LAND POLICY GOVERNANCE AND SUSTAINABLE DEVELOPMENT IN NIGERIA (A Book of Readings)

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CENTRE FOR HUMAN SETTLEMENTS AND URBAN DEVELOPMENT
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA

BOOK of READINGS

THEME:
LAND POLICY GOVERNANCE & SUSTAINABLE DEVELOPMENT IN NIGERIA

EDITED BY

- **Prof. Muhammad Bashar Nuhu, FNIVS**
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LAND POLICYGOVERNANCE AND SUSTAINABLE DEVELOPMENT IN NIGERIA

(A Book of Readings)

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Foreword

Most human activities take place on land. Given the finite nature of this natural resource, it is imperative that land policies put in place by governments and other relevant authorities provide for equitable access to and sustainable management of land resources. The theme of this book, "Land Policy Governance and Sustainable Development", is therefore apt and well thought out to promote academic discourse (SDGs). Goal Number Eleven is to 'make Cities and Human Settlements Inclusive, Safe, Resilient and Sustainable'.

The book explores the various elements of land governance with their contemporary challenges and include land access and management, urban growth and sprawl development, resilience and infrastructure. It also provides an insight into competing land uses in the face of urbanization and the nexus between urbanisation, poverty and security, as well as the implication of climate change on health and property values.

It is the general expectation that the issues covered in the fourteen chapters of the book will in no small measure be useful to policy makers, academics and students. It certainly should add to the body of knowledge for further research in the built environment.

One of the core mandates of the Centre for Human Settlements and Urban Development (CHSUD) is to provide capacity building in urban governance and urban development. This book of readings, is therefore, consistent with the Centre's areas of focus and its publication is quite commendable. It is hoped that the Centre will continue to work towards knowledge generation, dissemination and application that would enhance sustainable human settlements and human development. I recommend this book to academics, students and other professionals within the built environment.

Professor Abdullahi Bala
Vice-Chancellor
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May, 2019

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We also appreciate the contributions of our colleagues in the Department of Estate Management and Valuation, Federal University of Technology, Minna for the moral and technical support. We commend the efforts of some of our colleagues from the other departments in the School of Environmental Technology F.U.T Minna for their insightful contributions towards the success of the book.

We wish to state here that all views expressed in each chapter of this book are entirely those of the contributors of such chapters and does not represent that of the editors and that of CHSUD.

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RURAL LAND MANAGEMENT IN NIGERIA: LESSONS FROM THE UK

By
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Abstract
This paper examines rural land management in Nigeria and lessons that may be learnt from the UK experience. Using the British Crown Estate, the paper argues that the management of rural estates can make enormous contributions to Nigeria's gross domestic product (GDP) and by extension, its economic development. The paper therefore opined that estate surveyors and valuers can take up opportunities in rural land management to facilitate Nigeria's economic development. It concludes that estate management curriculum in higher institutions be expanded for training of rural estate surveyors and valuers. It recommends that the Nigerian Institution of Estate Surveyors and Valuers (NIESV) and the Estate Surveyors registration Board (ESVARBON) must re-strategize to encourage rural land management surveyors.
Keywords: *Rural land management, Economic development, Prospects, Opportunities, Nigeria*

1.0   Introduction

Nigeria's economic development has been at the centre stage particularly since the days of Goodluck Jonathan's government when Nigeria was declared the largest economy in Africa in April 2014 (BBC.com). It overtook the economy of South Africa that was occupying that position. Many issues have arisen in the country over this stance given its high poverty rate, low level security, high unemployment rate, high underemployment level and various companies have closed shop due to low capacity utilization. Oyakhilomen and Zibah (2014) had remarked that "despite the growth of the Nigerian economy, poverty was still on the increase which called for a shift from the monolithic oil-based economy to a more plural one with agriculture as the lead sector".

Nigeria's economic development must, however, be viewed from the perspective of economic growth. The former term embraces the latter which is usually measured by an increase in a country's gross domestic product (GDP). Economic development is also conceptualized as an increase in real per capita income over time. For instance, in 2014, the per capita income of Nigeria was US$ 6,200, US$ 6,200 (in 2015) and US$ 5,900 (in 2016). In Ghana, it was US$ 4,400 (in 2016) while in South Africa, it was US$ 13,400 (2017 est.). See CIA (2017). Thus, Nigeria's economic development must be juxtaposed with increase in the living standards or increase in quality of life of Nigerians. This can precisely be done using the human development index (HDI) which is an economic concept that considers intrinsic personal factors such as life expectancy,

poverty rate and literacy rate. Consequently, two countries with varying per capita incomes as shown above may not necessarily prove that country A with a higher per capita income is more developed than country B with a lower per capita income. Nigeria's economic development is still a major concern as it is constrained by inadequate infrastructure, inadequate electricity, lack of rural land management and many other factors. This is because a lot of the world's population particularly in the developing countries is located in the rural areas. Schaltegger (2013) noted that out of the two billion poorest people, three quarters live in rural areas. He further averred that many who live in cities are migrant workers and farmers who left rural areas. Thus, if living standards and income generations in rural areas are enhanced, rural immigrants will return to rural areas. Land management involves socio-economic plans which can lead to developments of both urban and rural areas. Thus, the development of rural areas will increase agricultural production and productivity and according to Mehmet *et al.* (2003), this will lead to new job opportunities, raise revenue per person and prevent rural-urban migration. Bello *et al.* (2015) also opined that developing the rural areas will enhance national income as most of the resources including crude oil are tapped in the rural areas.

Rural land management is synonymous with rural property management which may be defined as a land zoned for human activities in less densely populated areas other than towns and cities. It may be agriculture or farming community and in the developed societies, it is a community consisting of a farm for growing crops and trees, farm houses for livestock and implements and residential properties for farm workers. Thus, rural properties may include farms, ranches, land and homes with heavy equipment and livestock. The question that arises therefore is what are the prospects and opportunities in rural property management? Both terms; prospect and opportunity, connote a favourable juncture of circumstances or a good chance for advancement or progress. Recourse to the rural sector is all the more important today as the price of crude oil plummeted drastically from an all high US$100-US$150 per barrel to the current US$70 per barrel (Vanguard Newspaper, 2018). The price has no doubt improved considerably as it was below US$35 per barrel in mid-2015.

Rural land management encompasses agriculture policy, forestry, commodity prices, climate change and the hitherto unknown driver, estate surveyors and valuers (ESVs). The ESV is one who by his training and experience is a corporate member of the Nigerian Institution of Estate Surveyors and Valuers (NIESV), registered and empowered by the Estate Surveyors Registration Board of Nigeria (ESVARBON) to practice estate surveying and valuation in Nigeria. Rural land management is, therefore, a concept of rural practice of estate surveyors and valuers or professionals interested in managing countryside properties in a business context such as agribusiness, finance, farm management, farm implements, planning and development, compensation, valuation and ensuing statutory matters. In a wider sense, rural land use can involve agricultural land, arable land, pasture land, urban and mixed

uses. Table 1 shows the situation of land use in Nigeria. Arokoyo (2012, as quoted by Oyakhilomen and Zibah, 2014) had noted that Nigeria was a vast agricultural economy endowed with substantial natural resources to include 68 million hectares of arable land,

fresh water resources covering about 12 million hectares, 960 kilometers of coastline and ecological diversity. Furthermore, they established that agricultural production was positively related to economic growth in Nigeria.

Table 1: Land Use in Nigeria

	% Land Use
Agricultural land	78 (2011 est.)
*Arable land	37.3 (2011 est.)
**Permanent crops	7.4 (2011 est.)
***Permanent pasture	33.3 (2011 est.)
Forest	9.5 (2011 est.)
***Other	12.5 (2011 est.)

*Land cultivated for crops like wheat, maize and rice that are replanted after each harvest. ** Land cultivated for crops like citrus, coffee and rubber but not replanted after each harvest. ***Any land not arable or under permanent crops. It includes permanent meadows and pastures, forests and woodlands built on areas, roads, barren land etc.

Source: CIA (2017)

Agricultural contributions to Nigeria's GDP can be described as quite significant inspite of the fact that its production is not intensive and efficient and at a highly subsistence level as it is still characterized by hand tools such as cutlasses and hoes. Figure 1 is a bar chart showing the ups and downs of agricultural contribution to Nigeria's GDP. The years preceding and upto the first quarter of 2010 recorded low rates of agricultural contributions to GDP but tremendous progress was made in the 3rd and 4th quarters of 2015. The low drop is undoubtedly attributed to the impact of Boko Haram terrorism and herdsmen attacks on farmers. Its contribution dropped again in the 3rd and 4th quarters of 2016 but rose considerably in the 3rd quarter of 2017 to ₦5,189,365.99 million. All these fluctuating figures show that rural land needs proper attention, particularly, of professionals such as estate surveyors and valuers. Nigeria's agriculture requires radical mechanization to build farm

complexes comprising farms, warehouses, residential houses, adequate storage facilities etc.   The current harsh economy in the country has opened a new vista for rural land management as efforts are now being directed to reviving agricultural production which was the   mainstay   of   Nigeria's   economic development prior to the coming of crude oil in 1958. It is cheering news that publicly quoted and limited liability companies are making good progress in agribusiness. It is, therefore, an opportunity for estate surveyors and valuers to key into this opening to show their expertise in the field of rural estate management. This paper therefore examines various factors militating against rural land management and highlights why ESVs who should be at the forefront of rural property management are shying away from it. Thus, the paper identifies rural land management factors that can be dealt with in order to facilitate Nigeria's economic development.

NIGERIA GDP FROM AGRICULTURE

Figure 1: Nigeria's GDP from Agriculture   Source: tradingeconomics.com/nigeria/gdp

2.0   The Concept of Rural Land Management

Land management connotes different meanings to different people. FAO (1995) termed it as land resources management which was the practice of using land by the local human population which should be sustainable. It went further to note that it was the implementation of land use planning as agreed between and with the direct participation of stakeholders. Munro-Faure (1996) noted that land management had no generally accepted international definition other than that it related to the management of land. Sue Nicholas (1994, as quoted by Munro-Faure, 1996) also opined that land was any portion of the earth over which rights of ownership, stewardship, or use may be exercised and further added that management was the process of making decisions about the allocation and use of resources to meet defined goals and objectives. He claimed that, "many, probably most, land management issues do not distinguish

significant urban, rural or other boundaries". Mabogunje (2003) on his part defined land management from the point of view of land tenure system as it affected the economic and social development of the country and noted that for government, it was an avenue for collecting revenues. A quick example is the ubiquitous Land Use Charge Law, 2001 that was a pioneering work of Lagos State government. The Law was enacted in 2001 and was said to consolidate the hitherto different land charges such as ground rent, tenement rate and development charges. This was an all-in-one land taxation policy designed by the government to raise its internally generated revenue. Land management can also be expanded to mean rural area development. Mehmet *et al.* (2003) thus, opined that land management was the process by which resources of land were put to good effect and could include farming, mineral extraction, property and estate management and the physical planning of towns and the countryside. It, therefore,

covered all activities concerned with the management of land as a resource both from an environmental and economic perspective. Mehmet *et al.* (2003) submitted that land management in sustainable development led to**:**

➢ Establishing an effective and transparent real estate market,
➢ Well-balanced urban and rural development
➢ Planning and acquisition of land for public interests.

Bello et al (2015) also aligned with rural land management when they emphasized that rural transformation in Nigeria had become imperative as it constituted the largest percentage of the Nigerian society as well as the most depressed segment. Generally, land management to the planner, connotes a planning process that would make for better utilization of land while the estate surveyor and valuer (ESV) would wish to develop techniques of land assembly that are administratively sound and financially feasible. It was on this basis, Mabogunje (2003) averred that land management was quite critical for national economic development especially for countries such as Nigeria. Emeasoba (2011) like earlier writers (such as Mushimfwa, 2002, as quoted by Emeasoba, 2011) agreed that there was no standard land management system that could be transferred wholly from one society to

another. Most of these views therefore agreed with that of Ogbuefi (1998, as quoted by Emeasoba, 2011) that land management was generally cumbersome, complicating and confusing where proper land policies were not in place. Rural land management which is a variant of land management is, therefore, a concept of rural practice of estate surveyors and valuers. That is, it is the practice of those interested in managing the countryside in a business context such as agriculture, mineral extraction, property and estate management, physical planning, diversification or general agribusiness.

3.0 The Study Areas
3.1 Nigeria

Nigeria is located in West Africa and bordered by Gulf of Guinea, Benin Republic, Niger Republic and the Cameroon. It lies at 10' 00" N and 8' 00"E with a total area of 923,768 sq. km, land area of 910,763 sq. km and water body of 13,000 sq. km. It is one of the largest sub Saharan African economies and relies heavily on oil as its main source of foreign exchange earnings and government revenue. It has the highest population among African countries at 190,632,261. It has a GDP of $1.118 trillion (2017 est.) and a per capita income of $5,900 (2017 est.) with its labour force consisting of 70% agriculture, 10% industry and 20% services (CIA, 2018). See Figure 2

Figure 2: Map of Nigeria

3.2   United Kingdom

CIA (2018) notes that the United Kingdom (UK) which is located in Western Europe has a total area of 243,610 sq. km consisting of a land area of 241,930 sq. km and water body of 1,680 sq. km.   It enjoys a temperate climate and blessed with many natural resources including coal, petroleum, natural gas and etc. The country has a population of 65,648,100, a GDP of $2.565 trillion (2016 est.)   and a per capita income of $43,600 (2017 est.). Its urban population is 83.1% of the total population while its agriculture is highly intensive, mechanized and efficient. The UK has narrowly voted to leave the European Union (EU) by March 2019. See Figure 3.

Figure 3: Locations of the Crown Estates. Source: Hodge *et al.* (2009, p. 9)

4.0   Case Study

Hodge *et al.* (2009) noted that the Crown Estate which dated back to the reign of King Edward the Confessor consisted of four components, viz, the Urban Estate made up of over 600 commercial properties and 2,600 residential properties; the Marine Estate consisting of 55% of UK's foreshore, beds of tidal rivers, estuaries and seabed of up to 12 nautical miles; the Windsor Estate covering about 6,300 hectares of land and the Rural Estate which is the main focus of this paper. Hodge *et al.* (2009) further reported that the Rural Estate which held 119,000 hectares of land was made up of 780 agricultural tenancies and 750 residential properties giving an average agricultural holding of about 150 ha per tenancy. The holdings covered agricultural lands, forests, residential and commercial properties in England, Scotland and Wales. The Crown Estate which is one of the main sources of contributions to the country's GDP is managed by the Crown Estate Commissioners through the Crown Estate Act, 1961. HCTC (2010) remarked that the Rural Estate had suffered less from severe economic downturn than the Urban Estate. It added that in 2008/2009, it accounted for £920 million or 16% of value of the Crown Estate and €26.7 million or 9% of its revenue and that, in the last 10-13 years, it had usually accounted for 10-13% of value and 8-9% of revenue.

Table 2: Turnover and values of the Crown Estate Properties

	Turnover	**Property value**
Urban Estate	£194.4m	£5.381m
Marine Estate	£41.9m	£370m
Rural Estate	£22.5m	£903m
Windsor Estate	£5.8m	£173m

Source: Hodge *et al.* (2009, p. 6)

Table 3: Land Values on the Rural Estate

	Value £ per ha
Arable	6,646
Pasture	3,975
Urban	699,293
Mixed	10,582
Total	6,255

Valuation as at 31/03/2007. **Source: Hodge *et al.* (2009, p. 8)**

On analysis, the report elucidated components of Crown Estate as shown in Table 2 but the area of main interest of this paper is the Rural Estate. Further analysis showed that Crown Estate had considerable uncertainty for future of rural land, trends of declining food prices, and liberalization of agricultural policy. The report preceded Brexit or United Kingdom leaving of the European Union in a referendum of 23/06/2016 which would obviously impact on the Estate in the years to come. The report noted that Rural Estate held 119,000 hectares of agricultural lands, forests, residential and commercial properties in England, Scotland and Wales. The predominant land use in the

rural estate being agricultural land use, this subsector is further broken down as arable, pasture, urban and mixed uses. The arable land was reported as mostly of grades 2 and 3 while there was also a significant area of grade 1 agricultural land. Analyzing further, the report identified factors that could affect the Rural Estate as environmental, technology, society, economy and politics (see Tables 3.1 to 3.5 of Hodge *et al.* 2009). In simple terms, the report opined that rural estate drivers were commodity prices, agricultural policy, climate change and forestry. It also classified types of rural land uses within the rural estate as arable, pasture, urban and mixed uses as well as graded the land uses from 1st to 5th or land values from arable (1st grade) followed by pasture, urban and mixed use as the last grade.

5.1   Land Use
Turnover and values of the Crown Estate properties are shown in Table 2 and it is seen that though Rural Estate had a 3rd ranking in turnover of £22.5m, the property value was, however, staggering at £903m indicating the highest value of the four estates. Land values within the Rural Estate block are shown in Table 3 giving a total valuation of £6,255 per ha. The report indicated that the agricultural lands were quite arable as most areas were of 2nd and 3rd grades. This implied that the high turnover of £903m for Rural Estate among the four components of the Crown Estate meant that rural estate was contributing substantially to the UK's GDP or economic development.   This agreed with HCTC (2010) remarks that the Rural Estate in the last 10 years, usually accounted for 10-13% of value of the Crown Estate or 8-9% of its

revenue.   In comparison with the Crown Estate, rural land use had not made substantial contributions to Nigeria's GDP in the years preceding and up to the first quarter of 2010 to 2017. Thus, from 2010 to 2017, there were many low values which began to rise again in the third quarter of 2017. Its contribution to GDP was neither commensurate with its 78% agricultural land use nor the dominance of agriculture in the rural areas where it was providing employment for about 70% of the work force. Most of the land is devoted to agricultural production which has always been the mainstay of Nigeria's economy since the pre-colonial times. Nigeria's agriculture is still largely subsistence without proper harnessing of available land and human resources to facilitate its contribution to the country's economic development.

5.2   Framework   for   Rural   Land Management
Currently, there is a re-birth of agricultural revolution in Nigeria. The government is harping everyday on agricultural production, thus, reverting to agriculture which was the mainstay of our economy before crude oil birthed in Oloibiri, Bayelsa State in 1956. Nigeria is waxing bigger in agricultural production and Nigerians are fast diversifying into the sector. In the 1980s, many retired military officers had large farm enterprises throughout Nigeria. Good examples included the Farm Complex of Late Major General Agbazika Innih (owner of Niger Valley Agro Industries Limited Farm Complex) in Edo State, Obasanjo Farms in Ota, Ogun State as well as other large farms as listed by Leadership Newspaper (2015) and Odudu

(2018). Many of these farms are now moribund due to poor management. It is, however, cheering news that publicly quoted and limited liability companies such as **Presco Plc** with vast oil palm plantations in Edo and Delta States and **Siat Nigeria Limited**, also, with large oil palm plantations in Rivers State are involved in tremendous agribusiness in Nigeria today. Estate surveyors and valuers are therefore significant in this agribusiness revolution. Munro-Faure (1996) noted that the knowledge and skills required to enable land and property to be successfully valued and managed were vested in the appropriate professional who advised the owner (public or private sector) on choices available. He added that the adviser must be able to present the advice clearly, concisely and competently. Odudu (2018) also averred that the estate surveyor and valuer or a firm of estate surveyors and valuers was charged with the responsibility of managing a rural estate for a fee where the owner was unable to personally attend to such management details. It is therefore time for our professional bodies and tertiary institutions offering estate management courses to fashion out courses that will build and develop the rural estate surveyor and valuer. Such courses must be recognized by NIESV and ESVARBON. Suitable examples are readily seen in courses offered in the United Kingdom and are fully recognized by the Royal Institution of Chartered Surveyors (RICS). See https://www.harper-adams.ac.uk/. These are:

- ➢ B.Sc (Hons.) Rural Enterprise and Land Management
- ➢ B.Sc (Hons.) Rural Property Management
- ➢ B.Sc (Hons.) Countryside Management
- ➢ B.Sc (Hons.) Agriculture with Farm Business Management
- ➢ B.Sc (Hons.) Countryside and environmental Management

Thus, the rural estate surveyor and valuer is trained in the management of all types of properties in the countryside; valuation of all kinds of properties, estate planning, management of farm operations, valuation and negotiation for compulsory purchase and compensation as well as feasibility and viability studies.

6.0   Conclusion and Recommendations

This paper has conceptualized that though Nigeria' per capita income was lower than those of some other African countries; it was not necessarily less developed economically compared with those other countries using the human development index (HDI). It noted the country's over dependence on crude oil sales whose price nose-dived from US$100-US$150/barrel to the current US$70/barrel. Citing the example of the British Crown Estate Properties which make enormous contributions to that country's economic development, the paper advocates that more attention should be paid to rural land management to open up the agribusiness potential and hence facilitate Nigeria's economic development. Also, estate surveyors and valuers must key into rural land management to put in the necessary professional impetus. In order for the country to achieve faster economic development, there should be special training of rural estate surveyors and valuers by expanding the

curriculum of estate management courses in the tertiary institutions and the examinations conducted by the NIESV. The NIESV and ESVARBON must also put some strategies in place that will encourage estate surveyors and valuers to go into rural land management which will undoubtedly be beneficial to Nigeria's economic development in the long run.

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THE NATURE OF LAND GRABBING IN THE PERIPHERAL AREAS OF LAGOS AND OGUN STATES

By

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Abstract
Land grabbing has become a topical issue and assumed a disturbing dimension in the global development discourse due to its obvious effects on the livelihood of vulnerable groups in third world countries. This study examines the nature of land gabbing in 15 peripheral communities between two South-West Nigerian States of Lagos and Ogun and goes further to highlight its implications on the communities. This empirical study carries out a survey of the land actors in these areas as well as the land use pattern. A total number of 150 questionnaires were administered on land owning families, land agents, family heads, community heads and participators in the land market. The results indicate that the issue of land grabbing is real in the peripheral areas and has assumed a higher dimension in Nigeria. The study therefore recommends an urgent need in the overhaul of the entire land management and administration framework that will protect vulnerable groups against the "vultures" of local land grabbing. Such holistic intervention by public authorities will entrench transparency in negotiations involving land deals especially in peripheral areas, discourage corrupt practices by government officials, community leaders and influential individuals.
Keywords: *Land grabbing, implications, housing development, peripheral areas.*

1.0 Introduction

The global economy has witnessed several challenging issues in recent times among which are issues related to land. Being a base upon which all human activities take place and central to the lives, politics and economies of all countries both developed and developing, its control, management and use find expression in the policy thrust of public (central and regional) and private institutions. In addition, it is very imperative that human beings are adequately housed which also forms part of man's fundamental right. However, there seems to be a growing global concern over housing inadequacy, food security, civil unrest, poverty and issues of sustainable land use and management all attributable to the limited supply of land. Agricultural land use and housing development are competing for priority especially in the peripheral areas of Nigerian cities because these areas are where land speculation is rampant (Omirin, 2003) and where intensity of land use is growing, due to the rapid expansion of the urban centers. Furthermore, another phenomenon which is spreading like wildfire is land grabbing. The issue of land grabbing has become topical and continues to attract international attention. In addition, foreign companies and

countries have identified that large land holding opportunities exist outside their domain, extending beyond international barriers especially in developing countries because the total land area acquired by such institutions exceeds the farmland of France and the majority of these are in the African continent (FIAN, 2011; Kugelman & Levenstein, 2009). Considerable research on land grabbing and media reports of large scale land acquisition by foreign investors in Africa abound (Cuffaro & Hallam 2011). For example, Cotula, Vermeulen, Leonard and Keeley (2009) analysed land acquisitions of 1000 hectares or more between 2004 and 2009 in four African countries of Ethiopia, Ghana, Madagascar and Mali and found out that about 2 million hectares of land across the four countries have been acquired by foreign interests, including a 10,000-hectare project in Mali and a 450,000-hectare plantation for agro fuels in Madagascar. According to the study, the Government of Ethiopia in July 2009 mapped out 1.6 million hectares of land, extendable to 2.7 million, for investors willing to develop commercial farms. Single allocations include a 452,500 hectares agro fuels project in Madagascar, a 150,000 hectares livestock project in Ethiopia and a 100,000 hectares irrigation project in Mali.

Graham, Aubry, Künnemann and Suárez, (2010) estimate that a total 528,000 hectares of land deals have been recorded and at least 1311 projects would have been received, for a total of land promised to foreign investors by the government of Ethiopia comprising between 2.7 million and 3 million hectares.

The authors also report that more than 9,200 investors have received licenses for commercial farms in Ethiopia since 1996, of which about 1,300 are foreign. These foreign prospective investors are from India, China, Europe and Middle Eastern firms operating in Ethiopia. In Nigeria, Ariyo and Mortimore (2011) report that the Kwara State Government acquired 13,000 hectares of land from the local farmers in Shonga District, and allocated 1,000 hectares to each of 13 commercial farmers from Zimbabwe on 25-year renewable leases at no cost whatsoever to the farmers. This phenomenon portends dangerous consequences to the people of Africa and the economy as a whole and raise pertinent questions:

- What is the nature and changing concepts of land grabbing in the current sustainable development debate and its long term implications?
- What are the implications for ensuring justice, fairness and food security through investment in agriculture and sustainability in land use and management?
- Are stakeholders in land matters recognized and carried along always?
- What impact does land grabbing have on the peripheral communities due to the ever expanding urban centres?

This study aims to provide empirically answers to these questions by examining the nature of land grabbing in selected peripheral areas of Lagos and Ogun States.

2.0 Conceptual and Theoretical Underpinnings

2.1 Changing concepts of land grabbing

Land grabbing in its literal interpretation connotes exploiting an opportunity for land acquisition in a greedy manner for private gain. In the context of international discourse, it is defined by Merian Research and CRBM (2010) as land loss by rural population due to large scale land acquisition by foreign business (be it by purchase, lease or other forms of control over land such as long-term contract farming) for industrial, agricultural production (be it for food, agro fuels or other agricultural commodities). It is also seen as taking possession of and/or controlling a scale of land for commercial/industrial agricultural production by a national or local investor which is disproportionate in size in comparison to the average land holding in the region (FIAN 2010; Graham et al. 2011). It could also refer to the purchase or lease of vast tracts of land by wealthier food-insecure nations and private investors from mostly poor developing countries in order to produce crops for export (Daniel, 2011; Daniel & Mittal 2009).   According to FIAN (2010) land grabbing goes beyond taking possession of land. It is a process. This implies that several actors and variables are involved before actual possession and control. Cuffaro and Hallam (2011) see it as the involvement of foreign direct investors in land through several means and generally depends on the geographical origin, the large size of the deals in terms of the amount of land involved, the extent or lack of transparency and the incompleteness of contracts, the emergence of resource-seeking investors oriented to the production of food for export to their home markets. However, the concept of land grabbing is still evolving as Liversage (2011) asserts that the concept is broader than foreign land acquisition and includes domestic elites, the national land administration framework, the legitimacy or otherwise of the land deals in the face of high level of corruption and weak governance characterizing the developing countries.

Therefore in the context of this study, land grabbing is the dispossession of land from the socio-economically weak (vulnerable) segment of the population in the peripheral areas by private or corporate entities and individuals, whether foreign or local

2.2 Types of land grabbers

Reydon (2006) identifies types of land grabbers other than foreign investors to include the following:

a) Ethnic groups or clans that grab government land (mostly deserts, pastures and swampy areas);

b) Ethnic groups or clans that grab communal land;

c) Villagers grabbing government land (mostly deserts and pastures) around their villages;

d) Villagers grabbing government land (mostly deserts and pastures) around their villages with different types of deeds for part of the land;

e) Land lords, warlords and commanders grabbing governmental land;

Other types of land grabbers identified by their mode of operations, their positions or

social status and political advantages which are prevalent in Nigeria are:

f) Domestic elites, government functionaries and high ranking politicians who take advantage of their positions and with insider information exploit people's land,

g) Men who grab land from women, orphans and widows and the economically weak (aided by crude cultural practices),

h) Families can also grab from other families through prolonged legal processes,

i) Private companies or land speculators in Nigeria with international affiliations as well as conglomerates, who often hire touts or thugs to physically take possession of the land, keep it from other grabbers or to dispose of such lands to unsuspecting buyers.

According to Kleemann, Lay, Nolte, Thiele and Voget-Kleschin (2013), these types of land grabbers are categorized into four groups namely investors, government, local authorities and local land users. Kleemann et al state that the roles of these four classes of people and their political connections depend on the country in which they operate. However, the first two groups are identified as politically and economically powerful while the roles of the last two groups depend on the land administration system operating in their countries

2.3 Forms and manifestations of Land Deals.

Taylor and Bending (2009) assert that land grabbing manifests in other forms and characteristics in terms of the involvement of foreign companies and corporations. These include:

1. Transfers of large tracts of land, in many cases, over 100,000 Hectares especially in the Third World or developing countries (Schaefer, 2009; Liversage, 2010; Stephens, 2011),

2. Food and energy security are key drivers, and not necessarily economies of scale from large-scale production,

3.   There is lack of transparency and low level of public consultation,

4.   According to Balogun (2012), another manifestation of land grabbing can be seen in the increasing involvement of governments, or government-related agencies, the elite, power brokers and top political figures in the negotiations for land. Balogun report that property and land owners in a sub urban area along the Lagos-Badagry axis were forcefully ejected from their land by an unidentified agent with the aid of unknown officials of the state ministry of environment and physical planning and heavily armed policemen.

5. The land acquisition process commonly does not include the original users of the land acquired who are poor peasants and who do not have official titles to the land due to the nature of traditional tenure systems.

2.4   Implications of Land grabbing/ land grabbing as an infringement on owners' rights

The implications of this phenomenon pose very big threats to the development of Nigeria and Africa as a whole. According to Kleemann et al (2013), land grabbing has implications on four categories of rights of the people. These are right to liberty of legal ownership of land, rights of participation in

the acquisition process of their lands, rights to food and adequate housing of which land grabbing deprive them of. In view of this, dispossessing peasants of their land which is their only means of livelihoods will worsen the problems of poverty, high rate of unemployment, violence and crime as well as housing. Secondly, land grabbing will pose adverse consequences for sustainable development including land accessibility for other competing land uses, sustainable land management and the future expansion of the urban areas.

2.5 Peripheral   Areas and land grabbing: the relationship and theoretical foundation

The term peripheral areas also known as suburban, peri-urban or urban fringe include land at the fringes of urban areas or away from the city. They are parts of the city where there is existence of rural and urban life which are neither totally urban nor rural in character but a combination of both. Kasanga et al. (1996) define peripheral areas as a locus of abrupt tenurial transformation and since these areas lie between the rural and urban areas, land rights there are being transformed institutionally from rural to urban and as such they are in a state of transition from customary to statutory tenure. According to Masum (2009), peripheral areas go beyond the process of rural transition to urban but involve a complex process that comprises landownership pattern, land transfer process, types of development, regulatory measures and their enforcement.

Peripheral areas play very vital roles in modern societies because the transformations in those areas add to the dynamism of the rural and urban areas within which they are located. These areas which easily leads to urban expansion have serious implications for food security , sustainable land use and efficient land management because agricultural land is being 'eaten up' by demands for housing, commercial, industrial and infrastructure investments as UNCHS Habitat (1996) estimates that by 2020 half the population of Africa and Asia will be living in and around urban centres. Nkwae (2006) identifies these areas with the under listed characteristics which could be said to give rise to some form of land grabbing.

1. They are intermediate and interact between urban and rural areas as well as their economies.
2. There is an element of institutional fragmentation due to the land holding pattern defined by traditions.
3. There are evidences of urban and rural lifestyles that give the areas social stability and uniqueness thereby portraying a kind of state of mind.
4. There is a rapid transformation from peasant farming to intensive commercial and urban residential uses.
5. They lack basic utilities and infrastructure.
6. The rental markets are highly unregulated and very risky for both landlords and buyers.

Peripheral areas can exist in the following forms (Nkwae, 2006)

(1) Indigenous or customary tenure areas that are being subjected to strong demand

pressures because of urbanization and their close proximity to the city.

(2) Customary tenure areas that were outside the city limits but have now been absorbed by the city due to increasing urban expansion.

(3) Freehold farms within and outside the urban boundary.

(4) Squatter settlements within and outside the urban area limits.

2.5.1 Theoretical considerations of justice, fairness and sustainable development in the context of land grabbing.

Kleemann, et al (2013) posits that justice, sustainability and human rights are the basic principles guiding development. Therefore, the interpretations of their theoretical underpinnings determine policy formulation and implementation in order to achieve sustainable development especially in the light of land grabbing. Justice according to Buchanan and Mathieu (1986) is done when one receives that which he is entitled within the context of the justice system in operation and this can be related to land resources. Similarly, Cook and Hegtvedt (1983) assert that benefits and burdens are distributed in the society in a just and fair way that equals are treated equally and unequals are treated unequally. Theories explaining land grabbing in its current dimension and scale are very rare. However, Gibson (2008) while investigating group identities and theories of justice as they relate to land squatting in South Africa agrees that social identity theory must be integrated with the psychology of justice if the land related problems such as squatting, land grabbing and others facing

mankind can be resolved. Since there are land issues all over the world leading to controversies which go beyond who gets land and who does not, fairness and justice are key elements of land conflicts. Thus, to what extent does the justice system protect the vulnerable groups whose land is forcefully taken due to their social status? Perhaps it is necessary that attention is shifted to the understanding of how the various considerations of justice will be resolved which of course is an enormous theoretical insights and reality. This is aptly captured by the following:

…but the magnitude of the issue of land grabs is enormous, unprecedented, and growing. Virtually every piece of vacant land in South Africa's cities is at risk. Land grabbing is an extremely important problem for the homeless, landowners, and governments. But land grabbing also presents intriguing theoretical issues because it so clearly pits alternative conceptions of justice against each other (Gibson, 2008:700).

Relating this to the nature and implication of land grabbing to housing development, the urban poor and other socially vulnerable groups do not have the economic and political means of accessing land for housing provision and the land grabbers develop houses which these groups are unable to rent thereby compounding the housing gap.

Rawls (1999) formulated a theory of justice that guides the "basic structure" of society. According to him, justice is seen as fairness while Ambaye (2013) opines that justice provides the basic structure upon which the

fundamental arrangement for the distribution of "benefits and burdens of social life" that affect the lives of members of the society is built. Rawls believes that the principles of justice on which the theory of justice was developed are based on fairness to each and every one.

