p. 43 lines 10-11”. On p.67, ‘The interaction between the supply, demand and the market itself creates the third component of the tripartite arrangement which is termed Housing outcomes – p.67. The title to this figure should come below the figure and not above the figure. Figure 2.1: A Mode of Housing Market; p. 67; Figure 2.2: The Concentric Circle Theory as proposed by E.W. Burgess. Ditto to figure 2.3: The Sector Model by (Homer Hoyt 1939); p. 80. The title to the figure should be brought below the figure. Ditto to figure 2.4: The Multiple Nuclei Theory (Harris, C.D. and E.L. Ullman (1945); p. 82L, Figure 3.1: Map of Nigeria showing Lagos State; p. 90, Figure 3.2: Map of Lagos State showing the Local Government Areas; Figure 3.3: Map of Lagos showing waterways, p. 110; Figure 4.1: Gender distribution of respondents p. 120, Pie-Chart; Figure 4.2: Distribution of respondents according to Religion (p. 123); Figure 4.3: Place of Origin pp. 124- the bar graph should be under the figure. On p. 155, some information on the upper part of this page is conspicuously missing and so the message which the author was trying to convey could not be conveyed to his numerous readers. Figure 6.1: House Ownership/Tenancy in Lagos (p. 173) - the heading should be below the pie-chart. Fig. 8.1: A typical Traditional House in Nigeria, should be regarded as Plates 8.1 & 8.2 and place the titles to these Plates below them.

We expect and wish the author would have been able to inform his numerous readers where within Lagos can we locate/find the Central Business District (CBD), e.g. The Tinubu area of Lagos Island would have served as the CBD, while such areas as Ebute-Metta would have been regarded as the ghetto. The high income/workmen zone can be found in places like Ikoyi and Victoria Island. In the Sector Theory, we can liken the CBD here to Ikeja and the industrial areas of Ikeja where we can have the wholesale Light Manufacturing, the G.R.A. representing the high class residential etc. Ditto to the Multiple Nuclei Theory. Perhaps, the author could have shown us where each of this sector really falls into in the State. The aspect on rural housing is very scanty. Most often than not, researchers focus their attention on urban housing with little consideration to rural housing.

The above shortcomings, not withstanding, the language of expression in this book is simple, lucid and easy to comprehend even by a layman in the area of housing. The author has been able to communicate his thoughts and ideas to his numerous readers and admirers. We are, therefore, recommending this book to both students and teachers of housing, housing policy makers, and housing suppliers, etc. The post-graduate students in housing would find the book to be very educative, informative and interesting, more so that the book delved into the policy aspect of housing. The book is, in fact, recommended to all and sundry. “The taste of the pudding is always in the eating”.

VOLUME XXIII, NO. 1
MARCH, 2014
NOTES


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JOURNAL OF THE NIGERIAN INSTITUTE OF TOWN PLANNERS (JNITP)

Urban and regional planning is the veritable tool for the planning, development and management of land/space and all other environmental resource as well as the protection and enhancement of the natural environment in a sustainable manner. Given the centrality of planning in defining the growth and development of urban and regional space, the centrality of research in planning cannot be over-emphasised.

The Journal of the Nigerian Institute of Town Planners (JNITP) is a peer-reviewed and professional journal. It is intended to help better underscore the problems arising from unplanned growth in human settlements, regional development disparities as well as how implementing better planning can help human settlements and regions to create and support continuous and equitable growth for present and future generations. Today, half of the world's people live in towns and cities, and in the near future, two-thirds of the global population will be urban.

The main challenges confronting cities, towns, and regions across the world today include unemployment, social and economic inequalities, unsustainable energy consumption patterns, urban sprawl and housing shortage, slums, technological and natural disasters, inadequate urban basic services (water, sanitation, energy), poor mobility systems and increasing emissions of greenhouse gases and so on. Tackling these problems and turning the ideals of sustainable, inclusive human settlements and regions into reality makes the role of research more visible. The Journal of Nigerian Institute of Town Planners (NITP) shines the spotlight on this role that planned development plays in the long-term sustainability of urban, rural and regional space. The scope issues covered by the journal include:

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