Rawls states on page 53 as follows:

The first statement of the two principles reads as follows.

First: each person is to have an equal right to the most extensive scheme of equal basic liberties compatible with a similar scheme of liberties for others.

Second: social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone's advantage, and (b) attached to positions and offices open to all.

These principles are to be observed according to two rules. The first rule is that of ordering, that is, the first principle takes precedence over the second and the second rule is that of fairness and equal opportunities for accessing offices and positions (Ambaye, 2013). In relation to land grabbing, the right to own land is one of the liberties addressed by the first principle. Where land is illegally alienated without the consent of the land owners negates the principle of justice and fairness. In relation to the second principle, institutions charged with responsibility of distributing society's income and wealth should ensure that such distributions be done to everyone's advantage. Thus, where land belonging to vulnerable members of society (people who are economically and financially

alienated) and who do not have equal access to positions of authority are forcefully taken by few individuals by using   their positions of authority or by the manipulation of the justice system, the second principle of Rawls theory of justice will clearly be invalidated. By extension, this can be interpreted as an infringement on people's fundamental rights to land and its resources. Thus, the future generations of those whose land are forceful taken are at risk because their needs of land based resources are compromised. This is the whole essence of the definition of sustainable development by the World Commission on Environment and Development (1987) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. Illegal and forceful land acquisitions have social, economic and environmental effects on the immediate communities. These are seen as direct issues of justice since sustainability are viewed as intra- and inter-generational justice (Voget-Kleschin 2013; Voget-Kleschin and Stephan 2013).

3.0 Method

A mixed approach is adopted in this study comprising both secondary data and field survey. Data and materials used in this study were extracted from secondary sources and content analysis of different publications and research findings on urban land management, housing and environmental sustainability issues in agreement with studies such as Daramola and Ibem (2010), Okewole (1999) and recently Oletubo and Gbadegesin (2011). The peripheral areas identified lie between

the boarders of Lagos and Ogun States. Along peripheral areas, large hectares of land are being cleared on a frequent basis by land agents with the tacit approval of land owning families and communities, divided into plots and sold to individuals and corporate bodies including those that have international affiliations. This obviously has a far reaching effect on the ecosystem and sustainable development due to the fast disappearance of the forests, vegetation, wildlife, agriculture including the means of livelihood of the local communities. These areas include Akute, Agbara, Igbesa, Arepo, Mowe, Ofada, Aiyetoro, Atan, Baba Ode, Iju-Oja, Ewekoro, Ibafo Badagry, Ikorodu and Ayobo. These areas were chosen based on the fact that they are all currently experiencing peripheral area problems and challenges with variations in scale and degree (Nørgaard, 2011). They also have substantial amount of their land under customary administration and are relatively accessible. In order to gather primary information and data to verify the form, nature and extent of land grabbing in those areas, field work was carried out in agreement with Wolcott (1995). The population of this study comprises land owners (land owning families) or their representatives, land agents (always surrounded by land touts), people who have acquired land within the communities, community heads or their representatives and participators in the land market in those areas. As such, it is difficult to quantify the exact population of the respondents but common practice in these areas is that local agents are commissioned to clear virgin land of varying

areas, divide such lands into plots and sell to prospective buyers at negotiated prices. In order to know these land agents, the researcher had to purchase a plot of land in one of these areas (which is a form of participant-observation) thereby building familiarity with the agents who later felt relaxed to divulge information as well as introduction to the family heads and other land agents in their network that covers majority of the peri urban areas of Ogun and Lagos States. Therefore, 10 respondents comprising 2 land agents, 3 representatives of families and 5 people that have purchased land in each of these communities were surveyed through a combination of purposive and snowball non-probability sampling techniques. It is common practice to see these people or their "boys" always "policing" their lands and construction sites. These non-probability sampling techniques were adopted because the researchers needed to gather relevant information from the individuals that are capable of providing such information which also reflected the specific purpose of this study. In addition, the respondents seen during the field survey within the communities were requested to lead the researchers to additional individuals. Thus the 10 respondents in each of the 15 areas making a total of 150 respondents were surveyed in this study similar to Musa and Nuhu (2008) study which analyzed the pattern of land development and management in Niger State. Two methods of data gathering were used. These are self-administered questionnaires and informal or semi -structured interviews with land agents,

representatives of family heads and land owners. A total of 20 respondents among the family representatives and land agents were interviewed because they could not fill nor were willing to fill the prepared questionnaire which was also used as a guide for the interview. This justifies the adoption of informal or semi-structured interview bearing in mind the purpose and issues of investigation (Fife, 2005). In addition, the interviewees declined electronic recording of the interviews. In other to overcome this challenge, the study adopted participant observation which aligns with Alvarez and Urla (2002) who adopted unstructured interview to gather information that is required in order to implement an enterprise resource planning through a participant-

observation. Out of the 150 questionnaires administered, 126 were properly filled and returned (including the 20 responses from the informal or semi-structured interview) giving a response rate of 84%. Thus, the analysis was based on the 126 returned questionnaires. The questions were structured in Likert form such as strongly agree, agree, neutral, strongly disagree and disagree. The nature, extent and form of land grabbing were then predicated on the responses from the two approaches of gathering data. In the case of the semi-informal interview, the same questionnaire was used and the researcher filled the responses of the interviewees. SPSS version 17 software was used in data analysis.

4.0 Data Analysis and Result

Table 1. Basic profile and characteristics of respondents

Variables	Frequency	Percentage
Gender		
Male	96	76.2
Female	30	23.8
Total	**126**	**100.0**
Marital status		
Widowed	10	7.9
Divorced	5	4.0
Married	102	81.0
Single	9	7.1
Total	**126**	**100.0**
Occupation		
Self-employed	67	53.2
Employed in the private sector	28	22.2
Employed in the public sector	19	15.1
Agricultural	12	9.5
Total	**126**	**100.0**

Highest academic qualification

PGD/MBA/MSc	5	4.0
HND/BSc	50	39.7
NCE/OND	48	38.0
O-Level	23	18.3
Total	**126**	**100.0**

Indigene

Yes	43	34.1
No	83	65.9
Total	**126**	**100.0**

Years lived in the community (non-indigenes)

16-20 years	4	4.8
11-15 years	5	6.0
6-10 years	46	55.4
1-5 years	28	33.8
Total	**83**	**100.0**

Table 1 shows the basic profiles and characteristics of the respondents. Majority of the respondents (76.2%) are male. The number of married respondents is 102 (81%), 10(7.9%) are widowed, 5(4%) are divorced while 9(7.1%) are single. The respondents in paid employment either in the private or public sector are 47 (37.3%) while the majority is self-employed. A small number of 12 respondents (9.5%) are engaged in agriculture as their occupation. Furthermore, 39.7% of the respondents possesses a first degree while 38% have NCE/OND certificate and only 5 (4%) possess a post graduate degree. The other respondents 23(18.3%) have only the secondary school certificate. In terms of indigene-ship, 83(65.9) are non-indigene while 43 (34.1%) are indigenes of their communities. Among the non-indigenes, 46(55.4%) have lived in their communities for at most 10 years, 28 have lived between 1 and 5 years, 5 have lived a maximum of 15 years while 4 have lived between 16 and 20 years. These show that the respondents are capable of providing useful information relevant to the study.

Table 2: Responses of respondents on land actors and activities in their communities

Variables	Frequency	Percentage	Mean
Whether land initially got was sold without consent			**1.60**
No	50	60.2	
Yes	33	39.8	
Total	**83**	**100.0**	
Whether Community engages in clearance of virgin land			**1.87**
Sometimes	29	23.0	
Always	51	40.5	

Usually	46	36.5	
Total	**126**	**100.0**	
Estimated Area of land cleared annually			**4.07**
Above 20 Acres	41	32.5	
16-20 Acres	53	42.1	
11-15 Acres	32	25.4	
Total	**126**	**100.0**	
Attendance of meetings where land issues are discussed			**3.58**
Rarely	25	58.1	
Sometimes	18	41.9	
Total	**43**	**100.0**	
Incidence of land grabbing			**1.52**
Sometimes	8	6.3	
Always	49	38.9	
Usually	69	54.8	
Total	**126**	**100.0**	
<u>**Views on land acquisition activities within the community**</u>			
Whether other people are forcefully disposed of their land			**1.34**
Agree	43	34.1	
Strongly Agree	83	65.9	
Total	**126**	**100.0**	
Influential people always acquire tracts of land			**1.58**
Agree	73	57.9	
Strongly Agree	53	42.1	
Total	**126**	**100.0**	
Cases of land disputes abound			**1.79**
Neutral	17	13.5	
Agree	66	52.4	
Strongly Agree	43	34.1	
Total	**126**	**100.0**	
Companies or individuals always looking for land to buy			**1.72**
Neutral	4	3.2	
Agree	83	65.9	
Strongly Agree	39	31.0	
Total	**126**	**100.0**	
<u>**Actors carrying out major land acquisitions**</u>			
Government			**3.59**
Never	15	11.9	
Rarely	77	61.1	
Sometimes	34	27.0	
Total	**126**	**100.0**	
Companies with affiliations abroad			**2.46**
Rarely	74	58.7	
Sometimes	52	41.3	

Total	**126**	**100.0**	
Religious organizations			**3.85**
Sometimes	58	46.0	
Always	68	54.0	
Total	**126**	**100.0**	
Private individuals			**4.29**
Always	35	27.8	
Usually	91	72.2	
Total	**126**	**100.0**	
Private foreign nationals			**1.28**
Never	55	43.7	
Rarely	52	41.3	
Sometimes	19	15.1	
Total	**126**	**100.0**	
Frequency of activities suggestive of land grabbing			
Men dispossessing vulnerable people of their land			**3.88**
Never	23	18.3	
Rarely	65	51.6	
Sometimes	38	30.2	
Total	**126**	**100.0**	
Families dispossessing other people/families			**3.71**
Sometimes	7	5.6	
Always	37	29.4	
Usually	82	65.1	
Total	**126**	**100.0**	
Local companies buying large areas of land			**1.40**
Always	37	29.4	
Usually	89	70.6	
Total	**126**	**100.0**	
Foreign companies through Nigerian affiliates			**1.29**
Never	14	11.1	
Rarely	62	49.2	
Sometimes	50	39.7	
Total	**126**	**100.0**	
Influential individuals buying large areas of land			**1.62**
Sometimes	10	7.9	
Always	58	46.0	
Usually	58	46.0	
Total	**126**	**100.0**	
Land touts dispossessing people of their land			**1.79**
Sometimes	17	13.5	
Always	65	51.6	
Usually	44	34.9	

Total	**126**	**100.0**	
Involvements in family land related decisions			
I am always involved			**3.07**
Disagree	5	11.6	
Strongly Disagree	11	25.6	
Neutral	15	34.9	
Agree	6	14.0	
Strongly Agree	6	14.0	
Total	**43**	**100.0**	
We always involve land agents and/ or "omo-onile"			**1.47**
Neutral	5	11.6	
Agree	10	23.3	
Strongly Agree	28	65.1	
Total	**43**	**100.0**	
I am the family head and I decide who to involve			**3.98**
Disagree	11	25.6	
Strongly Disagree	20	46.5	
Neutral	12	27.9	
Total	**43**	**100.0**	
I am a land agent who sells/buys land for people			**1.40**
Agree	17	47.2	
Strongly Agree	19	52.8	
Total	**36**	**100.0**	
One of us is chosen and no external body involved			**4.23**
Disagree	12	27.9	
Strongly Disagree	29	67.4	
Neutral	2	4.7	
Total	**43**	**100.0**	
Views on nature of land use and activities			
Land clearing activity suggestive of industrial use			**3.34**
Strongly Disagree	63	50.0	
Neutral	43	34.1	
Agree	20	15.9	
Total	**126**	**100.0**	
Land no longer enough for our agricultural needs			**1.56**
Agree	70	55.6	
Strongly Agree	56	44.4	
Total	**126**	**100.0**	
Land no longer enough for our housing needs			**3.29**
Disagree	14	11.1	
Strongly Disagree	48	38.1	
Neutral	30	23.8	
Agree	29	23.0	
Strongly Agree	5	4.0	

Total	**126**	**100.0**	
We have very little agricultural activity			**3.68**
Disagree	18	14.3	
Strongly Disagree	69	54.8	
Neutral	20	15.9	
Agree	19	15.1	
Total	**126**	**100.0**	
Every virgin land has been cleared and being sold			**2.33**
Disagree	6	14.0	
Strongly Disagree	3	7.0	
Neutral	7	16.3	
Agree	10	23.3	
Strongly Agree	17	39.5	
Total	**43**	**100.0**	
Identification of purpose of major land acquisitions			
Purpose of land acquisition within the community			**4.20**
For private housing estates	40	31.7	
For industrial activity	12	9.5	
For Agricultural production	16	12.7	
For individual housing construction	49	38.9	
For public housing estates	9	7.1	
Total	**126**	**100.0**	

Table 2 presents the responses of the respondents on the main issues of this study. From the analysis, 39.8% of the non-indigenes agree that their land initially acquired was sold without their consent which is a form of land grabbing. All respondents agree that their communities engage in the clearance of virgin land and the area as reported by the responses of majority of the respondents is above 20 acres annually. This portrays the enormity of damage to the environment and the attendant effect on agricultural production. On whether the indigenes attend meetings where land matters are discussed, majority of them (58.1%) rarely attended while 41.9% attended sometimes. This implies that the head of the family whose duty it is to convene such meetings when family lands are involved may decide not to do so for purposes that appear to be pecuniary and may authorize sale of the lands which is voidable at the instance of the excluded principal family members whose consent to the sale of such lands were not obtained. Therefore, because of the cost and time involved in challenging such actions through the judicial process, the members who were eventually excluded in a bid not to be left out completely mobilize land touts to harass the purchasers who in turn have to pay twice in order not to lose the lands. On further enquiry why the majority (58.1%) rarely attended meetings, the response was that in some cases they were not invited

deliberately because of their uncompromising stand on land sales while a few stated that convening a family meeting is always difficult due to the urgency of the land transactions and the amount involved and sometimes such meetings may lead to violent disagreements. These groups among the families and purchasers are therefore vulnerable. A description of what constitutes land grabbing in the context of this study was made in the questionnaire and the respondents were asked if there are incidences of land grabbing in their communities. Furthermore, 6.3% agree that it happens sometimes, 38.9% agree that it happens always and 54.8% which constitutes the highest agree that land grabbing cases always occur. The respondents were asked their views on land acquisition activities within their communities. The highest mean response of 1.79 affirm that cases of land disputes abound, 1.72 say that companies or individuals always visit their communities looking for land to buy, 1.58 affirm that influential people have been acquiring tracts of land in their communities while 1.34 are of the view that they are aware that other people they know whose land has been forcefully taken. In order to identify the actors carrying out major land acquisitions, the mean responses from the highest to the lowest is as follows: Private individuals 4.29, Religious organizations 3.85, government 3.59, Companies with affiliations abroad 2.46 and private foreign nationals 1.28. In response to a question on the frequency of activities carried out by people which are suggestive of land grabbing, the mean responses of the respondents show that men dispossessing vulnerable people of their land is 3.88, families dispossessing other people/families is 3.71, influential individuals buying large areas of land is 1.62, land touts dispossessing people of their land is 1.79, local companies buying large areas of land is 1.40 and foreign companies through Nigerian affiliates has the lowest mean of 1.29. The indigenes were asked to state their involvements in land related decisions in their communities and the highest response with mean 4.23 a choice is made amongst themselves, 3.98 show that the family heads decide who to involve, all are involved has a mean of 3.07, involving other land agents and other "omo onile" has a mean of 1.47 and involving land agents among them is 1.40. Furthermore, the respondents were asked their on land use activities within communities and the results reveal that land clearing activities suggestive of industrial use has a mean response of 3.34, land no longer enough for their agricultural needs 1.56, land no longer enough for their housing needs 3.29, very little agricultural activity 3.68 and every virgin land has been marked for clearance and for sale is 2.33. Lastly, the identification of the purposes of major land acquisitions reveals that   private housing estates were 40 (31.7%), industrial activity 12(9.5%), agricultural production 16(12.7%), individual housing construction 49(38.9%) and   public housing estates 9(7.1%).

5.0 Conclusion and Policy Recommendation

The results from the analysis indicate that certain forms of land grabbing in the local context exist in the peripheral areas of Lagos and Ogun States. However, from the standpoint of large tracts of land acquisitions in the scale that has attracted international attention as identified in the literature, we cannot conclude that these constitute land grabbing. Although the phenomenon is seen as posing a big threat to third world countries involving developed countries and their agencies most represented by big multinationals, it is worthy of note that in this study, the locals who are mainly influential individuals with political clouts, their companies which perhaps have foreign links and private individuals are the main actors of land grabbing. This phenomenon perhaps can be linked to the weak regulatory framework of land management in Nigeria. In addition, the land market is observed to be very active in all the communities due to factors such increasing demography, the effect of urbanization and the expansion of the Lagos Mega city along these areas. It is noteworthy that the results are common to all the areas as there were no observed differences in each community in terms of activities of land grabbers in the land markets within the communities.

This study recommends that an overhaul of the entire land management and administration framework that will protect vulnerable groups against the "vultures" of local land grabbing. As Kleemann, et al. (2013) submit, weak land governance places land purchasers and investors in a very powerful bargaining position at the expense of the vulnerable local population which results in unfavourable land transactions. Such holistic intervention by public authorities will entrench transparency in negotiations involving land deals especially in peripheral areas, discourage corrupt practices by government officials, community leaders and influential individuals and bring to end situations that often lead to legal uncertainties exploited by powerful actors in the land market. Secondly, there is need for urgent land policy in the nature of land reform in Nigeria to ensure that the vulnerable groups have easy access to land and secured rights to land. In view of this, the Presidential Technical Committee for Land Reform has been granted a request for the transformation of the Committee into a Commission and a Bill to the National Assembly for the establishment of a National Land Reform Commission in therefore timely and very necessary. Such a Commission will guide, coordinate and guarantee that the land reform process is carried out successfully by providing strong legal and sustainable institutional foundation. These frameworks will ensure security of tenure for all socio-economic groups of people; provide sustainable sources of revenue for state and local governments and uniform regulations and procedure of land transactions that is transparent in line with the market economy with its attendant results of sustainable development, economic growth and prosperity.

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CONSEQUENCES OF DEVELOPING PERI-URBAN AGRICULTURAL LAND FOR RESIDENTIAL PURPOSES IN LAGOS

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Abstract
The growing population in urban settlements coupled with attendant increasing land prices has been forcing people to the peri-urban areas and presently further to areas zoned for agriculture in order to meet their residential needs. However, such encroachment on agricultural land usually comes with its consequences. To know such consequences in Agbowa, Lagos State (the study area), the purposive sampling method was utilized in selecting 9 (nine) officials of government agencies responsible for land, and agricultural land management in the State that were interviewed with the aid of semi-structured questionnaires. Findings showed that the encroachment of agricultural land by residential users in the study area is rife and there is absence of strict enforcement of agricultural land regulations among others. As part of the recommendations emanating from the study, the agency saddled with the responsibility of managing agricultural land in the State should be reorganized to make it stronger, and appropriate sanctions imposed on defaulters in order to safe guard agricultural land in the state.
Keywords: *Agricultural Land, Consequences, Peri-Urban, Residential Use.*

1.0 Introduction

Due to the increasing population of the inner cities which results to increasing value of accommodation and land in such cities, city dwellers and other migrants that could not afford property in the cities usually look towards the suburbs or peri-urban areas to meet their housing needs. Hence, these transitional zones are constantly under pressure due to rapid urbanization (see Dekolo, Oduwaye and Nwokolo, 2015).

Urbanization, the concentration of people in a particular urban area at a point in time (Naab, Dinye and Kasanga, 2013) is a global phenomenon among all categories of countries worldwide. United Nations (2014) reported that the population of people that live in the urban areas outweighs those that live in the rural. This can be attributed to the rising economic opportunities in major cities of the world as against low economic activities in the rural

settlements. It was equally reported that the global urban population for the first time in history exceeded the global rural population in 2007. Since then, the world population has remained predominantly urban. This was also buttress by the submission of Lwasa and Wahab (2011), that cities occupy about 4% of land globally, but over half (50%) of the world population lived in them.

As the urban population increases, spontaneous settlements will be coming up around the built-up areas to accommodate the increasing population, which according to Bobadoye and Fakere (2013), and Ekandem, Daudu, Lamidi, Ayegba and Adekunle (2014) are inhabited by the low income earners or the urban poor who cannot afford the rents in the city. Hence, they move to the suburbs for easy access to places that offer opportunities for casual work and that are at the same time, not far away from the city because of the economic opportunities that are available there too.

With regards to Nigeria, the rural population is also declining while the urban population is on the increase. In 2020, Nigeria's rural population would have decreased from its 92% level in 1950, to 48%, while her urban population would have increased from the 8% that it was in 1950 to 52% (UN, 2014). As the urban population increases, the urban area will begin to expand to its fringes. The urban fringe is the zone in which various urban and rural characteristics are mixed together (Allen, 2013; Woods, 2006). At the urban fringes otherwise known as the peri-urban areas, one begins to see increasing activities as found in the urban settings. This phenomenon can be termed as the "urbanization of rural areas" (El-Hefnawi, 2004). Consequently, since the common or popular land use in the urban fringes/rural areas is agriculture, a conflict arises between the dominant agricultural land use of the rural settlers and the residential needs of the urban populace moving to such area. And according to El-Hefnawi (2004), such is the problem of every growing cities of the world, developed or developing. However, the approach to settling the conflict between these two land uses (agriculture and residential) differs between developed and developing countries.

Furthermore, as the population continues to increase, the peri–urban settlements equally continue to expand to its periphery (Mandere, Ness and Anderberg, 2010) where there is intense agricultural practice by the people as well as large expanse of land zoned by the government for agricultural purpose. Hence, peri-urban are zones where traditional farming activities come into conflict with alternative economic, residential and recreational interests (Busck, Pilgaard, Praestholm, Reenberg and Primadahl, 2006; Ode and Fry, 2006). They are neither a city nor countryside (Busck et al., 2006). Peri-urban settlers usually have intense interactions with the urban area by daily commutting between the two areas, especially for work purpose. Peri-urban agricultural lands are lands situated at the periphery of an urban fringe specifically use for agricultural purpose.

With some specifically zoned by the government for such use. Peri-urban sprawl (spreading of developments such as houses, on undeveloped land near an urban area) has however caused reduction in agricultural land almost all over the world, and Nigeria is not an exception in such agricultural land encroachment (Bunce & Walker, 1992, cited in Mandere *et al.,* 2010). However, according to Lwasa & Wahab (2011), the recognition of the need for peri-urban agriculture as a formal land-use is the first step towards including it in the more comprehensive and tailored city strategies to reduce their overall ecological foot print and increase resilience to climate change. Lagos State, the economic and commercial capital of Nigeria, also doubles as the most populous state in the country. With an urban population of 13,661,000 in 2016 growing at a rate of 4.1% per annum, the state emerged and still remains the most urbanized state in Nigeria (United Nations, 2016). As a result, there is need for more houses to accommodate the growing population.

Interestingly, rising urban population has been identified as the main driver influencing agricultural land conversion to residential use the world over (Adeboyejo and Abolade, 2009; Azadi, Ho and Hasfiati, 2010; Fazal, 2000; Namara, 2011; Yaro et al., 2014). In addition, the effects of agricultural lands lost to urbanization include; decrease in supply of agricultural produce which could trigger rising food prices, loss of livelihood, increased poverty (Saleh, Badr, Banna and Sahata, 2014; Yaro et al., 2014);

longer farm distance which could cause price increase of farm produce, and many landless adults and dependents (Adeboyejo and Abolade, 2009).

Ironically, contrary to all the negativities about agricultural land encroachment or conversion in the less developed and developing countries like Nigeria (Babadoye and Fakere, 2013; Fazal, 2000; Saleh et al., 2014; Yaro et al., 2014) the phenomenon has been successfully managed in the developed nations (see Azadi and Hasfiati, 2010; and Heimlich and Anderson, 2001). Although, according to Dekolo et al., (2015), the examinations of 'peri-urban' remain elusive and often neglected by urban planners.
Nevertheless, all that is required is government authority that knows what to do ahead of time, and does not hesitate in doing the needful.
This study aims at examining the consequences of encroaching on designated agricultural land by residential developers in Agbowa, near Ikorodu, Lagos State. To achieve the aim, the level of residential users' encroachment in the study area was examined as observed by relevant government agency; and the possible consequences of their actions on their property investment.

2.0 Literature review
2.1 Theoretical Framework
According to Benu, Sugiyant and Kindangen (2013), land is a system that is composed of a structural component referred to as land characteristics, and equally composed of functional component known as land quality. Land quality is a group of land elements or complex attributes that determines the level of suitability and ability of land. Research in land system usually aim at optimizing land use by

studying the land system composition, development as well as regional differentiation (Deng, 2011). Land system is closely associated with human survival and development, and all human activities on land are under the influence of both natural and economic rules.

Furthermore, according to Deng (2011) the development of land system research theory is promoted by the territorial differentiation rules of various systems and theories including; the location theory, differential rent theory, natural environment theory, territorial complex theory, ecological balance theory, fertile decline theory, biological evolutionism, community theory, law of value, planned economy theory , entropy theory, dissipative structure theory and the theory of consideration of local conditions of the natural resource exploitation and utility. Fortunately, the application of computer technologies through the use of geographic information system (GIS), cartography, remote sensing (RS) technology etc. have all helped to advance the study of land system with respect to analyzing urban expansion and restructuring of land use patterns (de Koning , Veldkamp and Fresco, 1998; Li and Yeh, 2004; Seto and Kaufmann, 2003) .

In their study of urban expansion and agricultural land conversion in Henan Province of China, Jiang and Zheng (2016) framed their research with two categories of theories; the microeconomic theory of land use change and the urban bid-rent model. While the microeconomic theory of land use change describes the urban development of agricultural land as the outcome of decisions made by individual land users who attempt to maximize the expected profits (value) of individual parcel of land, the urban bid-rent model is the basis of urban economic theory, and

it explains the accumulated outcome of urban land use change. Studies by Filatova, Parker and van der Veen (2009), as well as Martinez (n.d.) equally buttressed the relevance of the microeconomic theory and the urban bid-price model in determining land prices.

Benu et al. (2013) identified the primary driving factors for land conversion as the doers, utilization, and conversion process. Based on these three factors, seven types of conversion were further identified as follows;

(i) gradual conversion- sporadic patterned; which is caused by two main driving factors of land, which are land that are not / less productive / economically beneficial, and urgency of conversion doers;

(ii) systemic conversion of enclave patterned; which covers an area conversion of small pieces of land simultaneously;

(iii) demography adaptive conversion; which occurs due to the need for shelter / housing due to population growth;

(iv) conversion caused by social problems; which occurs because the motivation for the conversion is to leave the old conditions as the primary agricultural sector;

(v) conversion of no-load; which is done by the doers to sell the land to others for further exploitation for other uses;

(vi) conversion of agricultural adaptation; which occurs because of the desire to increase agricultural output and purchasing new land in other places; and

(vii) conversion of multi form or without pattern; which is done due to various designation factors such as for the construction of residences, office buildings, schools, businesses, and so forth; which is the main focus of this study.

Conversion in multi form is an encroachment, that is, an act of gradual and unlawful entering upon a land, property, other possessions or infringement on the right of others. Hence, agricultural land encroachment is the conversion of agricultural land-use to other forms of land uses without proper urban planning. Consequently, when an agricultural land is been encroached upon without proper planning, it results into spontaneous settlement (Ekandem et al., 2014).

Similar to encroachment, is land conversion - a process by which land is changed from agricultural use to urban uses (Azadi, et al., 2010) and it is equally unavoidable. Several arguments have been thrown up as being the causes of encroachment on agricultural lands in sub-urban fringes. Chief amongst the causes as well as the driver of all other causes is urbanization (Appiah, Bugri, Forkuo and Boateng, 2014; Naab et al., 2013; Namara, 2011). While some of the other causes include close proximity to urban fringes, declining agricultural returns and land speculation (Mandere et. al., 2010); selling agricultural land because it gives better and quick returns than engaging in agricultural activities, ineffective and inappropriate control tools for agricultural land preservation, pressure from public infrastructure such as road along agricultural lands (El-Hefnawi, 2004); intention to convert prime agricultural land to other land uses of highest and best use (Naab et al., 2013); increasing demand

for residential land uses in peri-urban areas at the expense of agro-forest land (Appiah et al., 2014).

2.2 Agricultural Land Encroachment: The Problem in Focus

The high rate of urbanization in Lagos has been a factor driving people to the peri-urban (fringes) areas where accommodation and land are cheap. However, presently people are being driven further to the periphery of the fringes where most agricultural land uses exist, and even cheaper than the ones available in the peri-urban areas. One of such agricultural land use designated area is Agbowa, in the periphery of Ikorodu suburb.

As the population is increasing in Lagos cities and people are moving to surburbs like Ikorodu town and its surrounding areas as Odogunyan, Igbogbo, Ibeshe, Ijede etc., Lagos State government seem to be responding by developing at least the minimum infrastructures needed especially roads to make the areas accessible to the city centre. For instance, the reconstruction of Lagos Road from Mile-12 to Ikorodu garage to ease the movement of people from Ikorodu to the city centre. To further enhance movement of people, the government made available the Bus Rapid Transport (BRT) buses with dedicated lanes that make it faster to travel. The government has equally utilized the costal nature of Ikorodu by developing its water ways for the transportation of people from the area to Lagos Mainland and Island as far as Badore. Similarly, the proposed construction of Lagos Fourth Mainland Bridge to link Ikorodu with Lagos Island will equally ease traffic in and out of Ikorodu. Without any doubt, the above mentioned infrastructures have and will further open up Ikorodu by reducing travel time, thereby attracting many that could not afford accommodations and lands at the city centres to

Ikorodu. However, as government is developing infrastructures especially roads within Ikorodu and the population is increasing, prices of accommodations and lands in the suburbs are being pushed beyond the reach of some people, hence, they move further into the suburb down to Agbowa , an agricultural zone as well as a border town between Lagos and Ogun States.

Although there are residential areas in Agbowa, but large expanse of the area is zoned for agricultural use (see figure 2.). Ignorantly, unsuspecting members of the public that are not aware of the status of the land with regards to zoning or usage, purchase same from the omo-oniles' (family owners) to build houses, and subsequently to face unforeseen consequences they did not bargain for, such as re-purchasing same land from the government, inability to process property title documents, or outright demolition by government.

Buildings under consideration in this study are structures of permanent nature develop with bricks and mortar for any other purpose than agriculture. The major purpose for encroaching on peri-urban agricultural land use is for residential use while other complementary uses such as commercial especially shopping centres, institutional (private schools), usually follow. Therefore, as the subject area is zoned for agricultural use, the infrastructural facilities required to support residential use are lacking and unavailable. Consequently, lack of needed infrastructure and unplanned nature of the area by the government for residential use which unfortunately people have illegally being turning it into, the outcome according to Pugalis, Giddings and Anyigor, (2014) is peripheral slum, amongst many other negative effects as mentioned earlier.

Thus, as a result of pressure from the illegal residential users, the study area has been going through changes in land-use pattern resulting in the rapid decrease of agricultural land use. Thereby causing various environmental and other problems in the area, which require investigation.

2.3 Review of Previous Empirical Studies

According to the World Bank (1993), involuntary or forced involuntary or forced displacement of people as well as agricultural land use have remained till date a relatively silent companion of urban growth, and such occurrence will continue as far as the trend for urbanization grow stronger . This position was further buttressed by the submission of Hite (1998) that "trying to protect rural (agricultural) land uses against an encroaching urban frontier is a bit like trying to protect beaches from a relentless ocean". Judging from the happenings of the present, the submission of the report still remains relevant till the current period. And such encroachment may likely continue until drastic measures are taken to protect peri-urban agricultural lands.

In their study of Calabar and its environs, Yaro et al. (2014) discovered that agricultural land was being converted to residential and other uses such as schools (public and private), resort centres (Tinapa) as well as roads. The same trend is being reported globally as efforts intensify to meet the housing needs of urban dwellers (Azadi et al., 2010). Similarly, due to rising urbanization rate in Lagos State, which U.N. report (2016) estimated to be at 4.1% per annum, about 5 million housing deficits exists in the State (Olofinji, 2017). This is about 31% of the 18 million national housing deficit in Nigeria. Consequently, the city is continually expanding to its suburbs (Ikorodu, Badore, Badagry, Ajah, Ikotun etc.), to the fringes of neighbouring Ogun State (Ogijo, Ibafo, Agbara, Sango Ota etc.), and lately to the agricultural designated settlements far away from the urban fringes (Imota, Agbowa etc.).

Notwithstanding, if the above "self-help" approach is not effectively controlled or totally eradicated by the government authority, its effects will include; haphazard developments, flooding, unhygienic environment, poor quality houses (and neighbourhoods), overcrowding, high pressure on existing infrastructure facilities (Babadoye and Fakere, 2013; Fazal, 2000), food shortage and deforestation (Chen, 2007; Lambin and Meyfroidt, 2011) as well as social insecurity.

Table 1. Summary of empirical studies on agricultural land encroachment in Nigeria and across the world

S/N	Author(s)	Year of study	Location of study	Focus of study	Method Adopted	Findings	Conclusion/ Recommendation
1	Adeboyejo and Abolade	2009	Ogbomosho, Oyo State, Nigeria.	Encroachment of rural agricultural land.	Questionnaire survey,focal group discussions,and use of Geographical Information System (GIS).	Although encroachment is bad, but it is inevitable (at least because of our current stage of development in Nigeria) for city expansion.	Instead of zoning for agricultural use, government should establish farm settlements for farmers, and monitor them effectively against selling their land for other uses.
2	Namara	2011	Kawenpe, Kampala, Uganda.	Causes of agricultural land encroachment.	Mixed method (semi-structured questionnaires, focal group discussion, and observations).	Rural-urban migrations as well as industrialization are major causes of agricultural land encroachment.	Government should endeavor to enforce its urban development, town and country planning acts.
3	Naab, Dinye and Kasanga	2013	Tamale, Ghana.	Effects of encroachment on agricultural land.	Mixed method which includes questionnaire survey, visual observations, institutional surveys and key informant interviews.	The encroachment results into environmental degradation such as improper waste disposal.	People had lost interest in agriculture, thereby selling their lands for physical development.
4	Yaro, Okon and Itam	2014	Calabar and its environs, Cross River State, Nigeria.	Impact of urban expansion on agricultural land.	Questionnaire survey and comparative assessment of different years of field survey.	The encroachment leads to astronomical increase in land value within 10 years.	
5	Saleh, Badr, Banna and Shahata	2014	Kaduna, Kaduna State, Nigeria.	Assessment of agricultural land use.	Combined the use of remote sensing and GIS application.	Within the 10 years period, while agricultural land use decrease to 3.2%, residential and commercial uses increased to 61.3% and 22.6% respectively.	The study suggested the redirection of urban growth upward as against lateral spread.
6	Tarawneh	2014	Shihan municipality, Jordan.		Questionnaire survey, photographing, and aerial	It was revealed that farmers sell their lands in piece meal,	Fertile agricultural land should be guarded from physical

				Assessment of the relationship between urban sprawl on agricultural land, and its immediate environment.	photographs from Google earth.	and thereafter are pushed out of employment. This results in reduction of food production.	development. The loss of agricultural land has resulted in the loss of livelihood, reduced food supply, and increase supply.
						Continuous decrease in agricultural lands, resulting in food shortage and increasing poverty.Haphazard farming on any available open space.	It is the opinion of the researcher that in 209 years from 2007 (i.e. by year 2216), urbanization would have eliminated the entire agricultural land in the area.
						About 60,000 acres and about 100,000 agricultural jobs were loss annually to urban sprawl in the fertile agricultural area.	

Source: Author's compilation (2018)

3.0 The Study Area: Agbowa, Lagos, Nigeria

By land area, Lagos State is the smallest State in Nigeria with about 356,861 hectares (ha) of lands of which 75,755 ha (or 21.23%) is wetland, and 169,613ha (or 47.53%) designated for Agriculture. Agbowa, a town in Epe division of Lagos State, shares common boundary with Imota and Ikorodu towns in the West, Itoikin in the East, Epe town in the South and Ogun State in the North. The town is about 30km from Ikorodu town and accessible via Ikorodu-Itoikin Road. The people of the area were predominantly farmers, fishermen, palm wine tappers and traders of farm produce.

In the 1980– 2000 Regional Plan of Lagos State, about 180 km^2 (49%) of Ikorodu landmass was zoned for agricultural use (Dekolo et al., 2015) of which Agbowa was included. According to Lagos Bureau of Statistics (2016), Ikorodu Local Government has a population of 914,882 in 2015 with a population growth rate of 3.2% per annum . The large expanse of agricultural land which is usually sold by family owners (omo-oniles) or land grabbers (ajagungbale) for mostly residential developments have been attracting people to Ikorodu/Agbowa. Other attracting factors include a light port terminal at Ipakodo, the expanded Lagos-Ikorodu road to include BRT dedicated corridor, and established secondary and tertiary sector activities.

Figure 1: Map showing the study area (Agbowa) within the Lagos / Ogun States peri-urban areas
Source: https://www.google.com.ng/search?q=agbowa

Figure 2: Map showing agricultural lands and encroached uses in Agbowa
Source: Google earth satellite image (2018)

3.1 The Study Method

This study is both quantitative and qualitative in nature, hence, the mixed method of survey has been found suitable. The method utilized the primary data sources for information gathering. Primary data were gathered through the use of a semi-structured questionnaire, visual observations and institutional surveys. The semi-structured questionnaire was used to interview officials of Lagos State Land Bureaus, land regularization office, and the Lagos State Agricultural Lands Holdings Authority (LSAHA). The LSAHA is the government agency charge with the responsibility of protecting agricultural land and giving title to same in the State. This group of respondents are public officers who interact with the members of the community regularly and are therefore adjudged qualified to provide unbiased and relevant information on the state of agricultural land in the study area. This approach aligns with Dugeri (2011) which elicited information from public land officers in the study of property market maturity in Nigeria. This conforms to the purposive sampling technique because the group of respondents adjudged to be best informed of the study's subject matter was singled out for interview vide the semi-structured questionnaire (Ede, 2007; Etikan, Musa & Alkassim, 2016; Tongco, 2007; Umeh, 2018). Furthermore, Umeh (2018) opined that the researcher using this non-probability sampling method is at liberty to pick its units of respondents if done by exercising good judgment. In view of this, nine (9) officials of the government agencies were interviewed and their responses were captured in the designed semi-structured questionnaire.

The secondary sources of data for the study include journal articles, government publications, books either sourced online or in hardcopy.

4.0 Data Analysis and Presentation

A total of 9 respondents from the LSAHA, land regularization as well as the lands bureau departments were interviewed. The profile and distribution of the respondents are as stated in table 2 below.

Table 2. Profile of respondents

Department	Position	Years of service
Department of Agricultural services	1. Chief Agricultural officer	12 years
	2. Zonal officer	15 years
	3. Zonal officer	10 years
	4. Zonal officer	15 years
	5. Assistant zonal officer	12 years
	6. Chief agricultural officer	15 years
	7. Co-ordinator Agbowa Farm Estate	17 years
Land Regularization	1. Chief estate officer	18 years
Lands Bureau	1. Assistant Chief Land Officer	15 years
Total	**9 respondents**	

Source: Field Survey (2018)

From table 2 above, the respondents are senior officers in their respective departments with considerable years of experience. Therefore, their views are valid based on practical interaction with the actors in the land market of the study area.

Table 3: T**he abstracted responses from the respondents of the semi-structured questionnaire**

S/N	Theme	Findings
1	The state of Agbowa land in terms of ownership and control.	There seems not to be a general agreement about the state of ownership of the land in Agbowa based on the responses received. About 22.22% of the respondents submitted that the land is wholly under government acquisition, while 11.11% of respondents is of the view that the land is partially under government acquisition. Furthermore, 44.44% of respondents indicated that the land has been committed but not under government acquisition, while another 22.22% of the respondents said that the ownership is partially under government acquisition and committed, but not wholly under acquisition.
2	The predominant Land-Use of the area.	While 44.44% of the respondents indicated that both residential and agricultural uses are predominant, 22.22% said agricultural use only is predominant. Nevertheless, 11.11% each of the respondents are of the view that the predominant land-use is among three land-uses viz-a-viz; residential use only, commercial use only, or institutional use only.
3	Observation of the illegal change in use in the area by the agency (LSAHA).	All the respondents responded in the affirmative.
4	The form of the illegal change in land use in the area.	Majority (88.80%) of the respondents affirmed that conversion of agricultural land into residential use is predominant, while 11.11% of respondents stated that the conversion of agricultural land into institutional use was predominant.
5	The role of the agency in informing the public about the permissible use of land in the area.	All respondents affirmed that the agency does this when land owners come to the agency to process their land title documents.
6	The consequences of illegal conversion in the area.	About 66.66% of respondents indicated that illegal conversion resulted in the reduction of agricultural land for farming, 11.11% thought it could lead to shortage in agricultural produce in the state, while 22.22% of respondents indicated that the illegal conversion could result in the gradual transformation of the area to slum or unplanned settlement.
7	The possible remedies for illegal change of use in order to avoid government sanctions.	About 33.33% of respondents are of the view that the illegal land-users should be made to revert to government approved uses; 11.11% said they should be allowed to pay fine to the state government and thereafter maintain the "illegal" conversion; 22.22% of respondents favoured demolition of illegal structures; and another 33.33% of respondents thought the culprits should be permitted to process conversion of use (from approved use to the desired "illegal" use).
8	Suggestions on measures to be taken by the government to stop illegal conversion of agricultural land to residential or other uses in the study area.	The suggestions of the respondents include; demolition of illegal structures (22.22% of respondents), payment of heavy penalty by the culprits to discourage illegal conversion (11.11% of respondents), and refusal by government to process change of use documents when presented for approval (66.66% of respondents).
9	Suggestions on what the government can do in order to make the agency (LSAHA) more proactive and effective in dealing with illegal conversion of agricultural land.	All the respondents suggested that there should be reorganization in the agency to include officers that will monitor agricultural land encroachment in the state and enforce sanctions where there are identified cases of illegal conversion. The issue of lack of adequate funding was also raised by the respondents.

Table 4: Rating of respondents on the extent of land use change and causes in the study area.

Item	Rating by respondents				
	Very high	**High**	**Average**	**Low**	**Very low**
The extent of illegal conversion of agricultural land to residential use in Agbowa (if any).	33.33% (3 responses)	22.22% (2 responses)	44.44%(4 responses)	Nil	Nil

The intensity of the different under listed land uses and human activities and their effects in Agbowa.

Type of land use	Rating by respondents				
	Very high	**High**	**Average**	**Low**	**Very low**
Industrial land use.	Nil	Nil	55.56% (5 responses)	33.33% (3 responses)	11.11% (1 response)
Subsistence agricultural land use.	Nil	33.33% (3 responses)	44.44% (4 responses)	22.22% (2 responses)	Nil
Large scale agricultural land use.	11.11% (1 response)	33.33% (3 responses)	33.33% (3 responses)	22.22% (2 responses)	Nil
Residential land use for individual homes.	Nil	22.22% (2 responses)	44.44% (4 responses)	33.33% (3 responses)	Nil
Residential land use for housing estates.	Nil	22.22% (2 responses)	33.33% (3 responses)	11.11% (1 response)	33.33% (3 responses)
Commercial land use for businesses.	Nil	Nil	11.11% (1 response)	55.56% (5 responses)	33.33% (3 responses)
Commercial land use for markets and trading activities.	Nil	Nil	11.11% (1 response)	66.67% (6 responses)	22.22% (2 responses)
Institutional land use.	11.11% (1 response)	Nil	33.33% (3 responses)	22.22% (2 responses)	33.33% (3 responses)

Rating of possible factors that may be responsible for attracting people to Agbowa

Factors	Strongly agree	Agree	Cannot say	Disagree	Strongly disagree
People move there because they have access to cheap land to build house.	55.56% (5 responses)	33.33% (3 responses)	11.11% (1 response)	Nil	Nil
Because of the fertile land for agriculture.	11.11% (1 response)	44.44% (4 responses)	11.11% (1 response)	11.11% (1 response)	22.22% (2 responses)
Availability of social amenities.	Nil	11.11% (1 response)	22.22% (2 responses)	33.33% (3 responses)	33.33% (3 responses)
Availability of cheap accommodation.	Nil	44.44% (4 responses)	22.22% (2 responses)	11.11% (1 response)	22.22% (2 responses)
Availability of jobs in Agbowa.	Nil	11.11% (1 response)	22.22% (2 responses)	22.22% (2 responses)	44.44% (4 responses)
Ease of travelling out of Lagos.	Nil	22.22% (2 responses)	11.11% (1 response)	55.56% (5 responses)	11.11% (1 response)
Because Agbowa is on the outskirt of Lagos & serene.	Nil	Nil	33.33% (3 responses)	44.44% (4 responses)	22.22% (2 responses)
Because of its easy access to Lekki Free Trade Zone / Ajah.	Nil	11.11% (1 response)	11.11% (1 response)	55.56% (5 responses)	22.22% (2 responses)
Because of the proposed 4th Mainland Bridge.	Nil	22.22% (2 responses)	Nil	55.56% (5 responses)	22.22% (2 responses)
Because of the proposed relocation of Mile 12 market and other projects to Agbowa by the Lagos State Government.	22.22% (2 responses)	55.56% (5 responses)	11.11% (1 response)	11.11% (1 response)	Nil

Source:Field Survey(2018)

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5.0 Discussion of findings

One of the key drivers of changes in land is urbanization coupled with increasing population. As population continues to increase, there is pressure on the limited spaces available to provide accommodation. This creates scarcity and increase in land value. At this point, most city dwellers cannot afford to pay for the very high values of accommodation, thus peri-urban areas become the best alternative. As the core peri-urban also become saturated and more expensive, people move further to the areas zoned for agriculture. This has been the case of Agbowa. And the main consequence of agricultural land encroachment is reduction in land for farming, and by extension, reduction in agricultural production. From the responses of the agency officials saddled with the responsibility of managing Agbowa agricultural land, the primary reason why people move to Agbowa is because of the availability of cheap land. In peri-urban areas, land values are very cheap and government regulation is very weak. Due to the informality in the land market in peri-urban areas, houses are built without planning, there is high level of encroachment on agricultural land and slum settlement is easily created. As a result of the weak enforcement of regulations, it seems the illegal conversions do not attract any severe sanction from the government. Hence, the act goes on unabated without any significant consequence on the property investments. This situation is not different from the case of this study.

6.0 Recommendations and Conclusion

Extant literature on land use and related issues in Nigeria has revealed that there always have been policies and legislations coupled with institutional framework for implementation. However, the institutions responsible for implementing such policies have not been effective. Many factors are responsible for this. It is argued that Nigeria never lacked good policies, legislations and institutional frameworks but good implementation has always been the crux of the matter. The failure of existing laws and institutions to make significant impacts in protecting and preserving the environment may have been due to lack of political will for the implementation of the laws / policies, corruption on the part of those responsible for the implementation of the laws, less severe sanction or no sanction at all on defaulters, poor legal frameworks, poor funding of the appropriate government agencies, lack of adequate manpower etc.

This study therefore recommends that the public agencies responsible for the implementation of land use policies in the state should henceforth live up to their responsibilities. Appropriate reorganization of the agencies which has become very necessary in the light of the encroachment of agricultural land in the State will equally be useful. A situation where a government official / agency observes (as deduced from responses of the study data gathering instrument) encroachment of public land and does nothing means they lack the powers to implement land use policies.

Also important is sustained public awareness by using the various media channels to sensitize the people of the State about the dangers and consequences of encroaching on agricultural land as well as government owned land, no matter where such land is located in the State. Nevertheless, the government should be resolute in meting out appropriate sanctions to culprits in order to serve as deterrents to others.

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URBAN INFRASTRUCTURE AND SPRAWL DEVELOPMENT IN AKURE, NIGERIA

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Abstract

This study examined the interaction that exists between land use changes and urban infrastructural facilities; as far as the frequency of the changes, provision and functionality of facilities in Akure municipal are concern. The study adopts Survey Research Design (SRD) to investigate the level of the interaction via structured questionnaire on sampled households. It also made use of interview, personal observation and photo-snaps to express existing situation. The average households in Akure were estimated at 95,232 out of which a sample of 1% (952) was systematically selected. Findings show unguided expansion in the growth of the city which affected the pattern of land uses and efficiency of infrastructural facilities provided in the area. The regular massive flow of influx into the city due to urban sprawl is having serious sway in the determination of land use pattern in the city. This in turn have significant influence on the functionality of available facilities. To mitigate this, the study suggests corresponding increase in the provision of facility within the city and hinterlands while existing ones are giving regular overhauling. As the city expands, so the facilities need be replicated and maintained for maximum utilization.
Keywords: *Land use changes, urban infrastructure, sprawl development, Akure.*

1.0   Introduction

The Environmental Literacy Council Report (ELCR, 2014) described land use as a term used to describe the various ways in which land and its resources are been put into use by different people; such as farming, mining, building or grazing. Choices of how land is used are made by those who own or control the land. But, from the ELCR (2014), the choices are limited by the physical and biological characteristics of the land; especially, the climate type, soil and topography, as well as, institutional and economic factors associated with such land. Urban land uses are classified into different categories like residential, commercial, industrial, institutional, public, open space, infrastructural, and mixed land uses (Owoeye and Ogunleye. 2015).

Social scientists and land managers define land use more broadly to include the socio-economic purposes and contexts for and within which lands are managed (or left unmanaged), such as subsistence versus commercial agriculture, rented versus owned, or private versus public land (Ellis, 2010). Observations of land use dynamics generally require the integration of natural and social scientific methods to determine which human activities are occurring in different parts of the landscape, even when land cover appears to be uniform (Venkatesh, 2012). For instance, Oyinloye (2010) and Owoeye (2016) opines that areas covered by woody vegetation may represent an undisturbed natural shrub land, a forest reserve recovering from fire (conservation), re-growth following tree harvest (forestry), a plantation of immature rubber trees

(plantation agriculture), agriculture plots that are in-between periods of clearing for annual crop production, or an irrigated tea plantation. As a result, scientific investigation on the causes and consequences of Land Use Land Cover (LULC) classifications requires interdisciplinary approach to integrate both natural and social scientific methods which has emerged as the new discipline of land change science. Land use changes arising from urbanization, housing development, agriculture and deforestation are some of the contributory factors to land cover changes in Akure (Owoeye, 2016). According to him, these changes reflect on the population growth, land consumption rate, local climate and alterations in infrastructural facilities, leading to changes in physical morphology of urban landscapes. Expansion of Akure has resulted not only in depletion of natural resources, but also in deterioration of the environment due to incompatible changes in land use pattern. Agriculturally productive land and forestland are being converted to residential, commercial and other uses. The thrust of this paper, however, is to establish a relationship between land use dynamics, in relation to sprawl incidence and the functionality of urban infrastructures in Akure municipal with a view to providing information that will aid policy formulation towards the physical planning of the area.

2.0   Literature Viewpoint

Land use dynamics is urbanization driven, which has led to dramatic changes in land use practices (Mirkatouli *et al*, 2015). Rapid pace of urbanization has been observed as global problem present in most of the developing countries of the world. According to Balogun *et al* (2011), urban populations in developing countries have grown by 40% between 1900 and 1975. This was further observed at every indication that the trend will continue, adding approximately 2 billion people to the urban population of the presently less-developed nations for the next 30 years. Arnfield (2003) states that the world is becoming increasingly urbanized with 45% of the population already living in the urban areas by the year 2000 and with a projection that half of the world will live in urban areas by 2007. It was also estimated by the United Nations Population Fund (UNPF, 1999) that by the year 2025, 60% of the world's population will live in cities. According to UN-Habitat (2013), cited in Oduwaye (2015), it is expected from the advent of the urban millennium that 70% of human beings will be living in urban areas by the year 2050. All these have direct implications on land uses. That is, as more people are springing up in an area, more lands are bound to be consumed. Akure is not in any way going contrary to this projection as the population has been more than triple of what it used to be before it became administrative headquarters of the state and local government. For example, the population was just 71,106 in 1963; but with the influx of public servants into the town due to the state creation of 1976, the population rose to 239,124 by 1991 and 360,268 in 2006 (NPC, 1991 and 2006). As at 2010 and 2014, the estimated population has raised to 413,060 and 476,159 respectively at 3.18% annual growth rates.

Globally, Oduwaye (2015) argued that land cover is often altered principally by direct human use, such as agriculture and livestock raising, forest harvesting and management, urban and sub-urban construction and development. Hardly can we find any vegetation that has not been affected or altered by man in the world (Olofin, 2012; Oduwaye, 2013 and 2015). About 400,000 hectares of vegetation cover are confirmed to be lost annually (Adesina *et al*, 1999; Balogun *et al*, 2011; Oduwaye, 2015). Due to anthropogenic activities, the earth surface is being significantly altered by man's presence and several activities

on earth. His use of land has had profound effects on rather all meteorological/climatic parameters. Land alteration has been asserted to be one of the most important fields of human induced environmental transformation (Fasal, 2000). Environmental protection has faced critical problems due to several factors ranging from increasing population, depletion of natural resources, environmental pollution, unplanned land use and several others.

Several researches have shown that unplanned changes of land use due to urbanization have become a major problem (Zhao, 2003; Nanda, 2005). Most land use changes occur without a clear and logical planning and without giving attention to their environmental impacts. Major flooding, air pollution in large cities, as well as, deforestation, urban growth, soil erosion, and desertification, are all consequences of a mismanaged planning without considering environmental impacts of development projects (Balogun *et al*, 2011). The rapid land-use changes by the growing population have reduced natural vegetation cover in most countries of the world (Nicholson, 1987). All these submissions attest to the fact that urbanization is on the increase, leading to emergence of sprawl incidences in cities. However, it is expected that as cities increased in size and land expanse, urban basic services are to be replicated to afford residents maximum satisfaction.

3.0   Materials and Methods
3.1   The Study Area
The study focuses on Akure city and its immediate environments. Akure is a notable city in the South-western Nigeria which became the capital of Ondo State on February 3rd, 1976. It is located between Latitudes $7^0 \ 15^1$ and $7^0 \ 17^1$ North of the Equator and between Longitudes $5^0 \ 14^1$ and $5^0 \ 15^1$ East of the Greenwich Meridian. It is about 204 km east of Ibadan, capital of Oyo state; 168 km west of Benin City, capital of Edo state; 311 km north-east of Lagos; and 323 km south-west of Abuja, the Federal Capital Territory of Nigeria. Akure town spreads over an area of about 15,500 km^2 in about 370m above the sea level. Its population figure by the National Population Census (NPC, 1963) was just 71,106. With the influx of public servants into the town consequent upon state creation in 1976, the population rose to 239,124 and 360,268 in 1991 and 2006 respectively (NPC, 1991 and 2006). With a projection to year 2016, when this study was carried out, the population was estimated at of 476,159 (on 3.18 annual growth rate). Figures 1-3 describes the study area in the national, state and locational settings.

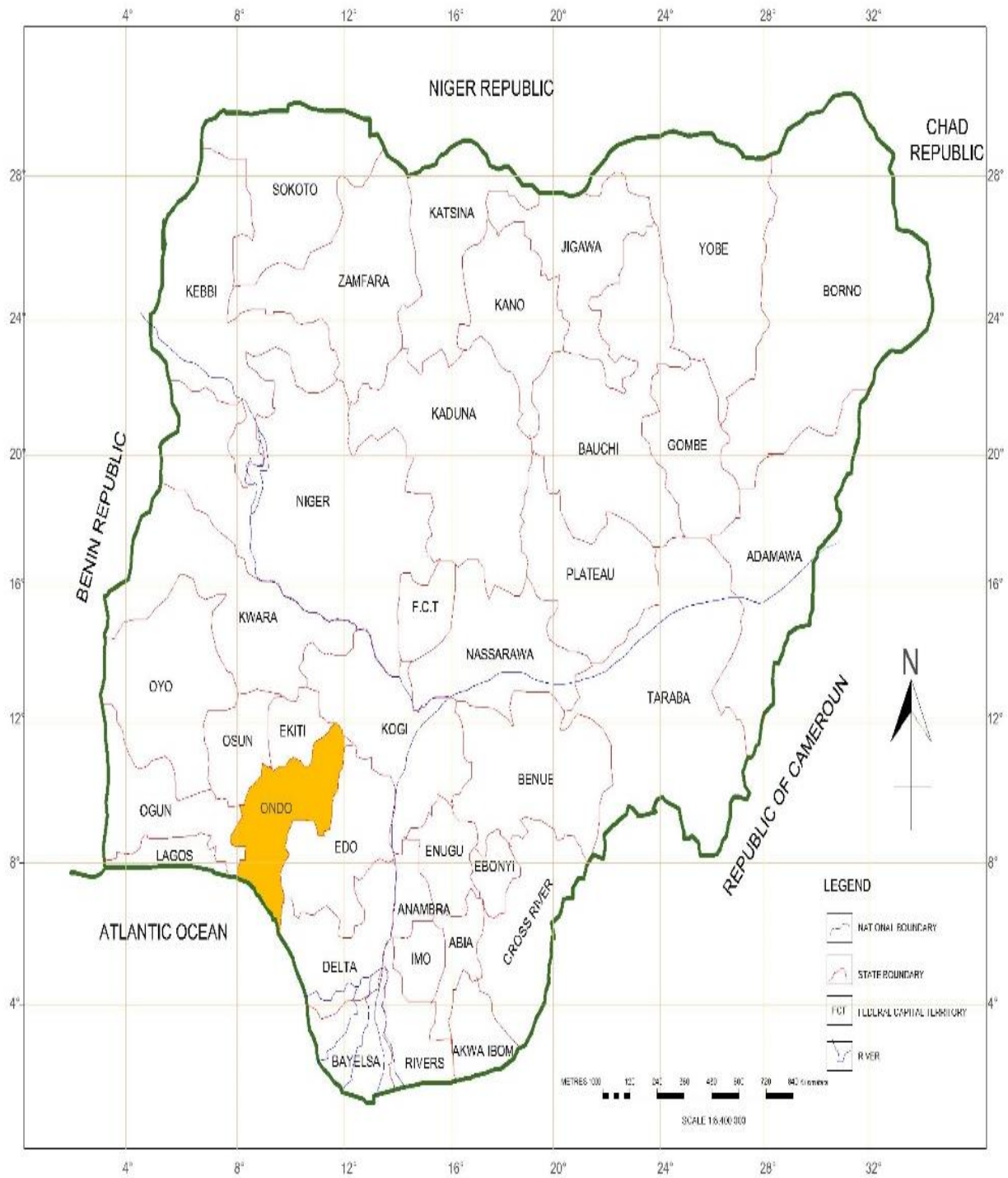**Figure 1: ONDO State in the National Setting.**
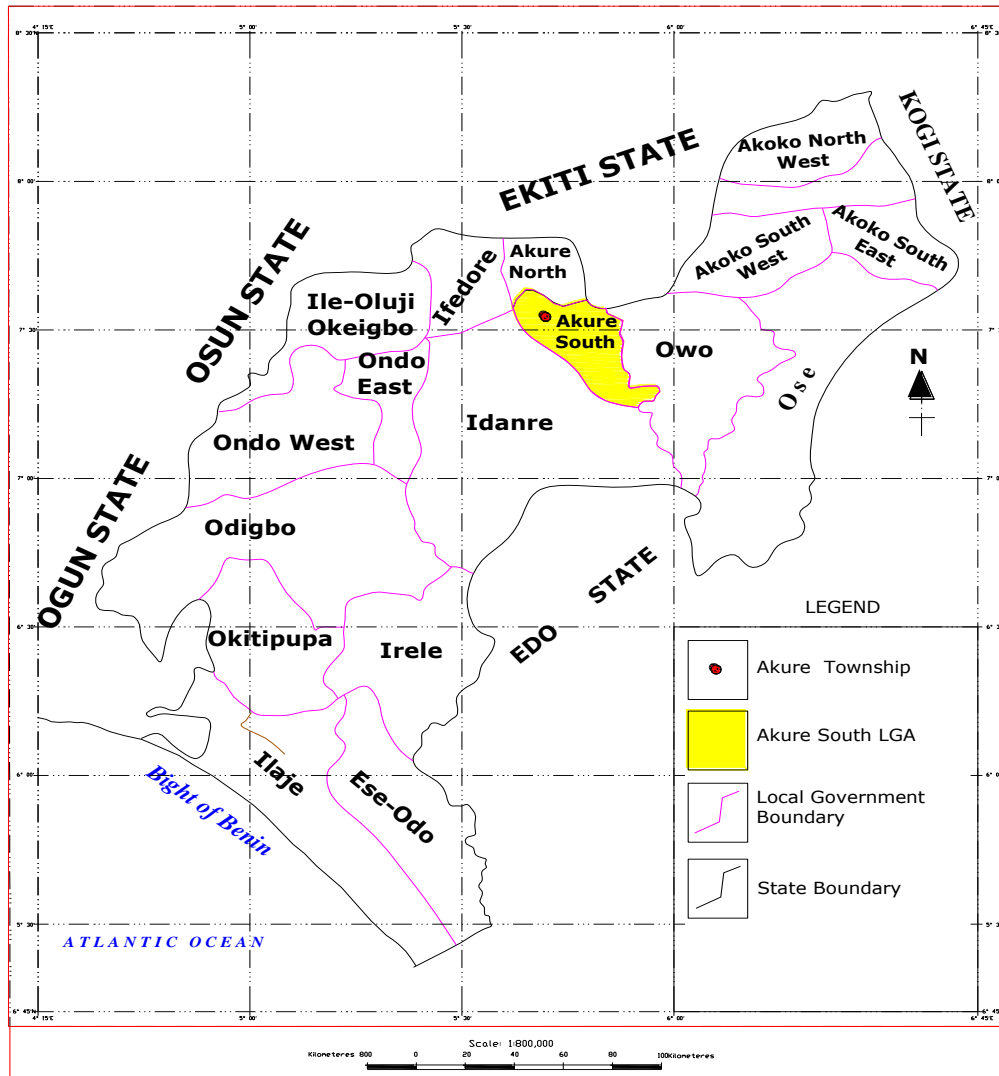**Source: Dept. of Surveys, Federal Ministry of Works, Abuja (2015)**

Figure 2: Ondo State and its Eighteen Local Govt. Areas
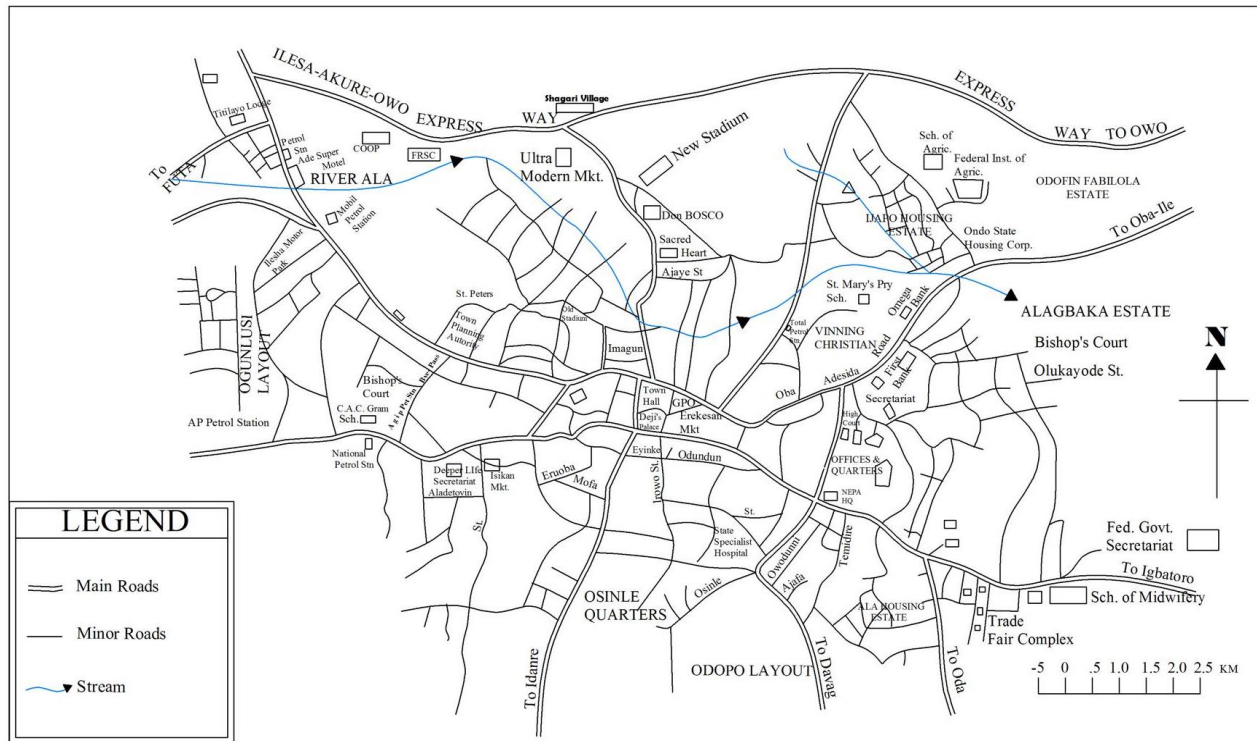**Source: Ondo State Ministry of Lands and Housing, Akure (2015)**

Figure 3: Locational Map of Akure (The Study Area)
Source: Ondo State Ministry of Lands and Survey, Akure (2015)

3.2   Sources of Data

Data collection for this study was essentially through Survey Research Design (SRD) with the aid of structured questionnaires, interview and personal observation. Other sources include government ministries and establishments for historical milieu of the area as well as maps and population data used for the study. Internet facilities were equally explored for relevant information. The study area was disaggregated into three zones namely: Zone 1 (the urban core), zone 2 (the transition zone) and zone 3 (residential estates/urban peripheries). The total (projected) population of the three zones is estimated at 476,159 in 2016 which was sub-divided into 95,232 households. From this, a 1% sample size (amounting to 952 respondents) was taken for questionnaire survey, randomly administered in a succession of 10th buildings to a household-head per building. Meanwhile, a total number of 818 copies of questionnaire were retrieved in usable form out of 952 that were distributed. These were analyzed using descriptive statistics and stepwise multiple regression model.

4.0   Results and Discussions

The results of data analysis were discussed on different sub-topics to express the effect of land use changes occasioned by urban sprawl on functionality of infrastructural facilities in the study area.

4.1   Descriptive Analysis on Condition of Infrastructural Facilities in Akure

Here, the conditions of household sanitary facilities and neighbourhood infrastructures were examined via descriptive analysis. Five household sanitary facilities were evaluated alongside with other essential infrastructures within the neighbourhood with a view to determine their availability, physical conditions and adequacy. These include toilet facility (TOILTYP),   kitchen   facility   (KITFAC),

bathroom type (BATRM), solid waste disposal methods (SLDWAST) and liquid waste disposal methods (LQDWAST). Others include condition of roads (RDCOND), availability of social facilities (SOCFAC) and adequacy of the facilities (ADQFAC). The results are shown in Table 1, Figures 4 and 5, as well as, Plates 1 - 6.

Table 1: Condition of Sanitary Facilities in the Three Zones of the Study Area

Facilities Examined	Zone 1		Zone 2		Zone 3		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
TOILTYP								
None	16	5.2	10	3.3	3	1.4	29	3.5
Pit Latrine	175	56.8	107	35.5	21	10.0	303	37.0
WC	103	33.4	183	60.8	181	86.6	467	57.1
Others	3	1.0	1	0.3	-	-	4	0.5
Missing	11	3.6	-	-	4	1.9	15	1.8
Total	**308**	**100.0**	**301**	**100.0**	**209**	**100.0**	**818**	**100.0**
SLDWAST								
Dunghill	30	9.7	37	12.3	13	6.2	80	9.8
Waste Mgt.	224	72.7	243	80.7	145	69.4	612	74.8
Burning	32	10.4	18	6.0	35	16.7	85	10.4
Drainages	3	1.0	3	1.0	12	5.7	18	2.2
Missing	19	6.2	-	-	4	1.9	23	2.8
Total	**308**	**100.0**	**301**	**100.0**	**209**	**100.0**	**818**	**100.0**
LQDWAST								
Open Ground	102	33.1	96	31.9	32	15.3	230	28.1
Drainages	160	51.9	148	49.2	128	61.2	436	53.3
Septic Tank	21	6.8	56	18.6	40	19.1	117	14.3
Others	-	-	1	0.3	3	1.4	4	0.5
Missing	25	8.1	-	-	6	2.9	31	3.8
Total	**308**	**100.0**	**301**	**100.0**	**209**	**100.0**	**818**	**100.0**
RDCOND								
Tarred	163	52.9	174	57.8	70	33.5	407	49.8
Graded	76	24.7	76	25.2	105	50.2	257	31.4
Not graded	40	13.0	41	13.6	25	12.0	106	13.0
Footpath	18	5.8	5	1.7	4	1.9	27	3.3
Not available	-	-	4	1.3	1	0.5	5	0.6
Missing	11	3.6	1	0.3	4	1.9	16	2.0
Total	**308**	**100.0**	**301**	**100.0**	**209**	**100.0**	**818**	**100.0**
SOCFAC								
Available	84	27.3	99	32.9	89	42.6	272	33.3
Not available	200	64.9	199	66.1	112	53.6	511	62.5
Missing	24	7.8	3	1.0	8	3.8	35	4.2
Total	**308**	**100.0**	**301**	**100.0**	**209**	**100.0**	**818**	**100.0**

Source: Field Survey (2016)

From table 1; 57.1% of sampled respondents indicated the use of Water closet (WC) in their buildings. Definitely, majority of such buildings (77.9%) are located either in residential estates or transition zone, since most buildings (56.8%) in the city core make use of pit latrine, while some (5.2%) do not even have any. The services of Waste Management Authority in the area of solid waste disposal cut across all the three zones as over 70% enjoyed the service. Nevertheless, some still make use of other crude methods, involving burning (10.4%), dunghill (9.8%) and drainage channels (2.2%). Major reason is either because they are not reached by the services of waste management agency or because of addiction or personal decision to choose such alternative methods. This situation does not guarantee healthy living environment as those wastes dumped in open places have the possibilities of harbouring animals that pose a

risk to human health such as mosquitoes, snakes, scorpions, among others. Sharing from the view of Chapin III *et al* (2005) and Ellis (2012) who argue that burning of vegetation biomass to clear agricultural fields remains a potent contributor to regional air pollution wherever it occurs. On this basis, it is believed that burning of wastes within the neighbourhoods will generate much pollution into the environment which will constitute discomfort to the residents. Even the disposal of liquid wastes into drainages (53.3%) and open spaces (28.1%) in the area has the possibility of polluting surface water, as well as, constituting stagnant water that can harbour mosquitoes and breed flies. All these are potent agents that can cause health hazard in the area if nothing is done about it.

For kitchen and bathroom facilities (as shown in Figure 4), they are either located outdoor and shared among different households (Kitchen, 32.4%; Bathroom, 37.4%), indoor and generally used by different households (Kitchen, 23.3%; Bathroom, 24.2%) or built indoor and privately used by individual households (Kitchen, 35.6%; Bathroom, 33%). This situation too does not guarantee safe sanitary condition. There are some buildings which do not have any of these essential facilities at all (Kitchen: 5%; Bathroom: 2.2%) while some who have them in their houses do not enjoy adequate access because of population pressure.
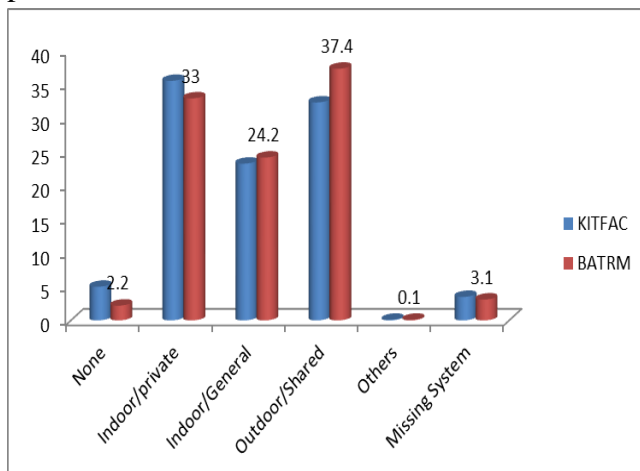

Figure 4: Condition of Kitchen and Bathroom
Facilities in the Study Area.
Source: Field Survey (2016)

To ascertain this submission, the level of adequacy of housing facilities in the study area was examined as expressed in Figure 5. In the figure, only 20% of the respondents affirm adequacy of facilities in their area. This shows how much is expected in the area of infrastructural provision to satisfy the remaining 80% of the population who do not have adequate access to these essential services.
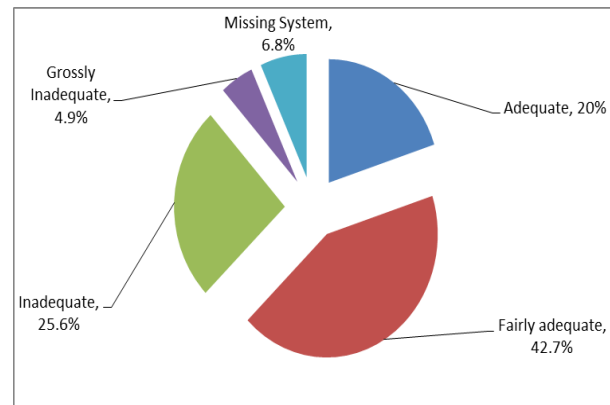
Figure 5: Adequacy of Sanitary Facilities in
the Study Area.
Source: Field Survey (2016)

Beside the sanitary facilities, observations were made on neighbourhood facilities in Akure as regards various alterations in land uses that were made in putting them in place within the town. Over the years, pocket of social facilities were provided at one time or the other which focused, essentially, on road rehabilitation, electricity, schools and water. But the situation between 2010 and 2014, under the administration of Dr. Olusegun Mimiko, was overwhelming. As reported in Owoeye and Omole (2014) and other researches on Akure urban developments, some of the facilities provided include neighbourhood markets (with security post and car parks), road dualizations, mother-and-child hospitals, auto-mart station, mechanic village, housing estates, mega schools, among others. The existence of

these facilities made significant alterations in land use which brought notable transformation in the physical landscape of the city. Places where most of these facilities are located were originally dominated by residential buildings; especially, those provided at the core and transition zones of the city. Plates 1 - 6 show pictures of some of these facilities taken at site.

Plate 1: Car Park behind Akure Central Mosque (for the patrons of Erekesan Market)
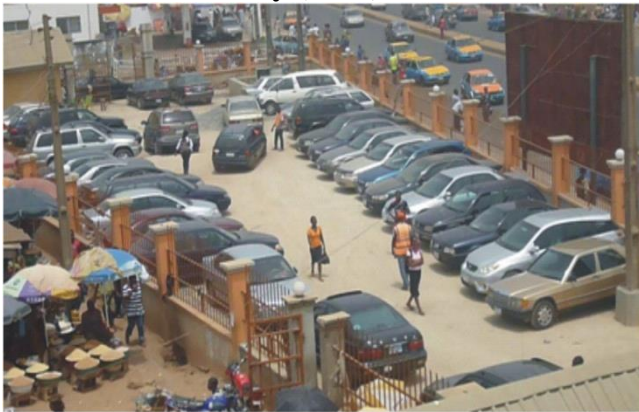**Source: Field Survey (2016)**

Plate 2: Car Park at Isikan Neighbourhood Market, Akure
Source: Field Survey (2016)

Plate 3: Mother-and-Child Hospital Oke-aro, Akure
Source: Field Survey (2016)

Plate 4: Mega School along Irowo Street, Akure
Source: Field Survey (2016)

Plate 5: International Auto-mart Station, Akure-Owo Express Way, Akure
Source: Field Survey (2016)

Plate 6: Shoprite Supermarket at Alagbaka, Akure

Source: Field Survey (2016)

Note: The provision of facilities shown in plates 1-6 made significant alterations in the physical landscape of Akure city as well as in the traditional and socio-economic lifestyles of residents. They were located mainly in high residential density as well as transitional zones; except features on plates 5 and 6 which are located in low residential zone at the urban periphery.

4.2　Regression Result of Urban Sprawl and Infrastructural Facilities in Akure

Table 2 shows the level of significance of each infrastructural variable when regressed against population density (POPDEN) at 0.01 and 0.05 significant levels. From the table, four of the variables are not significantly related, which include SLDWAST, LQDWAST, RDCOND and SOCFAC. As shown in the table, the percentage impact of POPDEN on infrastructural facilities in the study area is determined by 15.2% value of coefficient of determination (R^2). This implies that the association between the dependent variable (POPDEN) and infrastructural facilities provided in the study area is not strong enough. Three of the variables (TOILTYPE, SLDWAST and LQDWAST) have negative T-value, meaning that, increase in population does not commensurate with number of toilet and waste

disposal facilities provided in the area. This accounts for reasons why many of the residents make use of alternative means of disposing their wastes. Consequently, most parts of the study area are considered dirty and unkempt due to crude and uncivilized methods of waste disposal used.

Table 2: Logistic Regression Coefficient of Land Use Changes and Sanitary Facilities in Akure

	Un-standardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	T-value	Sig.	Decision
(Constant)	1.909	.264		7.238	.000	S
TOILTYP	-.150	.055	-.118	-2.750	.006	S
KITFAC	.104	.037	.134	2.786	.005	S
BATRM	.092	.040	.115	2.285	.023	S
SLDWAST	-.072	.048	-.054	-1.512	.131	NS
LQDWAST	-.017	.042	-.016	-.400	.689	NS
RDCOND	.042	.030	.050	1.384	.167	NS
SOCFAC	.047	.055	.031	.841	.401	NS
ADQFAC	.100	.036	.111	2.754	.006	S
Df	8					
R^2	0.152					
Adjusted R^2	0.143					
F-value	15.804				0.000	
N	818					

S = Significant　　**NS** = Not Significant

Dependent variable: Population Density (POPDEN)

Source: Field Survey (2016)

The Snedecor's ratio test of F-value (15.804) is highly significant at 0.000 alpha levels in validating the hypothesis set for this study. Since this is greater than the table F-value of 3.44 and 6.03 at both 0.05 and 0.01 alpha levels respectively, the hypothesis that says "There is no significant association between the level of urban sprawl and functionality of infrastructural facilities in the study area" is therefore rejected. This falls in line with the findings of Olamiju (2014) who establishes a strong association between the influences of provision of infrastructural facilities on micromanagement activities in private residential layouts in Akure.

According to him, the effectiveness of managerial activities in any residential land use is predetermined by the level of infrastructural facilities available in such area. Also, Aluko (2011) argues that supply of sanitary and infrastructural facilities is increasingly becoming inadequate for the ever-teaming population influx into urban centres. According to him, cities continued to grow but at a rate faster than the types of facilities initially installed. Consequently, the rapid population growth and physical expansion of cities have been accompanied by inadvertent urban sprawl, environmental pollution, deterioration, and deficiencies in modern basic facilities. Therefore, as increased urbanization exerts more pressures on urban facilities, most Nigerian cities tend to be losing their original dignity, social cohesion and administrative efficiency.

In view of these, a strong relationship between the functionality of infrastructural facilities and urban land use can be established to endorse the rejection of the hypothesis as revealed in findings made in the study. It is clear, therefore, that availability of functional infrastructural facilities in the study area (be it household or neighbourhoods facilities) will enhance growth, orderly development, as well as, efficient productivity of residents. It is also believed that it will serve as strong impetus to sustain healthy condition of the physical environment in the area.

5.0   Conclusion   and   Policy Recommendations

The study established the relationship that exists between land use changes and functionality of infrastructural facilities in urban areas of Akure. It should be noted that uncontrolled expansion due to unguided development through urban sprawl into rural lands is taking serious tolls on the socio-economic lifestyles of rural dwellers around the city. Therefore, efforts need be asserted at all levels to improve urban planning strategies on this issue with a view to promoting sound and sustainable environment. All existing policies on urban growth monitoring should be given proper review while new policies that will match-up with the current trend of development and growth be postulated on appropriate models for maximum results. The existing land use in the study area is more of residential with other complimentary urban components punctuating the whole area. Findings show that most households do not have sanitary facilities. In some places where they are available, they are either not adequate or completely out of use. Thus, provision of essential facilities and property rehabilitation become very essential. This should involve improving the existing infrastructural facilities, as well as, providing new ones with a view of making their services friendly, functional, accessible and adequate. Ideally, it is expected that as a city expands, the infrastructural facilities are to be replicated in newly developed areas and hinterlands while the existing ones are given adequate maintenance through periodic revamping for efficient usage. By these, the principle of sustainable city development will be a reality and beneficial.

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SIGNIFICANCE OF COMPULSORY LAND ACQUISITION IN THE DELIVERY OF PUBLIC HOUSING IN NIGER STATE

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Abstract

The provision of housing requires effective access to land. In Nigeria, access to land for public housing development is through compulsory acquisition. Also, the right to adequate compensation is a fundamental human right duly enshrined in the nation's constitution. This paper examines the significance of compulsory land acquisition in the delivery of public housing in Niger state. The study is based on descriptive research design and utilised secondary data obtained from the Niger State Ministry of Lands and Housing. It discusses in chronological sequence, the development of compulsory land acquisition practice in Nigeria and evaluates the quantum of land acquired by Niger state government from 2007 to 2017. It concludes that there is need for equitable acquisition of land for mass housing in Niger State to reflect the population of the senatorial zones of the state as well as mechanism that guarantees transparent identification of genuine claimants for assessment and payment of compensation based on the principle of fairness, equity and justice.

Keywords: *Land; Compulsory Acquisition; Public Housing; Niger State*

Introduction

Housing is a fundamental need of man after food. According to the United Nations, in Article 25(1) of the universal declaration of fundamental human rights, housing is a basic right of mankind. Jinadu (2004) stressed that it is a product that must be provided by government to all in order to guarantee security and good life of the populace. In achieving this objective, the government at all levels usually invoke the power of eminent domain to acquire land for provision of public housing and, for the sake of fairness, equity and justice, provide compensation to the claimants of various interests in the land. Eminent domain refers to the power of the state to expropriate private interest in land for public uses. In some countries, especially developing countries, adequacy of compensation is the key issue in compulsory land acquisition and in some cases little or no compensation is paid (Deininger, 2003). In Nigeria, the goal of compulsory land acquisition is to ensure access to private lands for overriding public purposes. One of such purposes is public housing development. It is against this background that this paper examines the significance of compulsory land acquisition for in the delivery of public housing in Niger State of Nigeria.

Evolution of Compulsory Acquisition and Compensation Practice in Nigeria

Compulsory acquisition and compensation practice in Nigeria has evolved through three major periods, namely the pre- colonial, colonial and post-colonial eras.

Pre-colonial Era

In Northern Nigeria, emirs were the chief custodians of all vacant lands. They were assisted by their lieutenants (*the Hakimi, Dagaci and Mai-anguwa*). These vacant lands include lands within the immediate vicinity and distant area under their jurisdictions. Once the emir allocates land, the allottee has absolute right to the land, he can alienate, develop, sell, loan and pass his right to the land to his inheritor but in most instances, he cannot alienate the land to a stranger without the prior consent of the emir (Atilola, 2010).

In Southern Nigeria, elders of the heterogeneous clans and communities were vested with the control and management of land within their communities by virtue of being the elders among their peers or a spiritual leader. Permanent alienation was considered forbidden because of the belief that land belongs to the gods and ancestors. Each elder has prerogative power to give land for any purpose such as building shrine or public institution. Alternative land was offered as compensation, though there was no clear delineation of the quantum and nature of the alternative land to be offered as compensation. Adequate communication with the parties (acquiring authority and land owners) prevented disputes in most cases (Umeh, 1973). More so, marginal population as against land mass and subsistence economic activities were factors that supported the customary acquisition and compensation trends as it were (Ezenwa, 2009). Different factors such as the socio-economic characteristics of the various geographical entities supported the system of land tenure operational before the advent of colonial rule in the country.

Colonial Era

The British government introduced English law into Nigeria in 1861 and by 1863, Ordinance Number 17 was enacted to empower the government in Lagos to demolish buildings affected by government activities. The ordinance was enacted to aid the government in accessing land. It paved way for the enactment of other ordinances which include:

1) The Ikoyi Land Ordinance of 1908 that declared certain lands as crown land
2) The Native Land acquisition proclamation law of 1900
3) The Native Land Acquisition Proclamation Law of 1903
4) The Crown Land Management and Proclamation Law of 1906
5) The Native Acquisition Ordinance of 1916
6) The Niger Land Transfer Ordinance of 1916
7) The Crown Ordinance of 1918
8) The Registration of Title Act of 1935
9) The State Land Act Cap 45 of 1958

In Northern Nigeria, Section 2 of the Land and Native Rights Proclamation Act of 1910 and 1916 ordinance declared all lands in Northern protectorate either occupied or not as native land. These placed restriction on the use of land in the region during the colonial period.

Post-colonial Era

By 1962, the Northern Nigeria house of assembly enacted the Land Tenure Law No. 25 Laws of Northern Nigeria, 1962. It declared all land in the protectorate as "native

land" irrespective of being occupied or not while in the southern part of the country, prior to the enactment of the LUA, lands were held by individuals, families and communities. The land tenure system in Northern Nigeria supported economic growth and development by facilitating access to land for development projects while land tenure in Southern Nigeria limited economic growth and development as it were (Oluwamoteni, 2010). However, the following laws relating to compulsory acquisition of land and compensation in the country were enacted in the post-independence era:

1) The Requisition Decree No. 3 of 1967.
2) The State Land Compensation Decree of 1968.
3) The Land Decree No. 30 of 1970.
4) The Public Land Acquisition Amendment Decree 1970.
5) The Land Use Decree No. 6 of 1978 (Land Use Act of 1978)

Legal Basis for Compulsory Land Acquisition in Nigeria

The rationale for compulsory acquisition of land by the government is to gain access to land for the provision of basic infrastructures for the overall benefit of the citizenry. The Land Use Act of 1978 is the principal legislation in Nigeria today that regulates compulsory land acquisition and compensation in the country. Section (1) of the Act vests ownership of all lands in a State in the governor who will hold and administer such lands for the common benefit of all.

Governors in Nigeria apply three essential powers in the control and management of land use. These include power of eminent domain, police power and taxation power. Eminent domain power arises as a result of the assumption that all lands belong to the state and shall reverse back to the state. Kuye (2010) argues that the source of power for compulsory land acquisition in Nigeria consists of military decrees, customary laws, statute law and constitutional law. Part 5 of the Land Use Act provides details on revocation of right of occupancy and compensation thereof. Section 28 of the Act states that "it shall be lawful for the governor to revoke right of occupancy for overriding public interest".

At present, the legal basis for land compensation in Nigeria is clearly stated in Section 29(4) of the Land Use Act of 1978 as follows:

(a) 'the land, for an amount equal to the rent, if any, paid by the occupier during the year in which the right of occupancy was revoked;

(b) buildings, installation or improvements thereon, for the amount of the replacement cost of the building, installation or improvement, that is to say, such cost as may be assessed on the basis of the prescribed method of assessment as determined by the appropriate officer less any depreciation, together with interest at the bank rate for delayed payment of compensation and in respect of any improvement in the nature of reclamation works, being such cost thereof as may be substantiated by

documentary evidence and proof to the satisfaction of the appropriate officer; (c) crops on land apart from any building, installation or improvement thereon, for an amount equal to the value as prescribed and determined by the appropriate officer'.

A lot of scholars including Kakulu and Nuhu (2012), Udoekanem (2013) and Sule (2014) have argued that the assessment for compensation for compulsory acquisition of land in Nigeria is basically statutory and that the valuation methodology to be adopted for the assessment must be derived from the LUA. This implies that for the compensation claims to be legally acceptable by the acquiring authority, the assessment must be done in the manner prescribed in Section 29 (4) of the 1978 LUA. The various key players in the compulsory land acquisition process in Nigeria are illustrated in Figure 1.

Key Players in Land Acquisition and Compensation in Nigeria
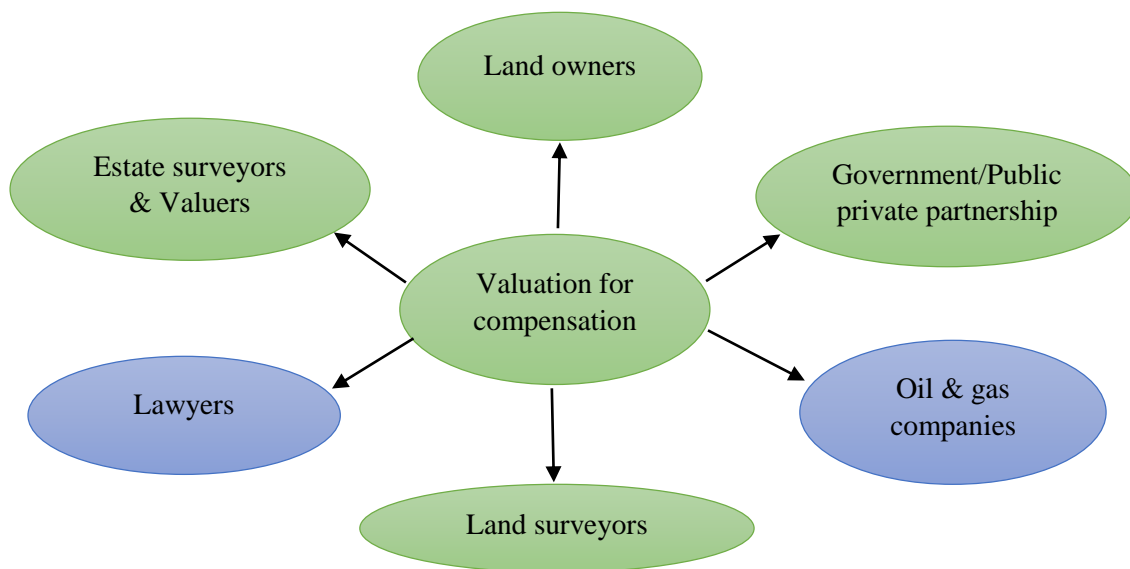
Figure 1: *Key players in the compulsory land acquisition and compensation process in Nigeria*

Source: *Adapted from Kakulu (2008)*

The key players in the compulsory acquisition of land and compensation process in Nigeria include the estate surveyor and valuer that represents the government or the acquiring authority, the estate surveyor and valuer that represents the claimant (s), land owner, the government/public private partnership (e.g. oil companies, construction companies, industries, infrastructure development partners, etc.), lawyers, land surveyors and community representative (in the case of community lands). It is worthy to mention that the professional expertise and skill of the valuation officer in charge of the

acquisition and compensation is very crucial in determining adequate compensation to the claimant (Famuyiwa & Omirin, 2011).

Unexhausted Interests for Compensation

The basic components of the unexhausted interests to be assessed in a just and fair compulsory land acquisition exercise are:

i. The portion of land itself;
ii. Development on the land (improvements, development or modification attached to land);
iii. The good will enjoyed on the land apart from market value of the land;
iv. Interest accruing as a result of delay in payment of compensation from the date of acquisition;
v. Overhead incurred (rationally) as a result of the acquisition;
vi. Reduction in value of other lands as a direct consequence of the scheme;
vii. Professional cost incurred (from advice to submission of documents);
viii. Incidental cost arising from seeking alternative accommodation;
ix. Incidental cost in agricultural operation when only a portion of the land is acquired;
x. Interim loss of income;
xi. Personal suffering/hardship;
xii. Perpetual loss in value of a business displaced by the acquisition; and
xiii. Additional damages or losses suffered from the occurrence of acquisition.

It is an established norm in many jurisdictions that payment of compensation should be guided by intent of "equity" and also, the adequacy of compensation should be scaled against the aim of ensuring that claimants are neither enriched nor impoverished by the acquisition exercise (Keith, 2008). There is no universal definition of adequate compensation; In Africa, Tanzania accepts payment of prevailing market value plus other losses and disturbance suffered (Komu, 2007). United Kingdom's principle on compensation is grounded on the value in use to the owner; encompassing market value plus losses and disturbance whereas the United States adopts only market value as the just compensation to the expropriated land owner (Denyer –Green, 2009).

The application of universal views on the principle of compensation in a developing economy such as Nigeria is a herculean task. This is occasioned by dearth of data on land market transactions and land records, lack of well-defined and standardized right to land, plethora of conflicting laws on compensation accommodating manipulation and multiple interpretations. Yet the Nigerian Constitution in Chapter IV places the right to adequate compensation as a fundamental human right. Hence, failure to pay the claimant compensation for unexhausted interest acquired is a breach of his/her fundamental right. Section 44(1) of the constitution states:

> *'No moveable property or any interest in an immovable property shall be taken possession of compulsorily and no right over or interest in any such property shall be acquired compulsorily in any part of Nigeria except in the manner and for the purposes prescribed by a law that, among other things -*

(a) requires the prompt payment of compensation therefore and
(b) gives to any person claiming such compensation a right of access for the determination of his interest in the property and the amount of compensation to a court of law or tribunal or body having jurisdiction in that part of Nigeria'.

Non-payment of compensation is therefore unconstitutional (Nuhu, 2008).

The Nature of Land Acquisition and Compensation in Nigeria

The task confronting the process of land acquisition and assessment of compensation is enormous and hinges on the type of environmental resources warranting acquisition and compensation, nature of the resource to be acquired and the statutes guiding the process. Kakulu *et. al*.(2009) did a content analysis on land compensation within the Nigerian oil and gas industry and found that legally, the country lacks distinct assessment and compensation code for application under diverse circumstances, plethora of isolated and often conflicting enactments regulating the practice of assessment and compensation in various sectors are subject to different interpretation and manipulation. More so, equity, fairness, adequacy, equivalence, completeness which are the essential principles of compensation are not pronounced in several enactments while compensation rates are not based on recent valuation comparable to the time of spill as the approach demands, but rather outdated rates spanning several decades are being used which are inconsistent with international valuation standards, crop enumeration and outdated predetermined value/rates as proxy for compensation values still persist despite scientific and technical innovative approaches that take into cognisance the present, medium and long time effect of oil spill on environmental resources. Cost of replacement method of valuation used for assessing compensation rate in Nigeria is based on the notion that cost is equivalent to value; in reality, some properties are income generating investments, the investment method of valuation should ideally apply. Also, method of valuation for economic tree and crop is erroneously not specified in the LUA. Some lands are actually acquired without compensation from the acquiring authority. However, where compensation is paid in most instances, disturbance, injurious affection and severance suffered by the claimant are not included in the assessment for such compensation (Nuhu & Aliyu, 2009). This gives room for sharp practices by the various groups participating in the compulsory acquisition and compensation process. Hence, the claimant will be left in a financial state lower than where he was before the acquisition (Deeyah & Akajuru, 2017).

In a developing and volatile economy like Nigeria where lands are acquired for development, land owners' perspective on compensation only considers monetary worth and not the economic value of the project for socio-economic benefit in terms of medium and long term development plan (Oluwamoteni,2010). Immediate monetary benefits from compensation in most cases serve as rescuer to the land owner, it serves as a source of financing his housing need in case

resettlement is not offered by the acquiring authority. Displacement of communities, businesses and people from their ancestral homes have significant human cost, therefore the process of acquisition and compensation must be based on international best practice (Munro-Faure, 2009).

Issues involved in Compensation Assessment in Niger State

Private ownership of land in Niger State is more pronounced than the state ownership. Land transactions are done by the people without the consent of the governor despite the availability of the LUA of 1978. Customary land tenure system still persists alongside the right of occupancy issued under the LUA. The customary land tenure system accommodates multiple individual ownership on a small piece of land. Lindsay (2012) as cited in Akujuru and Ruddock (2013) believes it is essential to concentrate on the private right to land which is to be expropriated as a result of compulsory taking over of his interest or source of his livelihood. Taking over private land most especially if it is the source of a family's income, will have significant impact on the socio-economic wellbeing of the family.

A privately owned right to land might be subject to multiple levels of rights as a result of lease, mortgage, right of way (grazing routes), right to inheritance among others. In Niger State, customary right holders lease out their land to migrants from other parts of Nigeria. This singular act leads to the subdivision of interests existing in land. The trees belong to isolated family member, hills belong to the community, some improvements are mortgaged, and each

interest acquired by the acquiring authority is a significant loss to the owner. To this end, land is an invaluable scarce resource to the lives of a lot of people and their generation unborn (Mpwehuka 2012 as cited in Ndjovu, 2016).

For the purpose of acquisition, the Land Use Act recognises only unexhausted improvements on land for compensation and ignores other potential rights which might be affected as a result of the acquisition. This has significant effect on the livelihood of claimants most especially if the acquisition will directly displace established families. Ignoring economic benefits derivable from right to compensation will lower household disposable income for housing and increase the housing deficit bedevilling Nigeria for decades.

In developed countries, compensation has transcended from payment for loss of land and improvements to encompass losses suffered, cost, harm to business and disturbance associated with the acquisition. In Niger State, it is the LUA that dictates the valuation method to be adopted in the assessment for compensation which has been widely criticised to be inadequate. Nuhu and Aliyu (2009); Udoekanem (2013) and Sule (2014) have advocated for an amendment of the relevant provisions of the LUA that regulate the assessment of land acquisition in the country in order to achieve transparency, equity and fairness in the determination and payment of adequate and just compensation.

Implications on Sustainable Public Housing

The right to shelter by the citizens is a fundamental human right to be fulfilled by the government of every nation. In order to achieve this, the government requires unhindered access to land to develop affordable houses for the populace. Data from the 2006 National Population and Housing census estimate indicates that with the growth rate of 2.5%, the population of Niger State will rise to 5,983,419 by 2019 and will continue to increase. Comparing the trend in land acquisition by the government in Table 1, without a corresponding increase in mass housing development coupled with the rapid population increase, achieving sustainable housing provision for the populace is a mirage. It will therefore take the present government continuous housing intervention programmes to fill the gap created in the provision of mass housing to curtail the housing deficit in the State.

Methodology

The study is based on descriptive research design. It utilised secondary data obtained from the Niger State Ministry of Lands and Housing. The data used in the study were obtained from newsletters and relevant documents from Ministry of Lands and Housing and Niger State Housing Corporation. Archived databases from previous empirical studies conducted have increasingly become a source of data for researchers (Teddlie & Tashakkori, 2009). Secondary data comprised data on quantum of land acquired for public housing development in each of the three senatorial zones in Niger State for the period, 2007 – 2017 and the status of the housing development projects as presented in Table 1. The data were analysed using descriptive statistical techniques and the results are presented in charts.

Table 1: Land acquired in Niger State for Mass Housing Development, 2007- 2018

Period of acquisition	Name of mass housing scheme	Area of land in Hectares	location	Stage of development
2007	M.I Wushishi housing estate	60	Kafin-Tela Minna	Completed
2008	Three arm zone housing estate	311	Maitumbi-Minna	Uncompleted
2008	Sani bello housing estate	50	Kontagora	Uncompleted
2008	Makama housing estate	50	Bida	Uncompleted
2008	Fed teachers housing scheme	50	Paiko	Uncompleted
2008	1000 housing unit Diko-kabo road	50	Gurara	Uncompleted
2008	Nigeria in diaspara	50	Kuchiko-New Bwari	Uncompleted
2009	Commercial layout (housing estate)	50	Chawa	Uncompleted
2009	Talba housing estate phase I	60	Bida road Minna	Completed
2009	Minna Airport City housing scheme	378.707	Maikunkele	Uncompleted
2009	500 housing unit	50	Maji Tunga shanu road Zariyawa	Uncompleted
2017	NSDC low residential layout	50	Butu Minna	Uncompleted

Source: *Compiled from NSML&H (2018)*

From the data presented in Table 1, land acquisition for mass housing development for the past 11 years took place majorly in 2008. After this year, subsequent government did not lay much emphasis on acquisition and compensation due to the dwindling economic fortunes of the state. By implication, access to land for mass housing development in the State is abridged and a huge gap is created in the provision of houses for the masses.
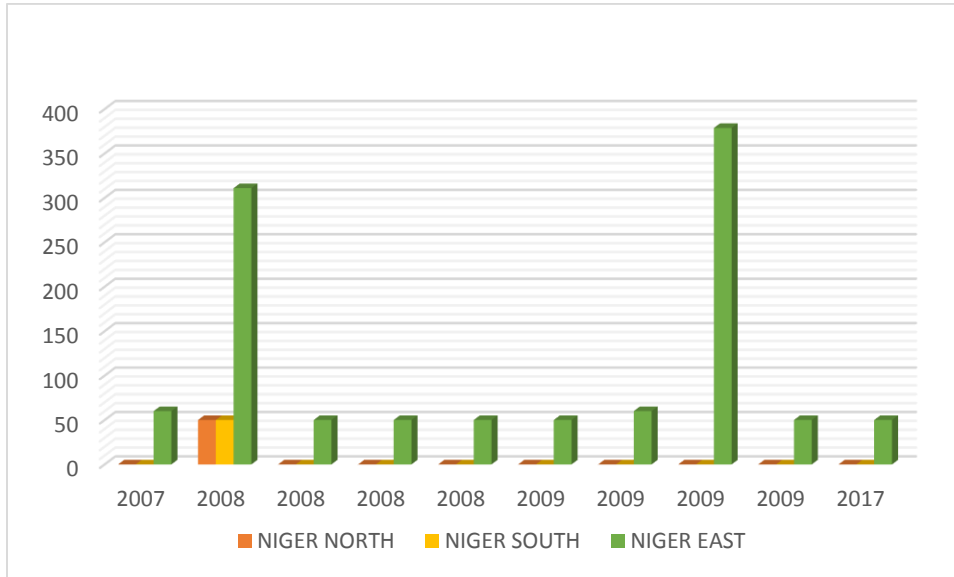
Figure 1: Distribution of land acquired for mass housing in hectares, year and location

Figure 1 above depicts the geographical spread of land acquired for mass housing by Niger State Government from 2007 to 2017 in hectares, for the three senatorial zones in Niger state. The chart above shows year of acquisition on the horizontal axis, the size of the land on the vertical axis and the location. The chart also indicates that acquisition of land was more prevalent for mass housing in 2008 through 2009. This might not be unrelated to the global dwindling economy faced by developed and developing nations. Thus, there is need for paradigm shift of government policy in favour of land acquisition for mass housing in Niger State.

Figure 2: Percentage of land acquired for mass housing in Niger state

Figure: 2 shows the total land acquired for mass housing in percentages from the three senatorial zones of Niger State computed from Table 1. The outcome of analysis here suggests that the geographical spread of land acquisition in Niger State is not evenly distributed within the three senatorial zones. The pie chart shows that 92% of land acquired for mass housing is within Niger-East zone, while Niger-South and Niger-North zones have 4% respe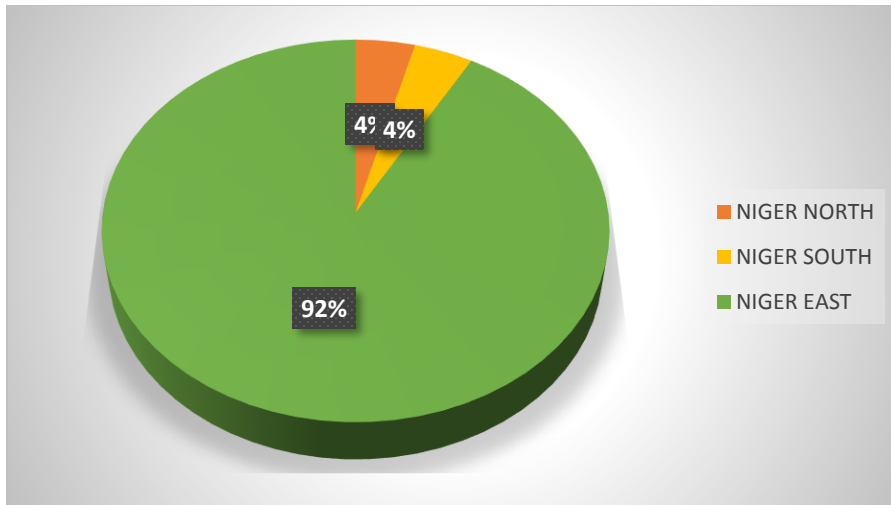ctively. This disparity in acquisition of land for mass housing to the advantage of Niger-East senatorial zone is as a result of Minna being the capital city and administrative capital of Niger State, coupled with growth in population and demand for housing (Nuhu & Aliyu, 2009; Salihu *et. al.,* 2018).

Conclusion and Recommendation

Before the advent of colonial rule in Nigeria, the northern and southern parts of the country each had its peculiar way of land acquisition and compensation in line with socio-economic needs of the people. Many ordinances and enactments were put in place to advance the goals of the colonial administration in the country. The enactment of the Land Use Act was to integrate the various land tenure systems and enhance access to land by the government for the provision of infrastructural facilities including mass housing. There are many complex challenges which are faced in the acquisition of land for public purposes as well as the payment of adequate compensation. These include inappropriate method of valuation for buildings, economic trees and crops, non-payment of compensation in some cases, non-inclusion of losses due to disturbance, injurious affection and severance in the assessment of compensation, non-standardization and defining of compensation rates, among others. These challenges are similar across the various States in the country. Acquisition and compensation is no doubt a function of the government. In a country where majority of its population are living below the United Nation's poverty level, acquiring their land without the principle of "equity" applicable to the process of acquisition and compensation will not empower them to economically resettle elsewhere. Instead, they will be

worse-off as a result of the expropriation of their interest in land. In conclusion, there is need for equitable acquisition of land for mass housing in Niger State to reflect the population of the senatorial zones of the state and mechanism that guarantees transparent identification of genuine claimants for assessment and payment of compensation based on the principle of fairness, equity and justice.

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THE DILEMMA OF URBAN GROWTH AND URBAN RESILIENCE IN A SUB SAHARAN CITY OF KADUNA, NIGERIA.

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Abstract:

The rapid growth of urban areas like Kaduna in the Sub Saharan region of Africa may serve as a potential driver towards economic growth and development considering the strategic role of urban areas as the Centre of human attraction and economic agglomeration that promotes productivity and improved standard of living. This study focuses on assessing the growth pattern of Kaduna urban area and it implications on adaptability and resilience. A systematic method of remote sensing and Geographic Information System (GIS) was used to extract the needed spatial data. Furthermore, the spatial analysis of data was done using the ArcGIS 10.2 software, Findings from the study revealed an outward radial growth of built-up area from 8440.31hectares representing 18.7% of total urban area in the year 1986 to 17,120.5 hectares representing 38.3% in the year 2016. A Mean Fractal Index (FI) of 1.29, for the years 1986, 2006 and 2016. Furthermore, a general falling Population Density (POD) from 10,422 persons Per square kilometers in the year 1986 to 7,726 persons per square kilometers in the year 2016. The identified pattern of growth for the city may likely chip away resilience, therefore, making the entire urban growth more difficult and unsustainable. An effective and stringent development control measures as major policies approach will help in guiding and balancing urban growth towards resilient.
Keywords: *Urban growth, Resilience City, fragmented development, fractal Index, Population Density.*

1.0 Introduction:

The urban growth in a sub- Saharan Africa region is determined in terms of sharp demographic increase and rapid physical expansion of towns and cities. The rate of urban growth across the region can be connected to the large-scale urbanization phenomenon been witnessed in recent years. The United Nations report pointed that 37% of future urban growth would simultaneously take place in India and China in Asia, and Nigeria in the sub-Saharan region of Africa

(UN, 2014). The entire process of urban growth in developing countries of sub Saharan is driven by demography forces of push-pull factor(Hartshorn, 1992). Therefore, bypassing the secondary stage of industrial activities has made urbanization and growth to be very rapid and associated with many challenges particularly with respect to economic, social and environmental aspect. On the other hand, resilient cities attempt to maintain its physical function while promoting ecological roles of the cities(Gunderson & Holling, 2002) .Therefore, a balance between urban growth

and resilience may be very paramount in our quest toward sustainability.

The general process of urbanization and growth across the globe has been very key to human development over the years considering the benefits associated with agglomeration and collective consumption (UN-Habitat, 2010). Urbanization and urban growth is recognized as a potential catalyst for economic development that can enhance structural transformation and serve as an engine of growth and development (Dorosh & Thurlow, 2011; Turok & McGranahan, 2013). The growth of urban areas which is considered as a part of the transitional process associated with urbanization in the 21 century may not be a problem at all considering the strategic role of the urban areas as the centre of intense human activities, economic growth and the betterment of human living condition (Cobbinah, Erdiaw-Kwasie, & Amoateng, 2015; Fagbohun, 2007). However, the overall pattern, direction and the scale of urban growth have been the issue of concern over the years. The rapid urban growth amid weak and inefficient land use system may gradually lead to the degeneration of the physical environment. The major characteristics associated with urban growth in the sub-Saharan region is the outward growth from the inside driven by forces of dynamism such as population and economic activities (Zakka et al.,2017). As this forces continue to exert internal pressure that leads to horizontal expansion over time. The availability of a land use plan may help guide the provision for the various land use activities and management over an earmarked period of time, while the lack of land use plan or non-implementation of the existing plan may likely affect urban growth. The continue process of uncontrolled urban growth which has great consequences on the urban land use cover and changes which may further impacted negatively on the ecological landscape of the urban centre and may pose a threat to the concept of sustainability at both the local and global front (Nwokoro & Dekolo, 2012) that may hamper resilience.

This study focuses on assessing the general growth pattern of Kaduna Urban area using selected spatial indicators of Fractal Dimension Index and Population Density. Furthermore, is to ascertain the implications of current urban growth pattern on adaptability and resilience towards the paths of sustainability. In accordance with the above goal, the following objectives are drawn for the study: (1) to establish the trend and pattern of urban growth for the city, (2) to determine how the current trend and pattern of growth may likely affect urban resilient and the path towards sustainability and (3) to put forward policy recommendations that will guide urban growth towards resilient and sustainability. Above all, having a clear perspective of the trend and pattern of urban growth will help the major urban stakeholders to be able to regulate and direct the entire growth process towards the path of resilience and sustainability.

2.0 Study Area and Methodology:

The sub-Saharan city of Kaduna, Nigeria was the focus of this study. Kaduna is currently a medium size city located in Northern Nigeria in the West Africa sub-region. The emergent of the city is traced back to 1907 by the British colonist. Kaduna is located between latitude 10°, 27'N and 10° 38'N and between longitude 7°, 20' E and 7° 35'E. A city with a population base of 628,000 people in 1980 is expected to have a projected population of over a million in the year 2016 (UN, 2007). A focus on Kaduna is motivated by the structural changes in physical forms, population, economic and social composition of the city due to rapid growth through the years.

A systematic technique of Remote Sensing and Geographic Information system (RS/GIS) was used to extract the needed spatial data. Furthermore, the spatial analysis of data was

done using ArcGIS 10.2 software. Based on the generated spatial data, the landscape spatial metric was used to calculate the Fractal Dimension Index (FI) and the unit of Population Density (POD) for the city. Figure 1, is the Landscape map for Kaduna urban area showing the spread of patches over the years under consideration. The landscape map was also used to generate spatial data that were used to calculate the Fractal Dimension Index (FD) and the overall Population Density (POD) for the city.
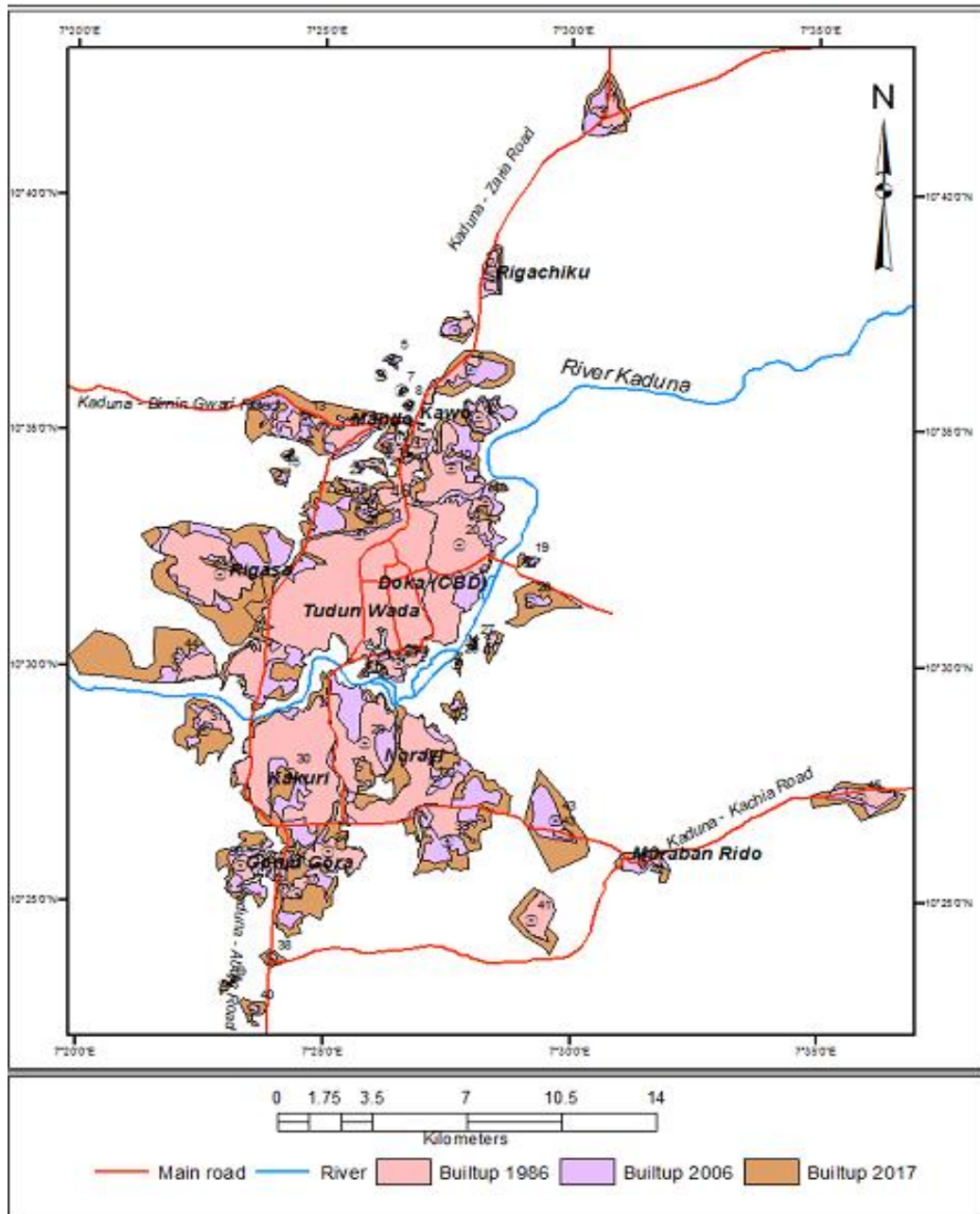

Figure 1: Kaduna Urban Landscape showing patches
Source: Landsat 1986, 2017 and Quick Bird 2006

Fractal Dimension Index (FI):

A Fractal Dimension Index was introduce to measure the degree of urban fragmentation (McGarigal, 2015) and has widely been used afterward. The FI, usually served as an indicator to show the level of aggregate or fragmentation in the urban physical growth and development. The fractal dimension is expressed as equal two times the logarithm of patch perimeter (M) divided by the logarithm of patch area (M^2) (McGarigal, 2015).

$$FI = \frac{2log(Pi)}{log(Si)}$$

- (Pi) = Perimeter of patch Pi in (M)
- (Si) = Area of patch Si in (M^2)
- FI values Ranges between 1 and 2

As FI values skewed to 2 the urban area under consideration is considered more compact, while a skew towards 1, development becomes fragmented indicating sprawling.

Density as a unit of measurement:

The Population Density (POD) is one of the indicators that can be used to measure the number of persons spread across the urban landscape over a given time. A continued decline in urban population density may be an indication of fragmented urban growth, while high population density may be an indicator of the compact growth of an area. The population density can be expressed in the following generic formula.

$$POD = \frac{Number\ of\ People\ (N)}{Area\ in\ Sq.Km\ (A)}$$

By this formula, the population density of urban areas at any given time can be determined.

3.0 Results, Findings, and Discussion:

A time series analysis of the land use cover of the city over a period of thirty (30) years as shown in Table 1 and Figure 2 revealed that the land use cover for the years 1986, 2006 and 2016 show an increase in the built-up area from 8440.31 hectares (18.7%) in 1986 to 17,873 hectares (39.9%) in 2016 and placed second to farm land. On the other hand, the natural areas of farmland, vegetation, Water bodies and bare surface show a declining trend of -5,671.62 (12.00%), -2,128.75 (4.7%), -119.78 (0.27%) and -1,531.62 (3.42%) respectively during the period of 1986-2016, as shown in Table 1. The general trend of urban growth as shown in Figure 2 is characterized by increase in the built up and decline in the natural area.

Table 1: Kaduna urban land use cover trend 1982-2016

Land Cover	Area in Hectares (1986)	% of Area (1986)	Area in Hectares (1990)	% of Area (1990)	Area in Hectares (2006)	% of Area (2006)	Area in Hectares (2016)	% of Area (2016)	Changes 1986-2016 (Hectares)	% of Changes
Built-up area	8440.31	18.7	9,610.36	20.3	12707.48	24.4	17,873.00	39.9	+9,432.69	111.76
Farmland	23175.12	51.5	22204.80	50.6	17,679.15	43.2	17503.50	39.0	− 5,671.62	-24.47
Vegetation	10,019.60	22.7	9919.60	22.1	9373.00	20.7	7,890.85	17.6	− 2128.75	-21.25
Bare Surface	2159.30	4.8	2059.30	4.6	4347.39	9.4	627.68	1.4	− 1531.62	-70.93
Water bodies	1040.33	2.3	1,040.33	2.3	1012.03	2.3	920.55	2.1	− 119.78	-11.51

Source: Authors Analysis, 2016
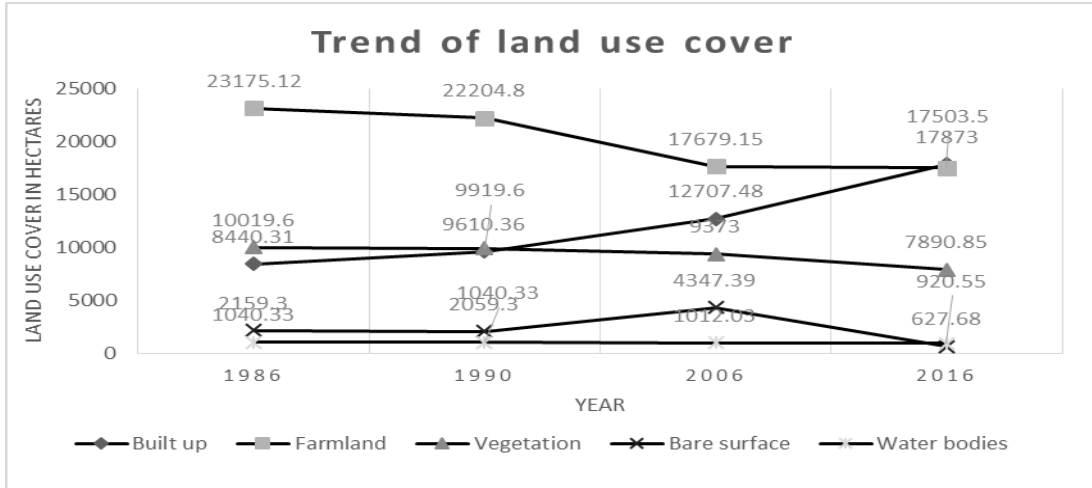
Figure 2: Trend of Land use/Land cover for 1986-2016

To ascertain the spatio temporal pattern of growth for the city, the FI was calculated based on the generated data from the thematic urban map of Kaduna Landscape.

Table 2. Showing Values of Fractal Dimension Index and Population Density

	Year	Fractal Dimension Index(FI)	Population Density (POD)
1	1986	1.36	10,422
2	2006	1.27	9,609
3	2016	1.26	7.726
Total		3.880	27,757
Mean		1.29	9,252

Source: Authors Analysis, 2016
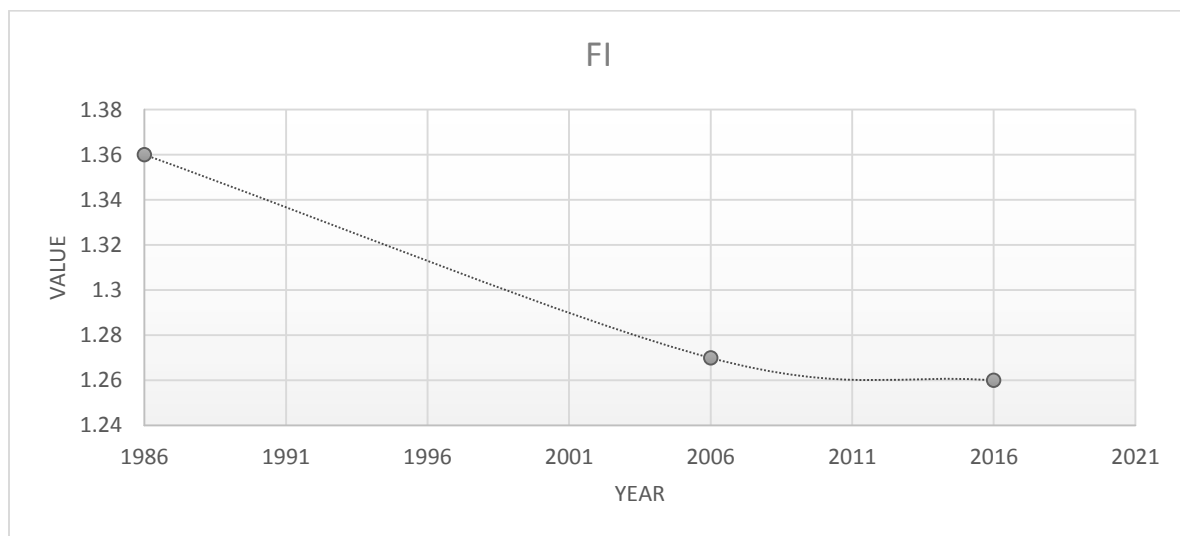
Figure 3. The trend of Fractal Dimension Index (FI)

The calculated value of the FI in table 2, and plotted in figure 3. Show variation in the FI values for the years under consideration. FI value for 1986 = 1.36, 2006= 1.27, 2016= 1.26 and a general mean value = 1.29. All the calculated values revealed a decline skewed away from 2, therefore indicating a growth pattern characterized by fragmentation of the urban landscape.
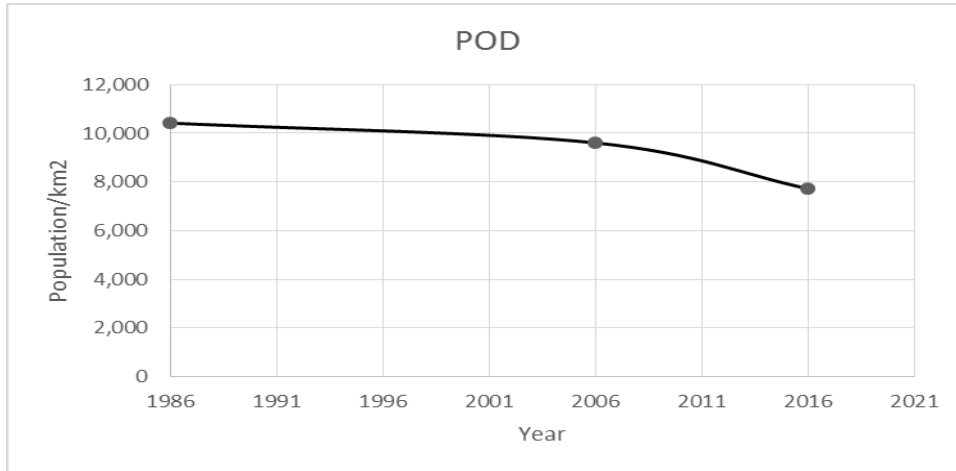
Figure 4. General Trend of Population Density for the City
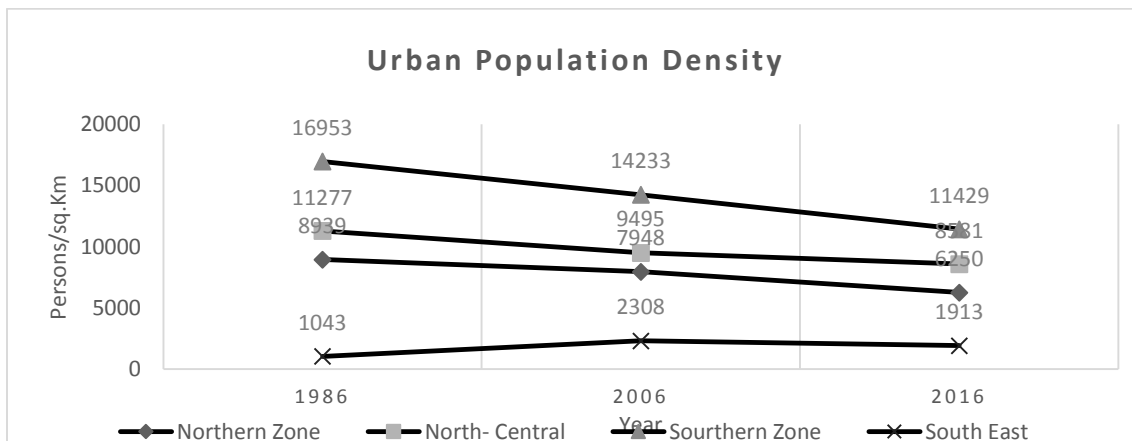
Figure 5. The trend of Population Density based on Zones in the city.

A look at urban growth base on the population density of the city as shown in table 2, Figure 4 and Figure 5 revealed a falling density amid steady population increase for the city over the years. The overall urban population density which was 10,422 persons per square Kilometer in 1986 has falling drastically to 7,726 persons per square Kilometer in 2016. On the similar trend, a look at population density based on the earmarked delineated four distinct zones in the city as shown in figure 5, each of the zones is characterized by a falling POD over the years under consideration.

The perspective of Urban Growth Based on Result and Findings:

Based on the results and findings the city of Kaduna has witnessed a steady horizontal expansion of built-up area, while identified

natural land use cover such as farmland, Vegetation, and Water shade area has shown a gradual decline.

A perspective of urban growth based on the spatial-temporal pattern of growth of the city as shown in Kaduna urban landscape in figure 1 revealed a spread of patches across the city. The increase in patches within the built-up area is usually a sign of urban fragmentation (Reis, Silva & Pinho, 2016; Ramachandra, Bharath & Sowmyashree, 2015) A fractal index means with the value of 1.29 in table 2 further buttressed the loose pattern of urban growth over the years under consideration. A comparison of the city fractal index value of 1.29 and the fractal index value of some notable Cities across the globe which includes: Mexico City(1.81), Bangkok (1.81), Kuala Lumpur (1.79), Chicago (1.81), Yokohama (1.80), Barcelona (1.61) and Seoul (1.82)(Erdogan & Cubukcu, 2014) shows a wide gap. The high fractal index values of the listed cities show a growth pattern which is characterized by compactability as all values are close to two, while the low fractal index value of 1.29 indicates level fragmentation that requires the infilling of spaces. Furthermore, the population density revealed a trend of falling density across the entire urban landscape and also the same trend based on the delineated zones across the city. An average mean POD of 9,252 persons per square kilometer for the city is not bad, when compared to Freire (2013) that pointed out density in many Africa countries ranges from 1000 to 4000 persons per square kilometer. The major concern of POD in Kaduna as revealed by this study is the continue falling trend amid increasing population in the coming years ahead.

The Implications of current growth on urban resilience and sustainability

The current growth of the city marked by a decline in the natural land use cover poses a major challenge to contemporary urban planning concept of urban resilience, adaptability, and sustainability. The urban resilient is define by the capacity to endured or absorb the consequence of hazard through the mechanism of resistance or adaptation during the crises period and later recover back it original statue(Twigg, 2009) Furthermore, resilience is the ability of the urban system that is exposed to hazard developed a strong resistance mechanism in order to absorb, accommodate and greatly overcome it within a short time frame in a very efficient manner(UNISDR, 2010). A resilient city has the ability to withstand and overcomes all forms of natural and manmade induced hazard overtime without abrupt collapsed that may lead to malfunctioning of the urban system. In accordance with urban design principles that entrenched urban resilient as pointed by Resilientcity (2017) urban area need to grow or develop in a way that the natural components of the city are safeguarded and enhanced for the betterment of all. It is a fact that, there is a direct link between the natural green land cover of the city and its ecological functions and ecosystem services (Gill et al.,2007; Pauleit, Ennos & Golding, 2005) . Therefore the decline in natural land cover of the city may reduce the adaptation ability of the city. Adaptation on it owns play a vital role in modifying the ecological and social system to accommodate the adverse impacts of climate change over time(Barnett, 2001). The natural area of the city is considered as the ecological system that acts as it adaptability mechanism that helps in regulating the resilient process that is needed to keep the city safe and healthy. One of the pathways towards green growth as pointed by White, Turpie, and Letley (2017), is that urban growth and city structure should be guided to avoid indiscriminate loss of natural and semi-natural open space. For example, the expansion of settlements towards natural green area especially along river floodplains and wetland increases the vulnerability of the urban area

towards the hazard of flooding which may further weaken adaptability mechanism and resilient.

The pattern of growth based on the above indicators signified a symptom of sprawling. Urban sprawling is a predictor of land, because it increases urban land consumption sharply(Alterman, 2002; Laros & Jones, 2014) than required. Zakka et al. (2017) Pointed that the uncontrolled expansion of the city has continued to increase the distance between the adjourning residential settlements at the fringes and the city center. The implications of increasing distance between the origin and destination may discourage trekking or the option of cycling. Therefore increase dependence on auto-mobile(Kockelman, 1997;Permana, Aziz, & Ho, 2015). The complication of high auto-dependence is seen in the increase air pollution at both the local and regional level, while at the global level it is measured in terms of greenhouse gas emissions considering the synergy between pollution and greenhouse emissions (Nam et al.,2014) which has remain very key on the ongoing global climate change challenges (Angel et al., 2005; IPCC, 2014; Watson, 2009). This phenomenon of urban growth continues to expose the city to become prone and Vulnerable to hazard.

In sub Saharan Africa, the urban growth pattern revealing a falling density is a major trend associated with many cities in the region (Farvacque-Vitkovic et al., 2008), falling density which is connected to sprawling makes the provision of basic urban infrastructure very difficult through an increase in the cost of supply, therefore limiting the chances of affordability of basic urban services(Freire, 2013). This further increases the environmental challenges and carbon footprint of the city. In addition, the trend and pattern of growth for the city of Kaduna is contrary to the current global derive towards green growth considering the fact that sprawling and green growth do not go together (Freire,2013). Above all, the trend of growth for the city which has negative implications for it resilient may likely affect the attainment of environmental sustainability over time. The goal eleven (11) of the current Sustainable Development Goals (SDGs) and goal seven (7) of the past Millennium Development Goals (MDGs) all highlighted the need to ensure environmental sustainability in urban areas, which further reaffirmed the importance attached to environmental issues in the 21st century.

4.0 Conclusion and Recommendations:

The decline in the natural asset of farmland, vegetation and water bodies reduces the city resilience and adaptability to climate change impact, retard the wellbeing and economic prospects of residents on a long run. In line with the current concept of green growth that accommodates the tenants of resilient, adaptability and sustainability. The following policies approaches are put forward as a guide to balance between urban growth and resilient for the city:

Strengthening the Land use planning system for the city: in order to revert the assertion of Dowall and Ellis (2009) that see land use planning for the sub-Saharan cities as weak. The land use planning system needs to be strengthen and reposition to accommodate the planning approach of new urbanism and compact growth. The ability to strengthen the land use planning will help to provide a comprehensive and long-term approach that will help reduces vulnerability amid continuing urban growth over time. The Land use planning approach should be reposition to integrate and balance between the urban growth and protecting the natural areas of city adaptability, resilient and sustainability.

Effective and stringent development control measure: Development control is that aspect of urban planning at the local level that

is used by the statutory authority to regulate all forms of development activities and to make sure it is in harmony with the physical local plan of an area. (Rakodi, 2006) considered lack of strict development control in major Nigeria Cities has led to a breach of development regulations and encroachment into a fragile natural area of the city. Effective and stringent development control measure should be through strict enforcement of development activities in line with the approved physical plan of the city. A proper and effective coordination of the mandated organ by the government will greatly enhance development control measures.

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SUSTAINABLE DEVELOPMENT GOALS (SDGs) AND INFRASTRUCTURAL FACILITIES DEVELOPMENT: A LESSON FOR NIGERIA
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Abstract
All human activities take place on land; making land related decisions crucial to national development. The success of private and public organisations depends strongly on the judicious use of land. Over the years, land use in Nigeria have suffered fundamental lapses resulting in deteriorating historical sites, waste, pollution, infrastructural inadequacy, housing deficit, insecure land tenure for the urban poor, environmental degradation, investment loss and other infrastructural facilities related challenges. This paper sets to reveal how SDGs can accelerate sustainability in infrastructural facilities development in Nigeria. The method of investigation is essentially a documentary and analysis of archival records. There are several concerted global efforts in achieving the SDGs with a view to achieving wellbeing, prosperity and adequate social infrastructure. SDGs provide the opportunities if well harnessed to fast track infrastructural facilities development in Nigeria. There is therefore, the need by governments at all levels to synchronise their infrastructural development plans with the SDGs with the view to accelerating infrastructural facilities development in Nigeria.

Keywords: *SDGs, Infrastructural Facilities, Nigeria.*

1.0   Introduction
Infrastructural facilities are fundamental pillars of any society in the operation of various sectors such as transportation, health care, housing, power, industries etc. They are structures or products relevant for the efficient functionality of nation's economy (Dipeolu and Fadamiro, 2013). Infrastructural facilities development provides an important basis of evaluating the performance of governance and as a tool for measuring economic growth and development. In recent years, the link between infrastructural facilities development and the growth of the economy has been an important consideration in the formulation of the national policies of nations.

Sustainable Development Goals (SDGs) which was pronounced as an outcome of the UN meeting in September, 2015 as a framework to succeed the Millennium Development Goals (MDGs) has an encompassing agenda of poverty eradication as well as fast tracking the developments of poor countries. Furthermore, in developing countries, challenges and opportunities are presented by SDGs as various nations have unique perspectives and as such should tailor the relevance of SDGs into their national plans and policies of action. Nedosi, Nedozi and Ighata (2014) defined sustainable state of the globe as one which the physical and social structures are firm and solid, accomplished through the means of satisfying

the needs of the present generation without any form of compromise made to future generations in meeting their own needs.

Sustainable development which hunts for the attainment of economic growth is a universal tactical objective that stimulates a rational and unbiased society whilst conserving the natural environment and its numerous non-renewable resources for the need of future generations. It is also the attainment of equality, creation of wealth, the safeguarding and just delivery of resources, and the achievement of improved economic, social and environmental standards of inhabitants. So, sustainable infrastructural facilities development describes the concept of being able to use the basic infrastructure as needed in the present, while at the same time ensuring its availability for future generations. Reffat (2004) provides an interpretation of sustainable development to mean an all-inclusive and united process of maintaining a dynamic stability between the demands and needs of the people for wealth, equity and what is ecologically possible.

This now makes it possible to deduce that attaining a sustainable level of infrastructural facilities is not solely based on the establishment of new infrastructural facilities but also entails the recycling, rehabilitation, and optimisation of existing infrastructural facilities**. This can be seen to mean the consistent revitalisation of existing infrastructure, the mitigation of energy and cost in the building process, the analysis of long-term economic impact and anticipated benefits of infrastructure**, the fortification of existing infrastructure from the environment as well as the thought of environmental

conservation during the procurement of material and the construction process. This study reveals how SDGs can accelerate sustainability in infrastructural facilities development in Nigeria

2.0   Infrastructural Facilities Development in Nigeria

The aspirations and desire of any nation is to attain sustainability in all phases and sectors of her economy which is dependent on fundamental considerations such as the quality and class of infrastructural facilities, industrialization level and the creation of an empowering environment through functional urban governance. Infrastructural facilities in African nations after a careful appraisal of its level of sustainability have been demoralizing as some of these facilities have virtually collapsed due to multiplicity of factors (Nedosi et al, 2014).The dilapidation of most infrastructure constitute a major environmental hazard in most African countries, it also retards the technological and economic advancement of most nations. Consequently, the dwindling resources in terms of budgetary allocation coupled with financial mismanagement and high level of corruption have drastically reduced the life expectancy of many infrastructural facilities in Africa

Also, unfortunately in Nigeria, the gradual but steady dilapidation and deterioration of available infrastructural facilities which is usually a symbolic occurrence only few years after its development is mainly attributed to the inadequacy of maintenance funds and strategies put in place by the recommended agencies and these public goods call for

attention if the United Nation's SDGs of 2030 is to be achieved. Nigeria has been deficient in the aspect of sanitizing and stimulating all the preferred concepts and practices for developing the needed infrastructural facilities programme for a broad spectrum of society beginning from the policy makers and extending to stake holders and the organised private sector. Despite these important basics, Oyedele (2012) in his view posits that Nigeria has been deficient in converting her unique advantages in terms of resources into economic and social welfares for the country and the majority of the human populace. The change in the political environment in May, 2015 was expected to improve the nation's economy but the fall in oil prices in August, 2014 has drastically reduced the revenues to the Federal government. Nigeria being a country dependent on large imported goods such as wheat, refined oil and gas products, rice amongst others, the fall in revenues to the government has significantly impacted the nation's currency negatively due to the high reliance on oil revenues, and limited investments in infrastructural facilities at the time of boom in oil prices. This makes the prioritizing of economic diversification in processing and manufacturing industries that are capable of providing supplies for local needs as well as competition in the global market.

Nations that have failed have been seen to have had some historical connection with diminishing budgetary allocation and according to Mac-Barango and Kakulu (2014) the pillar upon which the development, survival and sustenance of a nation's infrastructural facilities and other

private and public concerns is an efficient budgetary system, inadequate policy/institutional framework, and lack of both appropriate political will and management tools to put them in check. Although, The challenge of finance has specifically been identified as fundamental on the list with the existence of proper budgetary systems (finance) in a sustainable process provide a base upon which the continuous survival of infrastructural facilities depends and as such propelled the series of infrastructure privatization and regulation reforms in developing countries since the 1990s (Ogbonna & Ohiri, 2016). Hodson (2002) expressing his view concerning the vital role anchored by infrastructural facilities development states that the combative performance of virtually all aspects of a nation's commercial, technological and industrial base as well as the welfare of households is underpinned by the appropriate delivery of sustainable infrastructure. This is because infrastructural facilities should in a blended and interesting manner give the citizens of a nation the much desirable environmental aesthetics and affords social tranquillity especially with present users without compromising the benefits accrued to the future users.

However, the need for huge investment in infrastructural facilities in the diversification of the nation's economy cannot be over emphasized and has made the government made it a top priority in the current budgetary allocation of the 2018 because there isn't a better time in Nigeria to invest in infrastructural facilities development and no better time to contribute immensely to the diversification of the Nigerian economy.

3.0 Sustainable Development Goals (SDGs)

The transition from the Millennium Development Goals (MDGs) (2000-2015) to Sustainable Development Goals (SDGs) (2015-2030) by nations of the world propelled a close comparison in the development programs of the goals. The unchanged middle letter 'D' in the acronym provides an insight on the fact that development is of immense importance in the world's agenda. The General Assembly of the United Nations in September, 2015 adopted the 2030 Agenda for Sustainable Development chosen to curb key development challenges between 2015 and 2030. The Global Goals for Sustainable Development embedded deeply in the agenda also known as the SDGs having 17 goals and 169 targets.

Figure 1: pictorial view of the 17 SDGs
Source: United Nations (2016)

Although, the SDGs is said to form a world agenda, there is need to look at the world as a habitat of individuals, groups, cultures, places, economies, governments, amongst others all operating under different environments which has over time at different rates and ways been experiencing continued changes. The targets of the SDGs are to ensure access to adequate, safe and affordable housing; provide access to safe, affordable, accessible and sustainable transport systems for all and enhance inclusive and sustainable urbanization. Other set targets include reducing the adverse per capita environmental impact of cities; providing universal access to safe, inclusive and accessible, green and public spaces and Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials (United Nations Report, 2016).

The SDGs reveal an opportunity for the populace to advocate in one accord for

positive change built on the values of unity, care for creation, human dignity, and all-encompassing participation. Veritable tools and actions put in place to achieve these global goals should put into consideration the most marginalised set of people or groups in such a way that the goals or targets are not considered met unless met for all people, whoever they are and wherever they may be. The thought of engaging each other with shared sustainability objectives, full commitments, outcomes and impacts among NGOs, businesses and even the governments have quickly made the SDGs a universal language. An important contribution to achieving the SDGs is made by the private sector as the role of large multinational companies especially are key in curbing social and environmental problems in their sector and their supply chains. Achieving the SDGs signifies a business opportunity an environment faced with the degradation of natural resources and services, poverty, deprivation (inequality), water scarcity, power failure and climate change are all unfavourable for business which retards investor into committing their scarce resources into doing business in such environment.

At the development of the SDGs, the part played by the private sector was exceptional and equally the private sector will be charged with the trust of implementing the SDGs. Although, majority of the top businesses have made been committed to the cause of solving some of our biggest challenges today, such as poverty, steady change in climatic conditions, deforestation, amongst others, much is still expected of the business community to help

achieve the SDGs. These is because it is clear that without genuine commitment of both large and small companies across the globe, as well as the finance sector, the implementation of the 2030 Agenda will fail and the overall aim of poverty eradication and preservation of the environment will be defeated.

This policy (SDGs) contains coherent and collective vision which seeks to eliminate human deprivation worldwide by the year 2030 and also to create an environment that will meet the immediate needs of the present generation and the continuum generations to come. It also provides a frame work to monitored progressive achievements of the vision.

The SDGs which were adopted in 2015 are expected to be achieved before 2030. There are several concerted global efforts in achieving the SDGs with a view to achieving wellbeing, prosperity and adequate social infrastructure. In Nigeria, there are signs of seriousness on the part of the government in achieving the SDGs. The office of the Senior Special Assistant to the president on SDGs was created. There are also committees on the SDGs in both the House of Representatives and the Senate to provide oversight functions. In addition, there is an Inter-Ministerial Committee on the SDGs created to coordinate activities at the Ministries, Departments and Agencies. The private sector is equally involved in the implementation. Civil Society Strategy Group on SDGs, volunteers, Private Sector Advisory Group on SDGs are all private sector driven initiatives toward the attainment of the SDGs . (Punch, July 5, 2018)

4.0   SDGs and Infrastructural Facilities Development in Nigeria

Nigeria will find it difficult to sustain its increasing rate of population and economic growth without enhancing her infrastructural facilities. The existing total stock of Nigeria's infrastructure such as power, telecommunications, transport (seaports, road, rail and airports), and water in its value accounts for only 35% of GDP which is below par when compared to other rising market countries where the average is around 70% (FMBNP report, 2017). Although, PwC's report (2014) indicated there is a future full of opportunities for Nigeria with the estimated infrastructural facilities fund said to improve from $23 billion in 2013 to $77 billion in 2025. Infrastructure inadequacy has been predicted by the United Nations (2016) as a vital missing link to attaining the recently agreed SDGs. Also, the African Development Bank opined that the infrastructural facilities in Nigeria are in a dilapidated condition largely due to decades of neglect. But encouraging investment in infrastructural facilities development will drive economic growth, provide jobs, and enhance the delivery of vital services to the country and majority of its populace.

The inadequacies of infrastructural facilities in power supply, water supply, transportation, information communication technology (ICT), waste management amongst others that is evidenced in all core and social infrastructural sectors provides opportunities for investment in infrastructure development in Nigeria. This dynamic creates a vision for prospective investors that are keen on engaging in infrastructural facilities developmental projects in Nigeria. The availability, stability and efficiency in the cost of power have been widely regarded as vital in the path of any nation towards successful economic development. Yet, the power sector in Nigeria has been deficient with limited access to electricity by citizens across the country and therefore remains one of the biggest infrastructure challenges despite an abundant availability of oil, gas, hydro, coal and other energy resources most of which as a result of limited technical capabilities, inadequacy in finance, limited institutional capacity, and emerging regulatory frameworks remain under-exploited. Other infrastructural facilities are also faced with similar challenges such as transportation, healthcare, water, telecommunication and waste management (Ogbonna & Ohiri, 2016). The SDGs are meant to improve on the previous MDGs based on 17 goals, and 169 targets with the goals 6 (provide clean water and sanitation), 7 (provide affordable and clean energy), 8 (provide decent work and economic growth), 9 (innovativeness in infrastructure), 11 (build sustainable cities and human settlements), 12 (sustainable production and consumption), 16 (build peaceful inclusive and accountable institutions), and 17 (strengthen the means of implementation) all lacking in Nigeria. Generally, modern infrastructural facilities and national development can be said to be interwoven as they have a strong link which has propelled the trend in Public-Private Partnership (PPP) model. The close alliance between the public and private sectors is necessitated by the significant opportunities provided by infrastructural facilities in the Nigerian setting. This also implies that

developmental objective must be clearly stated in order to properly align it with the monetary, fiscal and regulatory policies to achieve the set aim. These policies should be well formulated in a manner that the overall essence of attracting investors to the infrastructural sectors in Nigeria from both the local and foreign scene is not defeated. Also, partnering with investors in the private sector is of utmost importance so as the government are providing these enabling environments, investors in the private sector should be adequately ready and well positioned to effectively harness the opportunities that will be presented.

Some of the important identified factors that will accelerate sustainability in infrastructural facilities development in Nigeria from the public and private perspective in order to propel the attainment or realisation of the country's potentials are;

1. **Efficient and Effective Developmental Planning**

Planning is all inclusive as it is not to only achieve a set aim but also take into consideration likely future occurrences which may be detrimental to the sustainability of the achieved aim. A deliberate approach to project development and appraisal process should be encouraged due to its relevance in ensuring a desired output is achieved. A proper and well conducted study on the importance of factors such as environmental, social, institutional and economic which will serve as an aid for investment in the absence of which failure will abound. The perception of developers is that it is costly in achieving healthy and diligent planning which are why it is usually carried out by the government but the unavailability and inadequacies of the

government propagated interested private developer in utilizing crooked means that are detrimental and usually resulting in failures. The establishment of dominant pulling forces for the needed investors and partners in order to build credibility for proposed infrastructural development which can be achieved through adequate planning of development. This makes it imperative for the government to provide sustainable and functionally planned standards that will serve as a guide to prospective infrastructural development projects either by the public or private sector if sustainability is to be achieved.

2. **Improvement of the Regulatory Environment**

The inadequacies and ineffectiveness of institutional bodies put in place by the government coupled with the formulation of poor policies by institutions have been identified as one of the key factors leading to the retard of infrastructural facilities development in Nigeria. There is need for the understanding that the performance of the government impinges on the designated assignment to the state, the competency of public agencies, the honesty in the behavioural approach of public official as well as the rate at which the private citizens key into these promoting activities. There are some formulated policies for the regulation of the infrastructure environment in its provision and sustenance. The National Water Supply and Sanitation Policy (NWSSP) formulated in the year 2000 for the purpose of providing, funding and operation of safe water supply through the establishment of institutional frameworks in the urban and rural setting

which resulted in the establishment of water boards in all states of the federation. Also, the National Electric Power Policy was formulated in 2001 due to the established fact that the deposited capacity of Nigeria's electricity has been inefficient with about less than one-third in operation which propagated the government to formulate principles to spring up regulatory framework to attract potential investors to the sector. Also, in the transport sector, the Federal Road Maintenance Agency (FERMA) was established in 2003 to strictly charge the maintenance of all federal roads in Nigeria but have been deficient in executing this mandate for which it was established due to poor funding and in adequacies in available equipment. From the above, it was deduced that the low implementation of legal frameworks put in place serves as a fundamental constraint to sustainable infrastructural development in the country. Therefore, sustainable infrastructural facilities should not be pilloried by regulatory institutions but rather encouraged to intervene in its provision and sustenance.

3. Infrastructural Master Plan and Design Put in Place

A rich and well designed infrastructural master plan that is linked to the SDGs should be developed to ensure the achievement of clearly expressed objectives of infrastructural facilities developments are adequately communicated among the users and major stakeholders. This is for the ensuring of proper allocation and development, management and maintenance as well as speedy identification of potential risk for adequate attention. It is of great importance

that the relevant technical knowhow fortified in the checkmating of some foreseeable risk are well communicated in the infrastructural master plan put in place. This is usually provided by the government to enable potential infrastructure developers either public or private to be guided if the sustainability is its development is to be achieved.

4. Building Strength in Technical Partnerships and Capacities at the Implementing Agencies

Infrastructural facilities developments require a broad mix of sundry skills and competencies for effective successful delivery. Unfortunately, Nigeria due to a dearth in proficient manpower is deficient and recorded a low rate of performance in infrastructural facilities development as only limited number of projects have been successfully commenced and delivered in the country over the last few decades. The strengthening of capacities and technical knowhow in implementing agencies aids success, timeliness in execution and rapid delivery of these developmental projects which has an impact on the level of competence. Therefore, it calls for the stakeholders in Nigeria to boost stronger collaboration and integration between our locally based developers and technical partners from foreign nations whom are well equipped with decade and sufficient wealth of experience through their involvement in countless successfully executed infrastructural facilities development project in other countries and as such help in building the required capacities to achieved sustainability. The essence of this is not just

for new infrastructure development but also for the eventual long term management and maintenance of the infrastructural facilities after delivery throughout its useful life. The need therefore to forge stronger acquaintances between our local based developers and foreign technical partners equipped with a sufficient level of experience in infrastructural facilities development cannot be overemphasized if credible and sustainable projects are to be embarked on and the subsequently management of these national assets on delivery.

5. Proper Mobilisation and Innovative Fund Arrangement for Infrastructural Facilities Developments

The role of the government in fund mobilization is key in any form of development infrastructure inclusive. This is coupled with the fact that monetary allocations will also be invested in the maintenance of these facilities over its useful life. But however, access to fund has being a constraint to not just the institutional framework put in place for the development and maintenance of these projects but also the private developers who may want to embark on these projects. Avenues for fund arrangement such as private equity and infrastructural funds should be encouraged as it plays an important role in making fund available for infrastructural facilities development at different stages from its initial development cost to subsequent maintenance and running cost. The amount of fund required to embark on infrastructural facilities development is huge and usually propelled them to seek alternative means of achieving returns on the short run or save on

the cost of development. Inefficiencies in institutions for fund arrangement affect the viability, quality of the completed development, timeliness in delivery and subsequent maintenance of the property over its useful life. Fund could also be mobilised from other equity sources such as pension funds, cooperative societies and insurance companies which could be invested through infrastructure bonds subject to laid down principles of their respective regulatory institutional bodies. The annual budgetary allocation for infrastructure development and maintenance should be increased by the government and delivered consistently.

5.0 Conclusion

Nigeria is a country experiencing slow rate of economic development. This is perhaps because it does not present an enabling environment in terms of infrastructural facilities availability. The link between the conditions of Nigerian cities and their ability to attract Foreign Direct Investments for investments has been stressed. This revealed a fact that infrastructural facilities development is imperative in the achievement of sustainable cities in Nigeria that is capable of attracting investors all over the globe with the capability of aiding the realisation of our city potentials. It is imperative for Nigeria to concentrate in investing deeply in the sustenance and redevelopment of its infrastructural facilities for the demand of the increasing population to be met, strengthen the growth of the economy as well as capacity building of its human populace. Since Nigeria is confronted with the challenge of deficit in infrastructural facilities provision across all its sectors and the means

of mitigating this is time consuming and expensive, there is a need to incorporate infrastructural facilities development in the long term national planning, provision of infrastructural development plans by the government with responsiveness in implementation, better innovative funding schemes as well as a well-drawn model for infrastructure development financing tailored towards the nation's economic development. SDGs provide the opportunities if well harnessed to fast track infrastructural facilities development in Nigeria. There is therefore, the need by governments at all levels to synchronise their infrastructural development plans with the SDGs with the view to attracting international financial aids and grants.

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ANALYSIS OF THE FUTURE TRENDS OF URBANIZATION, POVERTY AND SECURITY IN NIGERIA

By

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Abstract:

This study examines the security implication of urbanization and rising poverty levels in urban centres in Nigeria in the next decades. Secondary data were sourced from books, articles in journals and internet materials. The data were analyzed descriptively and also presented in tables. The findings were that towns and cities in Nigeria were urbanizing in a very high rate and this was due mainly to migration of rural people into urban centres for reasons of job opportunities access to better health, housing, education, water, transportation and other facilities. It is also discovered that jobs are not readily available and facilities are not adequate and as such, the opportunities are very lean. This has caused the inability of many migrant to get jobs, accommodation, food, healthcare and other comforts which is causing poverty among a high population of the urban dwellers. Due to poverty many have taken to different kinds of crimes including rape, robbery, kidnapping and cybercrime. Presently the crime rates are high and are increasingly overwhelming security forces in the country. With increasing urbanization without commensurate economic growth, this study has shown that the levels of poverty and crime will continue to rise. It is upon this that this study recommended among others that rural areas be developed with social and economic infrastructure to stem rural-urban migration and security personnel be increased and enhanced with modern crime facilities.

 Keywords: *Urbanization, Poverty, Security, Nigeria*

Introduction

Cities and towns in Nigeria are experiencing rapid urbanization. Population migration especially from the rural areas has been identified as a major factor of this development. According to The African Development Bank (2012) urban population growth rate in the last two decades was 3.5% per annum and this growth is expected to hold into 2050. The Bank further said that between 2010 and 2025, some African cities like those in Nigeria will account for 85% of its population. The World Bank (2015) states that urban population is projected to grow from 36% in 2010 to 50% by 2030. Increasing urbanization rates have been identified to be caused mainly by population migration into urban centres from rural areas. The opportunities provided in the urban areas in terms of industrialization, socio-economic amenities, employments and administration are some of the factors for these movements (Eliya et al 2014).

Over the last 30 years however, these opportunities have dwindles as Job opportunities have become lean while infrastructure provision has slowed down. In the face of this however, migration from rural

to urban centres have continued even at faster rates. With increasing population without commensurate increase in job opportunities and access to cheap housing, food, health water and education, a huge number of urban dwellers are poor. According to Arouri et al (2014) the failure of urban administration in Nigeria has led to the emergence of slums, pollution and dilapidating social infrastructure. Hope (1998) also agreed that most urban centres do not have economic and social developments plans, the reason they are often overwhelmed by the rapid population increase. The study of Onibokun, (2010) and Nna et al (2012) shows that 56% of urban population in Nigeria live in substandard housing and do jobs that cannot earn more than 1 dollar per day.

It is known that many migrants' posses' different traits, both negative and positive. According to Hatt et al (1967) negative traits are soon exhibited when such migrants are faced with challenges of lack of jobs or meager wages on available jobs which is incapable of paying high rents on housing, buy food, pay water, education, electricity and healthcare bill and other basic needs. To overcome such challenges many easily get into negative means such as, robbery, prostitution, drug peddling, ritual killing rape and electronic fraud to survive. As at today crimes have continued to grow in Nigeria urban centers. This problem has overwhelmed security forces as the personnel and material required to counter their activities have been inadequate. It is for the rise in crime that most Nigerians have began to clamor for state policing. It is believed that with the increasing population of urban centre where security challenges are very obvious,

more crimes are likely to be committed with grave socio-economic implications.

This study is on the security implication of urbanization and poverty in Nigeria urban centres since the last two decades. The aim is to analyze the security challenge that these cities are facing as a result of urbanization and poverty. The objectives are to examine the trend and rate of urbanization of these cities, the level of poverty due to population growth and to examine the types, and rate of crimes committed from the year 2000 to 2018. Secondary data from articles in journals, text books, students' thesis and internet sources are used and analyzed descriptively using tables.

Conceptual Analysis

This study is tied to the concepts of urbanization, poverty and security. They are briefly discussed here as follows.

Urbanization

Using Clark (1975) definition, urbanization refers to the percentage of a country's population living in urban centres. Olalalekan (2014) see urbanization as the expansion in the proportion of a population living in urban areas. According to Sciencedaily(2018), it refers to the increasing number of people that live in the urban areas which predominantly leads to urban physical growth. From these definitions urbanization can be seen to involve a population shift from rural to urban areas or the gradual increase in the proportion of people living in urban areas. It is a process where an increasing percentage of a population lives in cities and suburbs.

United Nations (2017) shows that world populations are increasingly moving from rural to urban centres. The United Nations in 2009 and the International Organization for

Migration in 2015 both estimated that around 3 million people now live in cities around the world. As at 2008, the Population Reference Bureau (2018) said that 74% of the population of developed countries lived in urban centres while that in the developing nations was 44%. It estimated that by 2050, this number for developing countries will increase to 70%. According to the Nordhag (2012), Africa is currently the least urbanized continent, but its urbanization rate of 3.5% per year is the fasted in the world. Today, the number of Africans living in cities is 40% and is projected to grow to 50% by 2030. Studies have shown that population increase in Africa was due to natural increase and more of migration from rural areas.

The causes of urbanization in the developing countries and especially Africa are many and according to Ojeifo et al (2012) it includes, industrialization, development of infrastructure, job opportunities and modernization. While urbanization can enhance national economies, it can also create many problems such as infrastructure and humanitarian problems. Other problems according to Oyeleye (2013) have been unemployment, shortage of residential housing, poverty, slum development, competition on limited resources and sanitation problems. In this study effort was made to examine urbanization within the context of the trend and the problems in Nigeria urban centres.

Urban Centres

An urban centre is a place or settlement with large population concentration; examples are towns, cities, and metropolis. Different criteria have been advanced in different parts of the world to define urban centres. In Nigeria, urban settlement has been defined to mean all settlements having a population of 20,000 and above (Ofem, 2012). In addition to this, the 1999 Federal Constitution of Nigeria recognizes all administrative settlements as urban. In this study, urban centres in Nigeria are all settlements legally recognized as urban and those with population of 20,000 persons and above.

Poverty

Investopedia (2018) defined poverty as a state or condition in which a person or community lack financial resources and essentials to enjoy a minimum standard of life and wellbeing that is considered acceptable by society. The Business Dictionary (2018) defined poverty as condition where people's basic needs for food, clothing, and shelter are not met. According to Ofem et al (2010), poverty is of two types, absolute and relative. Absolute poverty is when there is lack of basic amenities necessary for standard of living, such as clean water, shelter, and food as in most developing countries. Relative poverty on the other hand is when an individual or family lacks the financial ability to maintain the average standard of living for that society.

The most commonly used working definition for international poverty comparisons, and the poverty line is per capita expenditures of US $1 per person per day (adjusted for differences in purchasing power). While for some it is defined as US $2 per person per day, others calculate minimum caloric requirement as the poverty line. The United Nations has favored composite indices which take into account access to Education and basic health into the computation of poverty and human development measures. In the

end, the choice of the poverty line is subjective. In this study, the World Bank (1990) measure of below US $1.9 per person per day is used.

Security

The oxford dictionary defines security as the condition of not being threatened, especially physically, psychologically, emotionally or financially. It is also seen as an organizational or department responsible for providing security by enforcing laws, rules and regulations as well as maintaining order. The security of lives and properties is pivotal to the growth of urban centres. But in the last few years, urban centres of Africa has witnessed increase in common crimes such as murder, robbery and arson and the emergence new ones such as oil pipe line vandalism, kidnapping and internet fraud. Saulawa et al (2014) identified the emergence of cybercrimes to the provision of internet and online facilities and services in the urban and rural areas of Africa.

The importance of security to the overall growth and development of urban centres cannot be overemphasized. Apart from enhancing the safety of lives and properties it also ensures that the very fabric of economic development, that is transportation, government, goods and services are unhindered. Adequate security therefore means increased productivity while on the other hand insecurity leads to low productivity that affects the GDP of such countries.

Studies of urban crimes have shown that there is a general relationship between urbanization and crimes. Shopeju (2007) remarked that urban setting with its abundance of wealth and goods provide ample opportunities for various types of crimes. In the same vein Christiansen (1967) and Glaser (1967) had argued that urbanization reduces the possibility of social control. According to Omisakin (1998) modernization brings with it several forms and patterns and rates of crime. As in Nigeria he observed that between 1960 and 1984 crime rate was directly proportional to the level of development, that is, the more developed areas had more crimes. It is believed that the experience of poverty takes its toll on the poor and their families and that the poor economic and social conditions are the root cause of delinquency (Omisakin, 1998). According to Siegel and Senna (2000), those who go into crime do so as a means of survival, self esteem and revenge on society. Flowing from this it can be said that worsening economic conditions is a factor of crime causation in urban areas of Africa.

Urbanization, Causes and Rate in Nigeria

According to Onibokun and Faniran (1995) Nigeria is one of the most urbanized countries south of the Sahara. From available record, population increase in Nigeria is at a very high rate. Urban centres, both towns and cities are growing astronomically. In 1921 there were 18.71 million people in Nigeria. This increased to 30.4 million in 1952 and 55.67 million in 1963. It rose to 80.5 million in 1991 and 140 million in 2006. Current 2018 projection is put at 180 million and it is expected to reach 210 million by 2025 (UNFPA 2001).

Using the 20,000 population bench mark, less than 7 percent of the population of Nigeria lived in the urban centres in 1931. This rose to 10 percent in 1952 and again increased to 19.2 percent in 1963 (Onibokun and Faniran

1995). The 1984 and 1995 urban population estimates are 33 and 42 percent. According to Onibokun and Faniran (1995), seven cities in Nigeria had a population of more than one million in 1995, 18 cities had over 500,000 population, 36 had more than 200,000, 78 cities had over 100,000 while those with population of 20,000 and above were 5,050 and were mainly towns. Table 1 shows the population of Nigeria between 1921 and 2020 based on records of the Federal Office of Statistics (1952, 1963) and projections by Onibokun and Faniran (1995) based on 5% annual growth rate for urban areas.

Table 1: Population of Nigeria, 1921-2020

Year	Total Population 100's	Total Urban Population 100's	Percentage of Total Urban Population	No. of Cities with Population 100,000	No. of Cities with Population 200,000	No. of Cities with Population 500,000
1921	18,720	890	4.8	-	10	-
1931	20,056	1,343	6.7	2	24	-
1952/54	30,402	3,701	10.2	7	54	-
1963	55,670	10,702	19.2	24	185	2
1972	78,924	19,832	25.1	38	312	3
1984	96,684	31,902	33.0	62	356	14
2020	160,000		68.0	132	680	36

 Source: NBS (1963) and Onibokun and Faniran (1995)

Between 1952 and 1982, the population of most towns in Nigeria like, Port Harcourt, Kano, Kaduna, Lagos, Enugu and Jos had increased more than five times or 1000 percent. For example, the population of Enugu rose from 174,000 n 1963 to 850,000 in 1982 while that of Lagos was less than a million in 1963 to over 4 million in 1982. The population of some Nigerian cities from 1982 to 2000 is presented Table 2.

Table 2: Population of some Nigerian Cities, 1982 and 2000 (in Millions)

City	1982	2000
Lagos	4.10	6.90
Ibadan	2.84	4.70
Port Harcourt	.91	2.11
Enugu	.85	1.75
Benin City	.51	1.30
Kaduna	.92	2.14
Kano	1.50	2.60
Onitsha	.31	.73
Jos	.46	.84
Calabar	.39	.61

Source: Onibokun, (1987)

From the Table 2, we can see that the population of people residing in urban areas in Nigeria has been increasing. To this end, the percentage of the population residing in urban areas in Nigeria between 1950 and 2025 was determined. The figures showed

that there were significant percentage increases as shown in the Table 3. For example while only 10.1% of the Nigeria population were in urban centres as at 1950, this figure rose to 54.8% in 2010 and it estimated to reach 61.6% in 2025. This is alarming considering the enormous challenges of poor infrastructure, poverty, housing and crime that these cities are already facing.

Table 3: Percentage of Population Residing in Urban Areas in Africa and Nigeria

Year	Africa	Nigeria
1950	14.5	10.1
1955	16.3	12.1
1960	18.3	14.4
1965	20.6	17.0
1970	22.9	20.0
1975	25.2	23.4
1980	27.8	27.1
1985	30.6	31.0
1990	33.9	35.2
1995	37.3	39.3
2000	40.7	43.3
2005	44.0	47.2
2010	50.7	54.8
2020	53.9	58.3
2025	57.1	61.6

Source: United Nations (1991)

The causes of urbanization in Africa are many. Studies have shown that it is due to natural increase and migration. Rural urban migration is believed to be contributing more to urban population growth in sub-Saharan Africa including Nigeria. Urbanization in Nigeria is caused by the factors of economic development, industrial revolution, job opportunities, availability of easy transportation and political, social and cultural influences.

Urban Poverty in Nigeria

The continuous increase in urban population especially by rural immigrants without a commensurate provision and expansion of basic infrastructure and employment opportunities has been partly attributed to the reason for urban poverty (Ojeifo et al, 2012). Poverty level in Nigeria is on the rise using the US $1.90 per day bench mark. The 2006 United Nations Human Development Index put Nigeria at 159 out of 177 countries, with 70.8 percent of the population living in less than one dollar a day and 92% on less than two dollars a day (UNICEF 2006). The National Bureau of Statistics reports that 60.9% of the 158.6million Nigeria's population of 2010 lived below poverty line. The BBC on the 13th of February 2012 reported that almost 100 million people were living on less than US $1 per day in Nigeria despite economic growth as statistics has shown. This was corroborated by the report of the National Bureau of Statistics which said 112million representing 67.1% of the 167 million people in Nigeria in 2014 lived below poverty line. The Fitch report of 2016 shows that poverty level index jumped to 72% in 2016. Despite the exit from recession in 2017, The World Bank reported that there was a decline in the non-oil sector and agricultural sector which also negatively influenced unemployment and underemployment leading to increase in poverty level in 2017. With an estimated population of 198 million people in 2018, the Bookings Institution reports that at the end of May 2018, over 87 million Nigerians as against 73 million Indians were in extreme poverty. By this Nigeria overtook India to the first position as the country with the largest number of extremely poor people in the world.

The population of the poor in Nigeria lives in both rural and urban centres. Studies have shown that the poor are more in the rural areas than the urban centres. According to the National Bureau of Statistics 2010, urban poverty has been high

in Nigeria since the 1980s. Statistics on the trend of poverty levels in Nigeria 1980-2010 shows that urban poverty rate in 2004 was

43.2% and this increased to 58.1% in 2010 as shown in Table 4 .

Table 4: Trend in Poverty Levels in Nigeria 1980-2010

Year	Poverty Incidence %	Estimated Total Population (millions)	Population in Poverty %	Urban	Rural
1980	28.1	65	18.26	17.2	28.3
1985	46.3	75	34.73	37.8	51.4
1992	42.7	91.5	39.07	37.5	66.0
1996	65.6	102.3	67.11	58.2	69.8
2004	54.4	126.3	68.70	43.2	63.3
2006	74.9	120.5	74.85		
2008	54.4	131			
2010	69.0	163	112.47	58.1	69.7

Source: National Bureau of Statistics. HNLSS 2010

Indicators of poverty levels since 2010 have shown that urban poverty is still high and was indeed rising. Studies on the levels of poverty of some cities of Nigeria by Babanyara et al (2010), Okosun et al (2012), Olalekan (2014) Esiri (2016), Zubeiru (2017) and Iboaya (2018) shows that urban poverty in Nigeria city is high and on the increase. According to these studies, the urban centres in Nigeria still show a high proportion of evidences of low income especially among informal workers, lack of accommodation and overcrowded residences, poor housing environment, high rate of unemployment and underemployment rates, poor health, water and other essential services, poor sanitation and slum environments. This is the situation in the cities of Lagos, Port Harcourt, Enugu, Kaduna, Warri, Benin City and Abuja.

 Chamhuri; Ferdoushi, Ahmad, and Md.Shahin (2016) had established that there is a relationship between urbanization and poverty. Their study showed that urban poverty was a visible phenomenon in Malaysia. Onibokun et al. (1995) perceives urban poverty as living in sub-standard and sub-human environments plagued by slums, squalor and grossly inadequate social amenities like health facilities, schools and recreational opportunities.

Security Implication

Several studies have shown that urbanization is closely related to increase in crime. These studies hold on to the fact that as the population of urban centres increases particularly by immigrants mostly from the rural and other urban areas as in the case of Africa and Nigeria in particular, these people come with different deviant social characteristics. Coupled with lack of employment, housing, food, water, health and other basic needs, they get involved in different anti-social behaviours and crimes which go with adverse consequences.

According to Christiansen (1960), industrialization and urbanization had increased to a considerable degree in many countries over the years and at the same

period, the trend of delinquency and crime has shown a corresponding increase." This correlation, he said, may however, yield some support to the hypothesis that "increasing urbanization will cause an increase in crime". Hence, urbanization has been commonly considered a major contributor to the increase of crime in the city. Similarly Newman (1979) believed that "the run-down industrial areas lived by the urban poor were centres where most criminals live and from where most crimes were planned and hatched. To this end he identified that there is a strong' relationship between urbanization and criminal homicide, rape, assault and robbery. In a related study, Hatt (1976) had pointed out that rapid population growth and upsurge in urbanization might have brought with it certain negative effects like personal disorganization, mental breakdown, delinquency and crime.

In Nigeria, studies show that crime rate in urban centres and particularly in cities have been high since the last three to four decades. Adebayo (2013) had pointed out the upsurge in violent crimes such as homicides, rape, aggravated assault and armed robbery in Nigerian cities. He noted that between the late 1990s and the mid 2000s cities in Nigeria were under siege and ruled by hoodlums. Since the early year 2000, the rate of violent crimes have not only gone up, new crimes such as cyber crimes, drug trafficking, human trafficking, kidnapping, abduction, drug peddling, terrorism, and thuggery have emerged and are committed in high proportion. The study of Enugu Metropolis by Egwu (2005) revealed that in 1995, 1996 and 1999, 22, 25 and 28 armed robbery cases were respectively recorded in Enugu by the

police (Police Armed Robbery Statistics, CID, Enugu 2001). In Lagos, reported armed robbery cases in 1980 was 38,615 (Nigeria Annual Police Report 1980), this rose to 38, 955 in 2009 (Nigeria Police Watch, 2009). Apart from Enugu and Lagos high incidences of robbery had been reported in Abuja, Benin City, Aba, Owerri, Warri, Kano, Kaduna and other cities in Nigeria.

The Nigerian Communication Commission (NCC) had reported in 2017, that Nigeria ranked third globally in cybercrimes behind the UK and the US. And that about 127 billion naira was estimated loss to cybercrime in Nigeria in 2015 (Vanguard, August 22nd 2017). Most of the cybercrimes are committed in the cities of Lagos, Port Harcourt, Benin City, Enugu, Abuja, Warri, Ogbomosho, Abeokuta, and Kano (Adesina 2017). These crimes are mostly committed by school graduates who are unable to get jobs in the cities and those currently studying in Nigeria higher institutions (Omodunbi 2016). In June 2016, a 40 year old Nigerian identified to be the ringleader of a global cybercrime network behind scams totaling more than $60m was arrested in Port Harcourt. Many other arrests have been made including 13 suspects arrested in Lagos on February 13, 2018 (Leadership Newspaper, September, 20 2018).

Although there are no accurate statistics on rape in nigeria, reports and studies conducted show rising cases. A survey conducted by Umar (2011) in Minna Niger State, shows that child sexually abuse prevalence is 2/1000 (0.2%) while the monthly average incidence is 2.4cases. Similarly, Uchendu et al (2016) had reported increased incidences of gang rape in Benin city. He alerted that between 2008 and 2013, a total of 133 female ganged raped victims reported to the Central

Hospital, Benin City or the Police Clinic for medical examination. In kano, sexual assault has become incessant as reported by the Public Defendant Office in Kano State (The Guardian 10th March 2018).The Kano Police Command records 334 rape cases in 2017 alone, majority of the cases being in the City and other centres (the eagleonline news May 16 . 2018) . The case is not different in Uyo, Ebonyi, Jos, Warri, Lagos and other urban centres. Kidnapping is another high profile social crime in Nigeria. As reported by the police, kidnap cases is also on the rise with Kaduna, Benin City, Lagos, Enugu and Port Harcourt leading. In Benin City, Otedo News of January 5, 2012 reported that 27 persons were adopted and killed in 2010/2011 while between 2014 till date, 392 cases of kidnapping were reported in Lagos by the National Bureau of Statistics (2017). This is the case with other crimes where records show that they are all relatively high and increasing in some cities urban centres of Nigeria. According to Esiri (2016) over 56% of these crimes are committed in the urban centres annually.

By projection Nigeria urban population will reach 262.2 million in 2030 (Pardee Center for international Futures 2018) and 189 million by 2050 (United Nations 2018). This means that by natural birth and much more by rural migration, urban centres will be heavily populated by hese years. Unfortunately however, policies and plans are presently too weak to alleviate unemployment, housing, health and poor access to water, sanitation and transportation. By implication therefore, urban crime incidences are still likely to be high, as much as 75% of the total crimes that will be committed in the country by 2050.

Nigerian security agencies are besieged with so many inadequacies so much so that they are presently unable to efficiently and effectively check the wave of crimes. Such inadequacies include inadequate and obsolete firearms, operational vehicles, lean budget, poor remuneration, lack of medical care, welfare and housing facilities, lack of modern equipment and training among others. Urbanization of the next decades with ill equipped and inefficient security system will be a disaster for the country. As reported by Daily Post of August 11, 2015, Nigeria had 370,000 police personnel in 2015. For an estimated population of 170,000 in 2015, this figure was said to be grossly inadequate. Presently the Nigeria Police is operating at a ratio of 1:600 which is far below the United Nation's approved ratio of 1:400 (Premium Times September, 22 2017). Although, effort is been made to increase the number of police men and 155,000 men have been earmarked to join the force in the next five years. Considering those due for retirement and those that may exit due to injuries or death in battle, the number may still be too small to police the country in the coming decades. Other security agencies such as the Directorate of State Security (DSS), Economic and Financial Crimes Commission (EFCC), Nigeria Security and Civil Defence Corps (NSCDC) and the National Intelligence Agency (NIA) are also confronted with challenges similar to that of the police force.

Recommendations and Conclusion

No doubt, this study has established that settlements in Africa and Nigeria in particular are urbanizing at high rates. With 53% urbanizing rate, Nigeria's urban population is

estimated at 73% by 2050. Characteristically Nigeria's urban centres are places high crime rates as over 56% of crimes committed annually are in urban centres. Several studies have identified a relationship between urbanization and crime rates. In other words, increasing population without substantial economic and social plans to alleviate poverty will also substantially influence crimes and other anti-social tendencies. In the case of Nigeria, urbanization rate is about 53% and this is estimated to reach 75% by 2050. Giving the present condition of the Nigerian economy where there are lack of job opportunities, adequate and descent urban housing, access to water, health and sanitation, wide spread poverty and where security challenges are high with inadequate security personnel and equipments, the tendency for crimes to increase are very high. Therefore, to effectively check and combat urban crimes in the face of increasing urbanization, this study has recommended the following:

1. All Policies and programmes that have been initiated by government to develop the rural areas should be reviewed and implemented. Programs such as Agricultural Development Program, the River Basins Development Authorities and the Directorate for Food, Roads and Rural Infrastructure (DIFFRI), which were designed by government to transform the rural areas through the provision of electricity, cottage industries, roads, water and health facilities and rural housing should be implemented so that rural areas can become livable and attractive enough to provide rural jobs and create other opportunities for the rural population. By so doing, rural-urban migration would have been reduced drastically since the common causes which is lack of infrastructure and jobs would have been addressed.

2. With the huge rural population migrating into urban centres, government must intensify its efforts in providing and expanding existing amenities in the urban centres. Government must increase budget allocation for physical development and infrastructure that will ensure the provision and expansion of roads, water, electricity, housing, educational and health facilities to meet current urban demand. Standards must be used to enable people to have easy accessibility to the facilities. Also all abandoned and dilapidating infrastructure must be completed and rehabilitated across urban centres in Nigeria.

3. Housing is a major problem for rural migrants in the urban centres. The high rents on houses which migrant are usually unable to pay for is largely the reason for high urban occupancy ratio and the development of slums. Poor accessibility to housing in Nigeria is due to large housing deficit. For much of the urban dwellers especially the poor to be adequately housed, government must embark on massive housing provision in both urban and rural areas. Existing policies and programs on housing can be reviewed to achieve this

4. Crime is a major challenge in Nigeria and this study has shown that crime rate is high in urban centres in Nigeria. With more rural population expected in urban centres in the next 30 years, combating, crime with weak security system will be a very difficult task. This is because the Nigeria security system is besieged with inadequacies. For example, the

current police population ratio of 1:650 is inadequate and the effort by the federal government to increase this number in the next five years by 155,000 men will still not meet the required ratio. Modern technology to fight crimes like cybercrimes, kidnapping, rape, and organized robberies are either not available or inadequate. Communication system is poor while required arms and operational equipments including vehicles are inadequate. The rivalry of functions among the various security agencies is also a huge challenge. For these crimes to be adequately checked without creating any chance for their increase, the federal government who is in charge of security in the country must increase security budget for all its security agencies. By this, modern equipments can be purchased, more personnel employed, regular training of personnel especially on the use of modern technology. In the face of high urban crimes, the clamor for state police is apt at this point since it is meant to bring police operations closer to communities.

5. Finally, the provision of gainful jobs is requirements for people to live a better life and stay out of crime. This study recommends that governments at all levels in the country must begin as a deliberate policy engage in ventures that will provide the needed jobs for the urban dwellers. In partnership with the private sector, government should create enabling environment through the provision of necessary incentives and infrastructure that will encourage the private sector participation in job creation. Areas of investments should be urban agriculture such as horticulture, fishery, poultry and dairy farming, urban commerce and processing and manufacturing.

The drive for direct foreign investments should also be pursued with vigor. By so doing, large number of people will not only be employed but propulsive activities will be generated and expanded in the country.

This study has examined the security implication of urbanization and poverty in Africa with particular reference to towns and cities in Nigeria. Its major objective was to examine the rates of urbanization and poverty and determine their influence on crime in urban centres in Nigeria. Secondary data were used and analyzed and presented in tables. The finding show that towns and cities are urbanizing and poverty was high among urban dwellers in Nigeria. As these places are urbanizing with high level of poverty, the study identified that the rates of crimes were also high. This corroborates the thought that there is a relationship between urbanization, poverty and crime rates. Crimes such as murder, robbery, burglary, rape, cybercrime, kidnapping and trafficking were identified to be the commonest. It identified poverty as the commonest cause of these crimes as the poor feels that since they have been denied their human dignity and the capacity to participate effectively in society, and have therefore made crime the alternative to surviving.

The population of Nigeria is expected to reach more than 220 million by 2050. It is estimated that by this year 2050, urbanization rate would have reach 75%. Giving the prevailing economic conditions where jobs are not available, access to housing and other basic infrastructure is poor and where the security system is marred with inadequacies crime rate is expected to rise except urgent steps are taken. It is on the basis of the steps that recommendations have been made. It is

hoped that the recommendations will be useful to ameliorate the problems of urbanization, poverty and crimes in Nigeria urban centres.

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ASSESSMENT OF INAPPROPRIATE STREET NAMING IN KADUNA METROPOLIS, NIGERIA

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Abstract

The foremost objective of street naming and house numbering in any urban area is property identification. Street naming makes it possible to easily ascertain the location of a property, plot or dwelling on the ground, using a unique identity. However, this paper attempts to examine and provides empirical data on the magnitude of indecorous street naming in Kaduna metropolis. The study based its analysis on the primary source of data, obtained through direct field survey of the study area. The result from analysis is presented using maps and frequency percentage table, analysed using the ArcGIS software, and based on the existing urban districts of the metropolis. Finding reveals that most of the streets without names, multiple names and repetition in names, are located at the periphery of the city, comprising mostly of medium and low-income residents that have emerged as a result of urban sprawl. The wrongly named streets are found both within the periphery districts and the city centre districts, these are mostly in areas with new development. This implies that the authorities in charge are not keeping pace with the rate of development in the metropolis. Thus, the study recommends that the authorities in charge to properly plan for each layout within the Metropolis and ban residences from self-naming of streets.

Keywords: *Street Naming, House Numbering, Inappropriate Street Naming*

Introduction

A street name refers to an identity given to a street. The street name forms part of the address while house numbering is the system of giving a unique number to each building on street or an area with the intention of making them easier to locate a particular building (Salawu, Angbo and Ebuga, 2014). Street naming is a process that makes it possible to ascertain the location of a plot or dwelling on the ground, that is, to "assign an address" using a system of maps and signage that give the numbers or names of streets and buildings a unique identity (Ezeamaka, 2009). According to the Merriam Wester Dictionary (2016) a street, is a road in a city or town that has houses or other buildings on one or both sides. Streets being an integral part of towns and urban areas have diverse functions; streets provide routes to access properties and places, corridor of movement for people, goods and services (Mutinda, 2017).

In contemporary times, many cities in the developing countries have experienced tremendously rapid growth, and are faced by diverse challenges (World Bank, 2015). This growth according to Farvacque-Vitkovic, Godin, Leroux, Verdet, and Chavez (2005) has created many underserviced neighborhoods. The street identification

systems initially used in old neighborhoods in the city center have rarely been extended to new ones. Inadequate identification systems have created a worrisome predicament for urban services. For example, with no system of street naming and coordinates, how does one find your way around a continuously growing city? How do you dispatch ambulances, firefighters, or law enforcement personnel quickly? How do you send mail and messages to private homes quickly? How can municipal services be provided? How do you pinpoint breakdowns in water, electricity, and telephone systems? How do you set up an efficient tax collection system? (Farvacque-Vitkovic *et al.*, 2005; Dharmavaram and Farvacque-Vitkovic, 2017).

Street naming and house numbering is more than just a humble street identifying process, street naming and house numbering provides an avenue for map creation. This can be used in conducting an efficient survey that assembles a substantial amount of information about the city and its population. It also provides a substantial database on the built environment, which are good source of municipal information that is too often unavailable (Dharmavaram and Farvacque-Vitkovic, 2017). Information collected is associated with an address, consequently makes it easily locatable. The database, which is spatial information, is in the form of a Geographical Information System (GIS) at a later stage, it is the major revolution of street naming and housing addressing initiatives, mainly in nations with speedily growing urban areas where planning authorities have lost control of the urbanization course as a result of urban sprawl. The real advantage lies in the potential of the urban information database,

which, in conjunction with a street addressing plan and a street index, can be used for various applications to benefit the population as a whole, governments, and the private sector (Farvacque-Vitkovic *et.al.,* 2005; Dharmavaram and Farvacque-Vitkovic, 2017). Ezeamaka (2009) observed that street naming and house numbering in Federal Capital City (FCC), Abuja has made Abuja leading city of Africa and the only city in Nigeria with proper street names and house numbers.

According to Okyere (2012) information collected from people about their geographical locations can help in analyzing the spatio-temporal patterns of the incidences of disease, crime, and other phenomenon. Disease epidemiological databases can be created through the address patients supplied about where they live. One of the most convenient way to collect tax revenues from citizens is through the use of maps with street names. If tax collectors from the Internal Revenue Services (IRS) and other state agencies can collect tax effectively they need to be accurate in doing that; thus, they need maps with street names that exist on the ground and houses well numbered. This way, their staff can find anyone who has said the truth regarding his residential or business address (Okyere, 2012).

If all queries to find where people and places are to be accomplish, it is important to state that all the listed possible benefits that can be obtained from the naming of streets is very attainable because of the implausible processing power that computer have and the available expertise. Computers can process data faster today than compared to the past decade or so. Database management systems

that have been enhanced to work with GISs have really given us no reason to sit and stare at where squirrels store their nuts and grass. It is important to note here that decision-making regarding the space within which a problem occurs is as vital as the planned line of action to be taken as in intelligence-based approaches by the departments. The need of a resource is as important as the optimal use of it (Okyere, 2012).

A city without street names is as good as a city without map. Inappropriate street naming and house numbering is one of the challenges facing town planning and service delivery in developing countries. Nigerian cities are inclusive, as development often take place informally resulting to streets without names and houses without numbers, multiple named streets, making location of properties and services delivery difficult (Ezeamaka, 2009).

Driving through Kaduna Metropolis, one can observe a number of abnormalities such as unnamed streets, streets with multiple names, street wrongly named (that is street named not in line with the approved district naming pattern for that district, naming a street as a close and naming a close as street or road), a particular name being used more than once in the same district (street with the same name in the same district) and also the same repeated in more than two districts. This results to properties poorly numbered and difficult to located in the study area, leaving some of its residents vulnerable. Due to the confusing and incorrect street naming, a considerable number of residences are difficult to find during emergency response situations and services delivery (Mutinda, 2017). This is a critical problem because in

an emergency response, time wasted looking for an address, can be the difference between life and death for residents (Mangiaratti, *et al* 2008). Hence, this study attempts to examine and provides empirical data on the magnitude of indecorous street naming in Kaduna Metropolis, Nigeria.

Study Area

Kaduna Metropolis is the administrative centre and capital of Kaduna State. The then, Kaduna town was selected by the governor of northern Nigeria, Sir Lord Lugard in 1913 and laid out in 1917 as the administrative and military capital of the then protectorate of Northern Nigeria. The name "Kaduna" was coined from the Hausa word "Kadduna" meaning colony of crocodiles, which abounds in the main river of the town and it covers a large expanse of land of about 45,567 Hectares. It is located between Latitudes 10° 21'N and 10° 42' N and Longitudes 7° 20' and 7° 35'E with an average height of 645meters above sea level. The metropolis is made up of Kaduna North and Kaduna South Local Government Areas and some part of Igabi and Chikun Local Government Areas (Kaduna Metropolis Master Plan, 2010). The metropolis has a population of about 2 million inhabitants. Kaduna is well connected to different parts of the country. It is connected to the south-east, south-west, north-east and north-west corners of the country by major arterial routes. More specifically Kaduna is directly connected to the Federal Capital Abuja and ten other state capitals, namely Kano, Jos, Katsina, Gusau, Sokoto, Ilorin, Makurdi, Lafia, Lokoja, and Minna. In addition to these land routes there is a major airport from which there are daily flights connections to major cities within the

country. Kaduna is also a junction town for the two railway lines from the east and west of the country. Although the root of the development of Kaduna may be its historical, political as well its economic role in Nigeria

its accessibility has given rise to a large volume of commercial interactions (Master Plan, 2010). See figure 1, for the map of Nigeria showing the location of the study area.
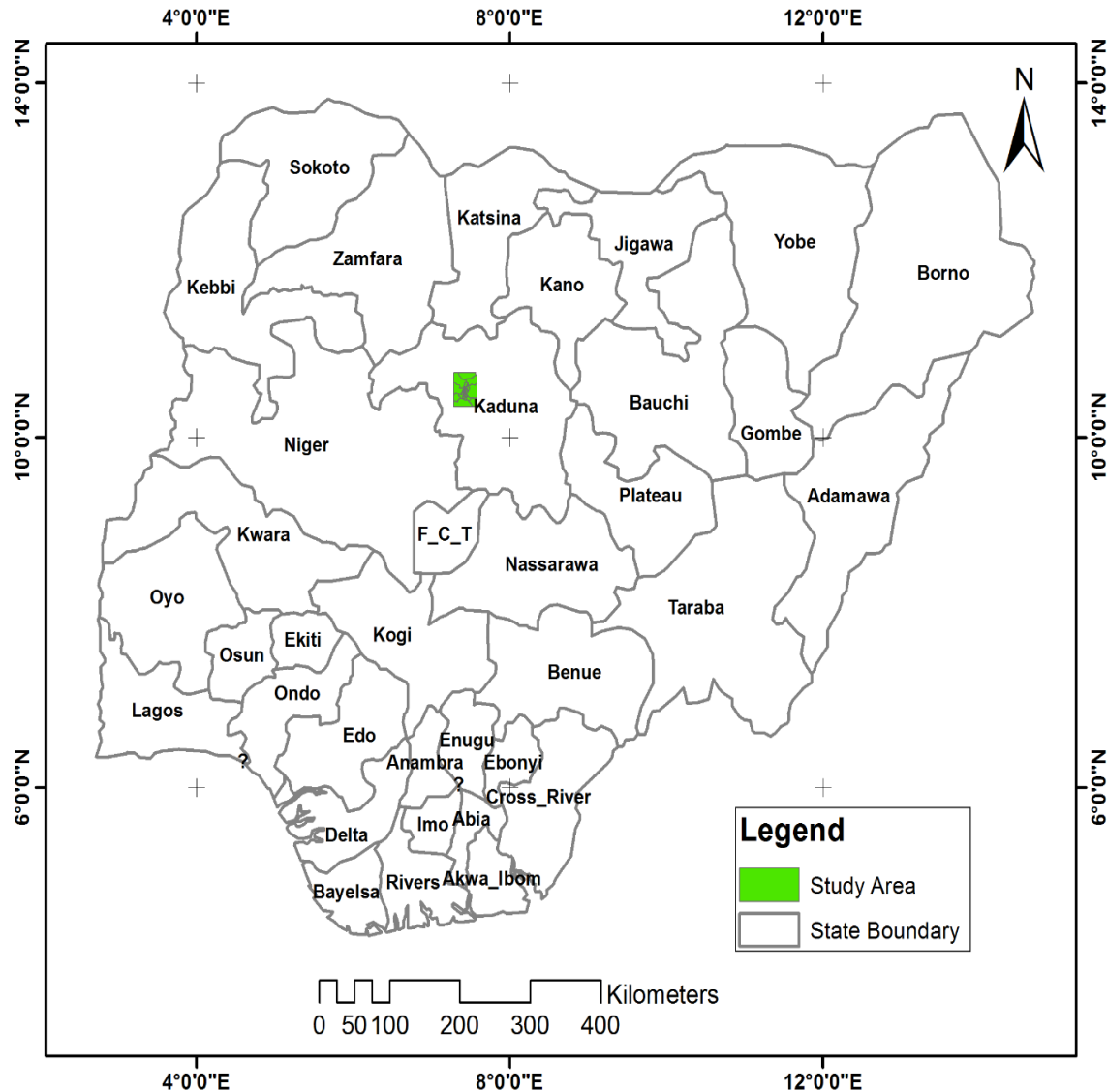
Figure1: The Study Area (Kaduna Metropolis) in Nigeria
Source: National Centre for Remote Sensing Jos, Nigeria (2014)

Literature Review

Street addressing is both an historical referent as well as spatial designation (Willians, 2014). As earlier mentioned, street naming has several benefits to different sectors and to extension, the geo-spatial field. Property

numbering system makes it easier to find unfamiliar places with lesser confusion. Logically in an urban setup street addressing will play a significant role to various users (Mutinda, 2017; Williams, 2014). Figure 2 shows some benefits of street addressing.
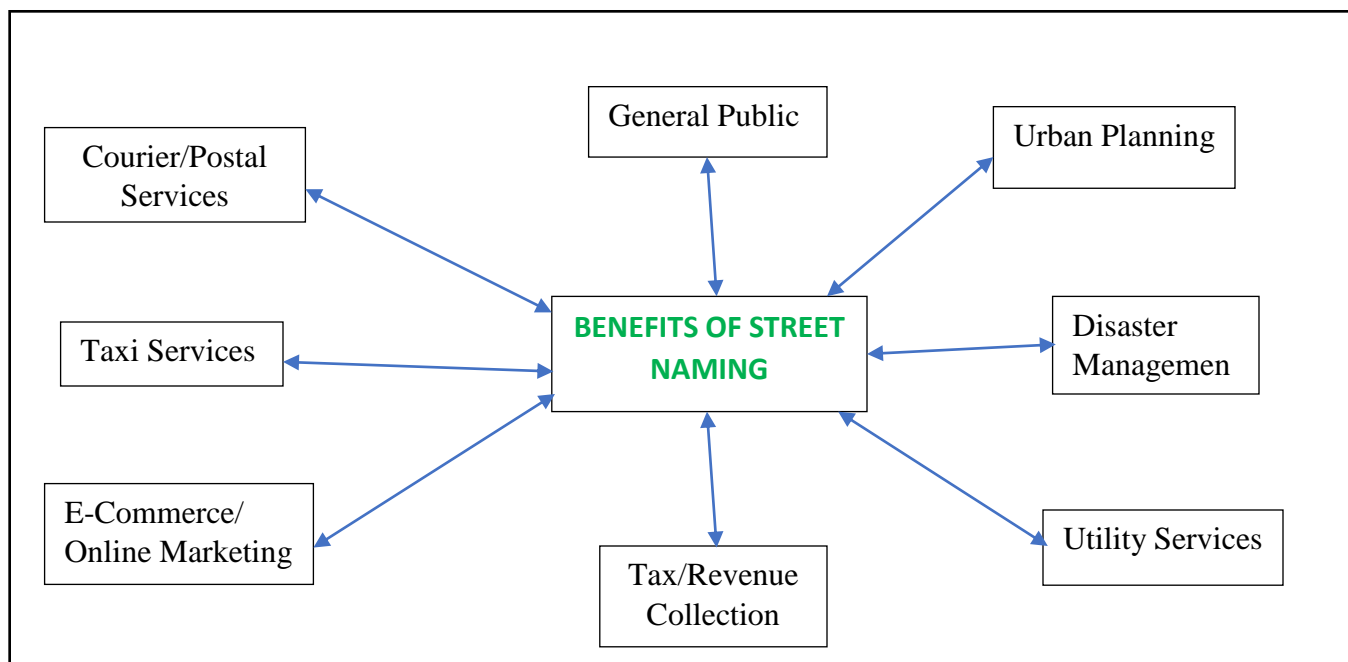
Figure 2: Benefits of Street Addressing
Source: Adopted from Williams (2014)

The importance of street addressing to different sectors of our society according to Williams, (2014) includes:

i. General Public: Ease and time saving in way finding and locating places

ii. Disaster Management: Speedy response to emergency incidences such as fire accident and security operation

iii. Courier/Postal Services: improved door to door shipping of client's parcels/letters

iv. Utility Services: Efficient management of utility networks/facilities and also enhanced utility service fee collection.

v. E-Commerce/Online Marketing: Improved sales and timely delivery of sales to client (such as Konga, Jumia, Ali Express, Amazon).

vi. Urban Planning: Enhance planning for the management and provision of facilities, infrastructure and public services.

vii. Tax/Revenue: Maximization of tax collection and management and enhance accuracy in revenue collection.

viii. Taxi services: Ease and time saving in navigation to carry and dropped clients.

A brief background on Street Addressing
The first official denomination of city streets by name did not become common until the 18th century in Western Europe, and although some house names were used to locate an exact site, street naming was only undertaken in the early 19th century. In general street names developed from informal descriptive

references to landmarks and to formalized names. Street naming increasingly followed a pattern that organized urban space into neighborhoods and later included the designation of house numbers. The changing concepts of public space and the rate of urban growth required consistency and formalization of street naming and house numbering (Williams, 2014; The University of California, 1992).

According to the guideline from the Urban Research Department of Kaduna State Urban Planning Development Authority (KASUPDA), for a street to be considered to have an appropriate name in Kaduna metropolis, the following are considered:

    i.   The name should be in line with the approved district themes, i.e. should follow a regular pattern,

    ii.   The street should not have more than one name (Multiple Names),

    iii.   The street should not have the same name with another street in the district,

    iv.   The street Names should be approved by the relevant authority (KASUPDA).

Thus, any street in Kaduna Metropolis, whose name is not in line with the above guideline is having an impropriate street name. Wrongly named street are streets named without approval and not in line with the approved district theme. For example, the district theme for Doka is Names of cities in Nigerian, therefor any street with name other than Nigerian city in Doka district is wrongly Named.

Methods

This study uses both the primary and secondary sources of data, though based its analysis on the primary source of data, obtained through direct field survey of the study area.

The secondary data used for this study was literature review of both published and unpublished material). These include literature from various texts, monographs, article, journals, previous works, maps, census figures, information from the internet and other essential information applicable to the subject matter. The study categorized the study area based on the existing 24 urban districts of the metropolis. Thus, each district in the study was considered separately, this was with the view of having a spatial finding for the study. The field survey was carryout in December 2015.

The materials used for data collection includes: Street Guide Map, Metropolis District, Boundary Map, Garmin Etrex 30 GPS, Field Observation Chat, Pencil, Eraser, Sharpener and Highlighting pen

Data collection was based on a rigorous street-by-street field observation of the study area, collecting data on the existing street names, street without names and their coordinates on ground, each district was considered at a time. The existing city-street guide map was used as a guide in the field. The district boundaries of the study area were digitized using the Arc GIS 10.3 software as polygons, the street guide map was imported in to the Arc GIS environment and geo-reference. The digitized district boundaries were overlaid on the street guide map. This was with the aim of properly defining the

boundary of each district in the study area so as to avoid confusion by the field observers (that is mixing up streets in one district with that of the other) thus, each district was clip out (extract) using the polygon shape file of that district from the street guide map. Using the Arc GIS software, showing only the streets of that district, removing all other districts, and print on A0 size paper, this makes the map more legible for the field observers. The field observation guide was used to write down the name of each street, and its coordinate. The highlighting pen was use to highlight any street observation is being carryout on, in the street guide map of the district.

The data analysis of the study was based on the use of tables and maps. It analysed the frequency and spatial distribution of each of the indecorous of street naming. Such as un-named streets, streets with multiple names, street named not in line with the approved district naming pattern for the district, street named as a close inset of a street, and naming a close as street or road, a particular name being used more than once in the same

district (street with the same name in the same district). Microsoft Excel spreadsheet was used for office data collation and analysis in tables, while the Arc GIS 10.3 software was used to show the findings of spatial analysis as a map.

Results and Discussion

The foremost objective of street naming and house numbering in any urban area is property identification. However, this study analyzes the indecorous street naming in Kaduna Metropolis. This was with an aim of examining the magnitude of indecorous street naming in the study area. In assessing the inappropriateness of the street naming, the study focuses on the total observed streets in each district, analyzing the number of streets without street names, streets with multiple names, repetition in names within the same district and also within the metropolis and wrongly name streets. Table 1 presents the findings of the study on the magnitude of indecorous street naming in Kaduna Metropolis.

TABLE 1: Analysis of Improper Street Names in Kaduna Metropolis

District	No of Streets	Unnamed Streets	%	Multiple Named street	%	Repetition in Names	%	Wrongly Named	%	District Pattern
Kabala	151	10	6.62	-	-	2	1.32	-	-	No Define Regular Pattern
Badarawa/Malali	305	18	5.901	-	-	2	0.66	97	31.803	African Cities and Names of Individuals
Hayin Banki	146	15	10.27	-	-	-	-	25	17.12	Name of Places and Tribes in Nigeria
Kawo	122	12	9.84	-	-	3	2.46	33	27.05	Names of Individuals
Doka	168	7	4.17	-	-	2	1.19	28	16.67	Nigerian Cities
Sabon Gari	132	8	6.06	-	-	4	3.03	23	17.42	Names of Places in

District	No of Streets	Unnamed Streets	%	Multiple Named street	%	Repetition in Names	%	Wrongly Named	%	District Pattern
										Kaduna
Afaka	98	11	11.22	-	-	1	1.02	-	-	No Define Regular Pattern
Badiko	104	14	13.46	-	-	1	0.96	27	25.96	Names of individuals and Amy officers Ranks
Tudun Wada	79	3	3.79	-	-	3	3.79	9	11.39	Names of LGA's and Tribes in Nigeria
Narayi	216	8	3.703	-	-	8	3.703	49	26.28	Names of Individuals
Rigachukun	141	45	31.91	-	-	2	1.42	29	20.57	Names of Individuals
Kakuri	46	1	2.17	-	-	3	6.52	4	8.69	Names of Places
Ungwan Muazu	196	6	3.06	-	-	5	2.55	39	19.89	Names of Individuals
Matagyi	438	18	4.11	-	-	22	5.02	93	21.23	LGA's Ethnicity and Tribes in Kaduna
Gabasawa	160	3	1.88	-	-	6	3.75	45	28.13	Names of Places and Traditional Titles in Northern Nigeria
Nassarawa	173	36	20.81	-	-	-	-	-	-	No Define Regular Pattern
Television	188	14	7.45	-	-	11	5.85	37	19.68	Names of Places and Traditional Titles in Kaduna
Kakau	227	42	18.502	5	2.2	7	3.08	35	15.42	Names of Places and Traditional Titles
Rigasa	349	13	3.72	-	-	4	1.15	-	-	No Define Regular Pattern
Barnawa	154	10	6.49			6	3.89	87	56.49	African Cities
Kamazou	92	23	25	14	15.22	2	2.17			No Define Regular Pattern
Makera	59	-	-	-	-	3	5.08	6	10.17	Names of Places

Source: Field Work (2015)

One of the basic characteristics of an uncoordinated city is street without names or unnamed streets, in view of the importance of street naming a number of streets without names where identify in the study area. The result of the study on streets without names as

shown in Table 1 reveals that Rigachikun, Kamazou and Nasarawa Districts have the highest percentage of streets without names, with over 20% of their streets without names. Whereas Kakau District has about 18% of the streets with names, whereas Badiko, Afaka, and Hayin Banki Districts have between 10 – 14% streets without names. Kawo, Television, Kabala, Barnawa, Sabon Gari, and Badarawa/Malali Districts have between 5 – 9% of their streets without names, while most of the districts (Doka, Matagyi, Tudun Wada, Rigasa, Narayi, Ungwan Muazu, Kakuri and Gabasawa Districts) have less than 5% of their streets without names. However, all the streets in Makera District have names on ground. This implies that Rigachikun, Kamazou, Nassarawa, and Kakau Districts have more unplanned streets, while Makera, Gabasawa, Kakuri and Doka District, shows some elements of planning in terms of the availability of street names, thou some streets in Mogadishu layout of Doka district have no names. Although Gabasawa District has more government administrative and residential building, Doka district is the commercial nerved centre of the City, Kakuri and Makera District are the industrial heaven of the city, which are all planned areas. While Rigachikun, Kamazou, Nassarawa, and Kakau District comprises mostly have medium and low-income residents that have emerge because of urban sprawl in the Metropolis. The impact of non-naming of streets and numbering of houses in Kaduna Metropolis has made residence and first-time visitors erroneously surfer and waist money on phone calls and transport fares as they precise place they aim for can hardly be located without these. The made delivery of

mails at home highly impossible, many letters and courier hampers over stay in post office and if they are registered, they are mostly returned undelivered (Salawu, *et al.,* 2014; Gusau and, Dauda, 2010).

The spatial analysis of the location of the streets without names as presented in Figure 3 shows that the Central Area Districts (CAD) of Doka, Gabasawa, Kabala, Barnawa, Narayi, Sabon Gari Tudun Wada, Makera and Kakuri, has less than 10 streets without names depicted by the green color on the map. These districts are mostly the old neighborhoods in the city centre's, with some form of initial planning, but as a result of more development in the city centre, some indecorously planned development emerge given rise to streets and, mostly closes without name. Badarawa/Malali, Kawo, Hayin Banki, Television, Matagyi, Badiko, Afaka and Regasa Districts has between 11 to 20 streets unnamed depicted by the blue color on the map. These are mostly districts with settlements as old as that of the city center but have more undeveloped areas compared to that of the main city center, as population continuously increase within the metropolis. The peripheral districts continue to expand and planning authorities were not fully up to the task of ensuring that, all developments are well planned, given rise to a number of streets without names, also most of the street names in these districts have no form of approval. Kamazou District has between 21 to 30 streets unnamed depicted by the yellow color on the map. While Rigachukun, Nassarawa and Kakau Districts has 31 and above un-named streets depicted by the purple color on the map in Figure 3.
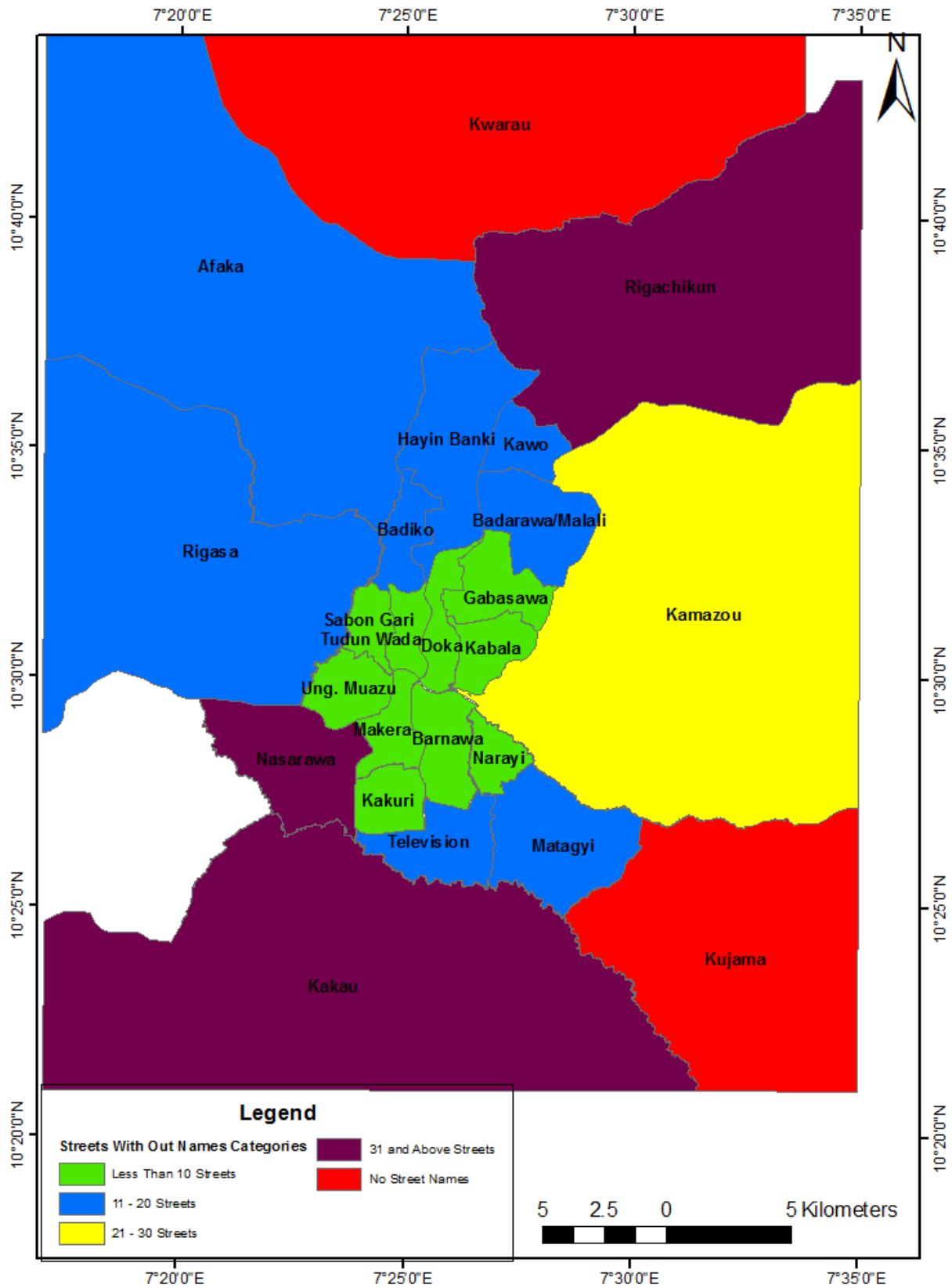
Figure 2: Spatial Distribution of Unnamed Streets
Source: Field Work (2015)

These are urban settlements that have emerge as a result of urban sprawl in the city, given rise to streets without name and most of the streets names in this district have no form of planning permit or approval from any authority. Kujama and Kwarau Districts have no street names in its streets, and are depicted by the red color on the map. These are districts very far away from the city centre, and more of a rural and semi urban settlements, which are unplanned settlements, though most of its land area undeveloped, thus, the planning authority need to quickly provides a layout planned for all undeveloped land within the city and properly monitor its development.

Streets with multiple names can cause confusion to resident, visitors, property owners, government agencies and service delivery companies; as it is more become difficult to describe their actual location. This is because individuals gave names to streets based on their individual discretions and this has made streets to have multiple names. Many have duplication and others triplication of names (Salawu *et al*., 2014). The study shows that some residents numbered their houses with names from adjacent or opposite streets resulting in double names on a street. However, this study was able to identify some few streets with multiples names, the result as shown in Table 1. This reveals that the study area has 19 streets with multiple names distributed over two districts (Kamazou and Kakau). Kamazou District has14 streets (15.22% of streets in the district) with multiple names, while of streets in Kamazou District have multiple names while Kakau District has five streets with multiple names. The two districts have mostly medium and low-income residents

emerging as a result of urban expansion, however the multiples names where observed in only the medium class resident's area in the two districts. The impact of this that during emergencies such as armed robbery or fire incidence, the rescuing team suffers problems of tracing fire distress calls or emergencies, the team can only trace with noise, smoke or smog from the burning building as result of the multiple names of the street. This causes inconveniences to visitors and residence alike.

This study considered street wrongly named as street named not in line with the approved district naming pattern for that district, naming a street as a close and naming a close as street or road, and streets as roads. The result of the study as shown on Table 1 reveals that Barnawa District has the highest number of wrongly named streets accounting for about 56% of the streets names in the district. This is closely followed by Badarawa/Malali Districts, which accounts for about 31.8%, and Gabasawa District accounting for about 28% of the street's names in the district. This was followed by Kawo District with about 27%, and Badiko District accounting for about 26%, followed by Narayi with about 22.68%, followed by Matagyi and Rigachikun districts accounting for about 21% of street names in the districts. Ungwan Mazua and Television Districts each accounting for about 20%. Doka, Sabon Gari and Hayin Banki Districts accounting for about 17% of the street's names in each of the districts, and Kakau accounting for about 15.4%. While Tudun Wada District accounting for about 11.4%, and Makera with about 10%, this is followed by Kakuri District with about 8.7% of the street's names in the district. However, Kabala, Afaka,

Nassarawa, Rigasa and Kamazou districts have no any form regular pattern observed in their street names, this implies that these districts emerge as unplanned settlements. However, districts with low percentage of wrongly named streets such as Kakuri, Makera and Tudun Wada have some element of planning in its street naming pattern.

A spatial analysis of the wrongly names street according to their districts as shown on Figure 3 reveals that the central area district of Tudun Wada, Makera and Kakuri have less than 10 streets wrongly named, depicted by the green color on the map, this shows some form of conformity in the naming pattern of those districts. Doka, Sabon Gari, Hayin Banki, Rigachukun and Badiko Districts have between 11 to 30 streets wrongly named, depicted by the blue color in the map, this are also districts around the city centre except for Rigachikun District which is a semi urban area located at the north-eastern part of the Metropolis. This shows some element of the existence of some unapproved layout in those districts, with unauthorized street names i.e individuals naming streets without appropriate approval. Kawo, Gabasawa, Television, Ungwan Muazu, Narayi and Kakau Districts have between 31 and 50 streets wrongly named, depicted by the yellow color. Gabasawa a central area district and a Government reserved area, Kawo an old city settlement north of the city centre. Ungwan Muazu an urban sprawl settlement west of the city centre, Narayi, Television and Kakau located south of the central area, this shows that the districts with 31 to 50 street wrongly named are distributed virtual all-round the city, with more in the southern part of the city, which depicted by the pick color as shown in Figure 4. Badarawa/Malali, Barnawa and Matagyi Districts has 50 and above streets wrongly named, Badarawa/Malali and Barnawa Districts are old settlement with the presents of the Shagari Housing Estates, and except for the housing estate area and its immediate environs in the district most other streets are wrongly named, this shows that only the low-cost housing estate area was well planned, others are old city settlement and settlement that emerge as a result of city expansion. While Matagyi District developed rapidly within the last two decades as a result of the then frequent ethno religion crises in the city, leading to urban sprawl. Kujama, Kamazou, Kwarau, Afaka, Rigasa, Kabala and Nassarawa Districts have no any form of regular pattern in its street naming pattern, this are mostly peripheral districts as shown on Figure 4, depicted by the red color on the map, this shows that those districts have no initial planning.
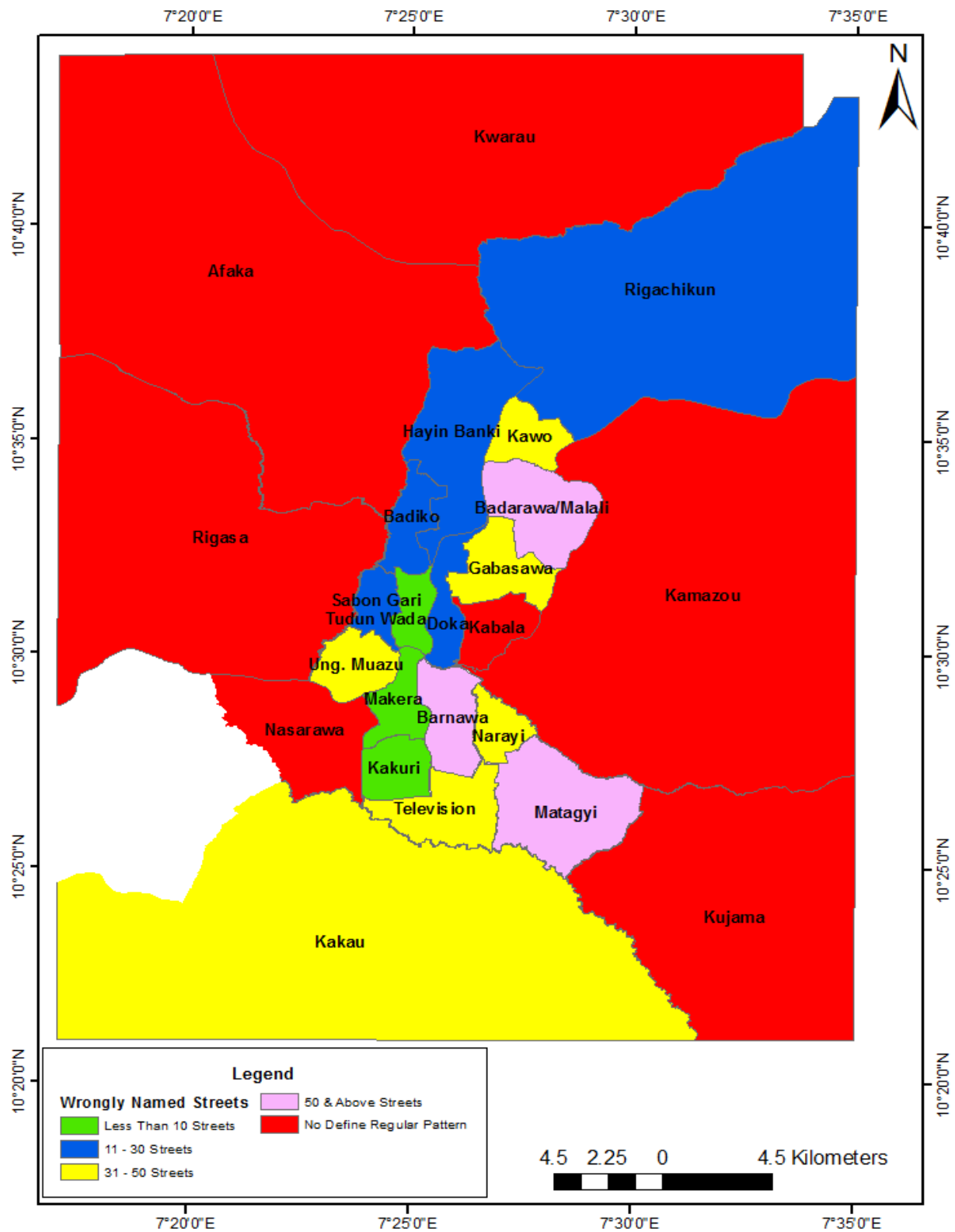
Figure 4: Spatial Distribution of Wrongly Named Streets
Source: Field Work (2015)

Repetition of names in streets within the same district and the same city, is another great challenge of an unplanned settlement. The study shows that a total of about 160 street names were repeated within the study area, with some names being used more than 10 times within the city, more than thrice, and some more than five times. The result of the study analysis on repetition in names within the same district is as presented on Table 1. It shows that Matagyi District has 22 street names repetition, which is the highest in the city, followed by Television district with 11 street Names repetition, followed by Narayi District with 8 street names repeated, and Kakau District with 7 street names repeated, followed by Gabasawa and Barnawa District with about 6 street names repeated. Ungwan Muazu has 5 street names repetition, and Sabon Gari District has 4 names repeated, Kawo, Tudun Wada, Badiko and Makera Districts has 3 street names repeated each. Kabala, Badarawa/Malali, Rigachikun and Kamazou Districts has 2 street names repetition in each of the districts, and Afaka district have only 1 observed street name repeated. However, Hayin Banki and Nassarawa Districts have no repetition in street names. The study reveals that quite a number of street names are being used more than once within the same district, this is not good as it results to time wastage in terms of service delivery, tax collection, and confusion in the allocation of infrastructural projects and makes the location of property difficult for visitors.

The spatial analysis of the result of the study on repetition in names, as presented in Figure 4, shows that repetition in names in the city have no regular pattern as both the Central Area Districts (CAD) and peripheral districts has repetition in names, the green area on the map depict districts with no repetition in names, though this shows some form of planning it is located in an unplanned settlement of Nassarawa and Hayin Banki Districts. The light green area in the map shows districts with less than 4 street names repeated, this covers a greater proportion of the map, distributed from the central area through to the peripheral area, which implies that there is the need for the renaming of those streets so as to avert confusion in the location of properties within the city. The blue color area on the map depict districts with between 5 to 9 streets names repetition within those districts, located mostly south of the city centre, this implies that there is more confusion in the location of properties within these districts, thus the need to renamed streets with repetition in names. The yellow color on the map shows districts with more than 10 street names repetition, this are part of the southern urban sprawl of the city, with greet need for the regularization of streets names, renaming of streets with repetition in names is very essential in these districts, so as to avoid confusion in the location of properties and service delivery in those districts. Kwarau and Kujama districts depicted by the red colour on the map have no street names.
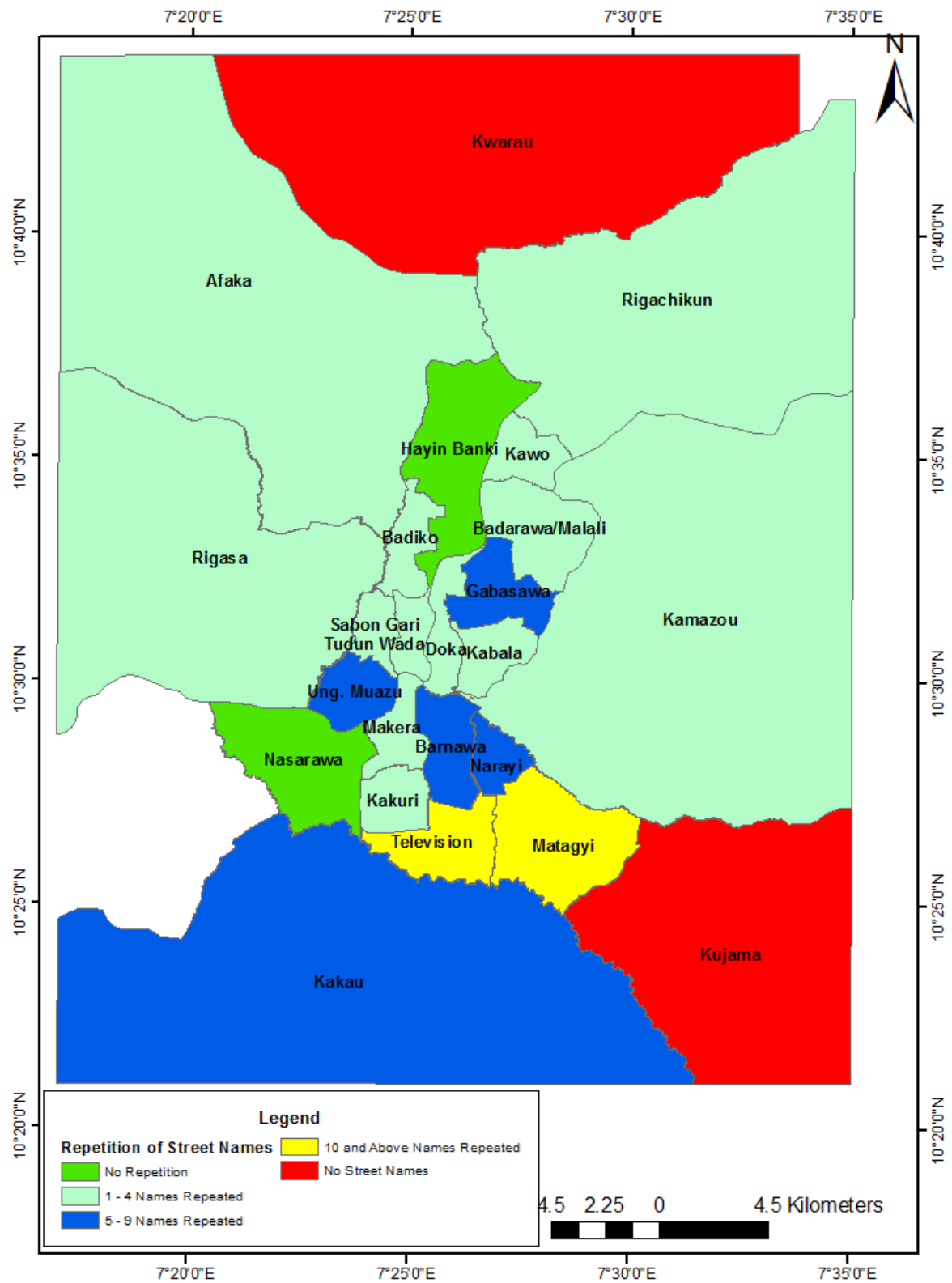
Figure 4: Spatial Distribution of Streets with Repetition in Names
Source: Authors Field Work (2015)

Conclusion

It is important to note that decision-making regarding the space within which a problem occurs is as vital as the planned line of action to be taken as in intelligence-based approaches. If all queries to find where people and places are to be accomplish, it is important to state that all the listed possible benefits that can be obtained from the naming of streets is very attainable because of the implausible processing power that computer have and the available expertise. Thus, this study has examined and provides empirical data on the scale of indecorous street naming in Kaduna Metropolis, Nigeria.

The study reveals diverse forms of indecorous streets names in the study area such as streets without names and houses without numbers, multiple named streets, and wrongly named streets. Planning authorities in an attempt to plan for street names in the city, form a naming theme, for districts in the city, which have been greatly abuse, resulting to the high level of wrongly named streets. The study equally shows the spatial pattern of the indecorous of street names in the metropolis, which reveals that most of the indecorous street names are in the periphery districts though the central area district equally has some indecorous street names but less compared to the periphery districts. Which implies that the old city neighborhood has some element of planning, but planning authorities in the city are not keeping pace with the rate of development in the city. This is resulting to the present state of urban sprawl in the metropolis. Thus, the need for the proper empowerment of the authorities' concern with all the relevant resources required for the effective and efficient planning and monitoring of the city rate of development.

Recommendation

The study therefore recommends the following for alleviating the problems;

i.   The authorities should ensure that all emerging streets are well named and houses well numbered, banning self-naming of street. This will ensure urban livability and sustainable growth of the metropolis.

ii.   The authority should ensure public participation in the management of the existing street names in the metropolis, through urban governance and pubic enlightenment on the standards and regulation guiding street naming in the area.

iii. Also, for the metropolis to be economically buoyant and sustainable the authorities should provide a framework that will encourage public private participation in the management of the street names. Through the introduction of a monitoring team, that will use the street signage for adverb, and also report any abnormality that may rise from any street. This is if the maximum benefits of street addressing are to be enjoyed in the metropolis.

iv.   All streets with inappropriate names in the city should be renamed and house should also be well numbered in line with the standard and regulation guiding street naming. This will equally provide some form of livability and sustainability of the metropolis, as facilities can be easily

managed, and also their will be an improvement in services delivery.

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RESIDENTS' EVALUATION OF PERCEIVED ENVIRONMENTAL CHALLENGES ARISING FROM QUARRY ACTIVITIES IN AKURE, ONDO STATE, NIGERIA

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Abstract

This research examined residents' perception on environmental challenges arising from quarry activities in Akure, Ondo State, Nigeria. Two different locations of quarry sites were selected and visited within the study area for the purpose of this work. Questionnaires were administered using simple random sampling technique on 130 residents within the two locations out of which 90 constituted valid response and was eventually used for the analysis. Data collected were rated on a five-point Likert scale and analyzed using descriptive and factor analysis by principal component while Geographic Information System (GIS) was adopted to determine the extent at which the quarry site environment were gradually enveloped into built –up area. The result revealed that nearness to market rank high among factors that motivates residents' choice of location around the quarry site which was as well shown in the aerial imagery using GIS. Respondents are faced with the challenges of noise pollution, land vibration arising from rock blasting, flying rocks, and air pollution. However, community residents employed strategies such as moving away from the house during blasting with the highest mean score of 4.489 to cope with the situation. While those respondents residing far from the sites live with the situation with mean score of 4.389 ranked second. It is therefore recommended that there is an urgent need for Federal and Ondo State governments to critically look into these factors in order to monitor the activities of quarrying in Akure, considering the effects on resident's health. Community residents should also be educated on the danger of building house close to quarry sites, while quarry owners should ensure that international standard of safety is strictly adhered to by the operators in Nigeria.

Keywords: *Environmental challenges, Quarry Activities, Environmental Sustainability, Factor analysis, GIS, and Akure*

1.0   Introduction

Quarrying products are increasingly demanded for industrial, domestic, agricultural and other purposes so as to satisfy the needs of the rapidly growing population. Quarrying operations generally involve removal of over- burden, drilling, blasting and crushing of rock materials (Adetiloye and Nenuwa, 2016). The various impacts produced by these operations are both size and locations dependent. Manifestations of specific impacts are on the air, water, soil, earth surface, flora and fauna, and human beings (Areola, 1991). However, the scale of operations involved in exploration, mining and processing of a mineral determines the intensity and extent of environmental degradation. The results of this

anomaly are numerous which include continuous depletion of environmental resources, pollution of surface and underground water, and visual ugliness. All these have considerable implication on well-being and health of communities where quarry industries are located (Oyediran and Omoare, 2016).

According to Vincent, Joseph and Raphael (2012) a survey of the communities and the quarries in the Lower Manya Krobo District in the Eastern region of Ghana revealed worrying issues concerning the impacts of the mining activity on the environment which included impact on buildings, farmlands, crops and water systems. Several buildings were observed to have developed different degrees of cracks with some near collapse. These cracks were basically due to strong vibrations coming from rock blasting. Farmlands are usually lost to flood waters which are water pumped from the quarry pits and run-offs. Dust from rock processing and unpaved (dusty) roads have settled on crops and other plants as a result of sedimentation. High concentrations of dust on the plants result in poor plant performance and yield. Furthermore, Aigbedion and Iyayi (2007) asserted that large – scale mining of tin and associated minerals in the Jos, Plateau has resulted in a high degree of degradation of arable land, vegetation and landscape, as well as other environmental problems.

Local communities within a 1 km (1000 metres) radius from the source can potentially be affected by environmental pollution, although concerns about it are most felt within 100 meters (Akinwamide, Adebayo & Binuyo, 2018). Deposited dust gives rise to the greatest number of complaints to quarries from local communities, particularly for contrasting colours that are more noticeable on deposition. Settled particles may show up particularly on clean or polished surfaces such as cars, windows and window ledges, or surfaces that are usually expected to remain free from dust (Yacim, 2013). However, these activities are usually not carried out within or around the built – up residential environment but as development/urbanisation sets in with passage of time, the areas which hitherto were used for agricultural purposes, mining exploitation and quarrying are gradually enveloped into residential/commercial built –up areas (Aribigbola, Fatusin and Fagbohunka, 2012; Akinwamide and Idris, 2018).

In view of this, various Environmental safety laws and edicts have been adopted by Governments of nations in order to protect the environment from such hazards. However, operators of quarries have abused these laws in order to maximize profit; the abuse is paramount in Africa, especially in Nigeria (Omosanya and Ajibade, 2011). Several years after the promulgation of this law, many communities hosting large quarrying plants has had to live with serious environmental problems following the operation of such industries. In Oyo State, some of the notable quarries located in the rural areas includes Associated Granite Industry, Ratcon, Kopek, Niko to mention a few (Oyediran and Omoare, 2016). Aribigbola et al., (2012) observed that little attention has been given to this detrimental situation in research as most empirical studies often focus on economic gain of the quarrying. It is in view of this background that this study becomes pertinent to examine residents' perception on environmental challenges arising from quarry activities in Akure, Ondo State, Nigeria.

1.1   Study Area

The study centers on Akure city and its immediate environments. Akure is a notable city in

south-western Nigeria which became the capital of Ondo State on February 3, 1976.As shown in Figures 1–3, it is located between latitudes 70 151 and 70 171 north of the

Equator and between longitudes 50 141 and 50 151 east of the Greenwich Meridian. It is about 204km east of Ibadan, capital of Oyo state; 168 km west of Benin City, capital of Edo state; 311 km north-east of Lagos; and 323 km south-west of Abuja, the Federal Capital Territory of Nigeria. Akure town spreads over an area of about 15,500 km2 in about 370m above the sea level. Its population figure by the National Population Census of 1963 was just 71,106. With the influx of public servants into the town consequently upon state creation in 1976, the population rose to 239,124 and 360,268 in 1991 and 2006, respectively, with a projection of 476,159 in the year 2014 (Akinwamide *et al*., 2016).
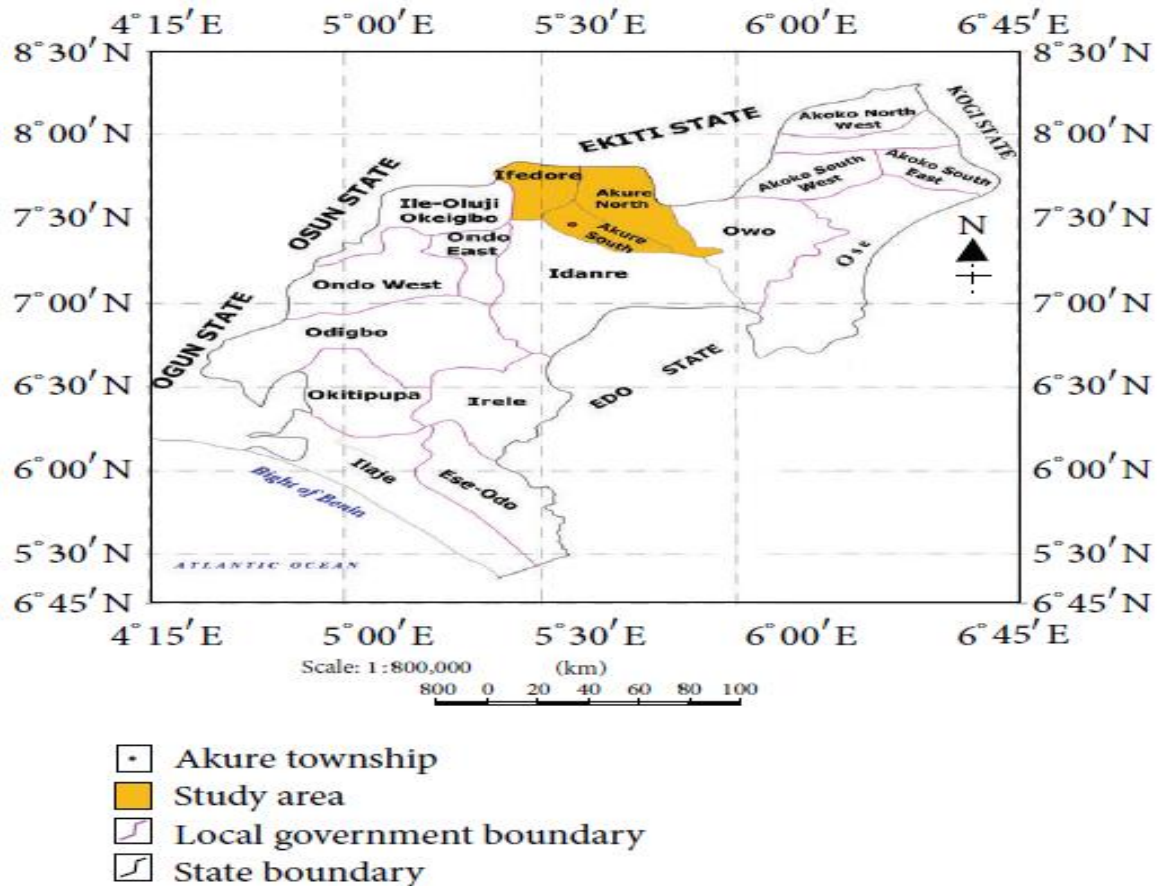
Fig 1. Map of Akure showing the Study Area
Source: Ondo State Ministry of Lands and Survey, Akure (2017)

2.0   Literature Review

Quarrying activities have over the years impacted positively and or negatively on the environment. Rolfe (2004) while carrying out a study on the economic impacts of coal mining on small country town of Nebo using the input – output models and multiplier approaches found that mining industry is a major contributor of revenue to the Queensland economy. Muyanda and Gu (2008) in a study using the simple percentages to investigate the magnitude of small scale quarrying and mining on the environment in Crooks/Nyerere compound of Lusaka found that mining can provide job and increase income of miners per day. The

same view hold sway in Aigbedion et al (2007) on environmental effect of mineral exploitation in Nigeria, where it was discovered that mining of solid and non – solid minerals contributed to the national wealth with socio – economic benefits to residents' of that area.

However, various research work has proven quarry activities as a human activity that generates particulates pollution in the environment (Oyediran and Omoare, 2016, Akinwamide and Idris, 2018, Akinwamide *et al*., 2018). Aigbedion et al (2007) found that mining exploitation contributed to the pollution of air, land and water. It also cause damages to the vegetation, ecological disturbance, degradation of natural landscape, geological hazards, socio-economic problems and radiation hazards arising from by – products of tin etc. More so, it is more terrible if an area used for mining previously is left un-reclaimed. According to Deborah (1996) and National Industrial Sand Association (1997), dusts generated from granite quarrying contain 71 percent silica. Inhaling such dust results in silicosis which is capable of disabling an exposed person and subsequently, leads to death. Apart from silicosis, sandblasters, miners and quarry workers also suffer from pneumoconiosis (www.gulflink.osd.ml). Suspended particulate matter may be affecting more people globally than any other pollutant on a continuous basis (Richard et al, 2002). Adetiloye and Nenuwa, (2016) found that the impact of air pollution/dust generation and destruction of biodiversity are relatively less serious as only between 20 – 35% of the respondents rated these issues as serious in a study carried out in Ekiti State using

percentage distribution. The consequence is more on residents as Muyanda and Gu (2008) found the presence of craters and open pits left after quarrying and mining.

According to Oyediran and Omoare, (2016) the issues of concern in quarrying include visual intrusion, damage to landscapes, traffic, smoke, noise, dust, damage to caves, loss of land, and deterioration in water quality. Of major concern is blasting which is necessary to break down the rocks from the ground for subsequent processing into aggregates. Using Geographic Information System (GIS) and Crosstabs' nominal-by-nominal measures, Akinwamide and Idris (2018) study found that the farther the distances away from the quarry site, the lower the percentages of high level of environmental pollution. It was also found that statistically significant relationship exists between the level of environmental pollution and satisfaction with the quarry site. Adetiloye and Nenuwa, (2016) observed that the effects of noise from the quarry operations and vibrations from rock blasting were serious and of major concern as about 70% of the respondents attested to this. While the other environmental issues which are river siltation/farm flooding, pollution of water sources and degradation of farm land and roads were perceived to be absent or insignificant as more than 60% of the total respondents confirmed this. The workers in the quarries were the most affected by noise, vibrations from rock blasting and air pollution/dust generation; other environmental issues majorly affected the residents of the communities in the study area.

Interestingly, quarrying activities in the developed countries have since undergone phenomenal and rational changes within the purview of sustainable development (Lambert, 2001; Moran, 2003). In Nigeria, the efforts being made by government to ensure sustainable development was through the establishment of Environmental Planning and Protection Division (EPPD) in 1975 under the Ministry of Industry. Later, the Federal Environmental Protection Agency (FEPA) was established under CAP 131, LFN, 1990 as amended by Decree No 59 of 1992. The states also established their own Environmental Protection Agency. Akindele (2003) succinctly put forth the goals of this body, as to ensure a quality environment for the health and well-being of the people, to conserve and use land with its natural resources for the benefits of present and future generations; restore, maintain and enhance the ecosystems and ecological processes essential for the functioning of the biosphere, to preserve biological diversity and principle of optimum sustainable yield in the use of living natural resources and ecosystem among others.

From these, it can safely be said that if an environment is stigmatized by residents, it could have a short and long time effects, however, this may be dependent on what people are looking for in areas/neighbourhoods where vacant land and or property are situated (Yacim, 2013). This current study therefore, examine residents' perception on environmental challenges arising from quarry activities in Akure, Ondo State.

3.0   Methodology and Materials

The study involves site visit, empirical investigation, observation and interview of selected residents of the study area. Primary data were obtained by means of questionnaire administration, participant observation and Aerial Imagery Overlay (AIO) with the aid of GIS and Remote Sensing (RS). Secondary data sources included relevant journals, textbooks, other published materials relevant to the study and map of the study area. One hundred and thirty (130) structured questionnaires was administered and equally distributed between the two locations of quarry sites in the study area. The questionnaires were administered on the residents of the communities within the study area on a simple random sampling technique. Ninety (90) questionnaires were completed and returned; sixty (60) questionnaires were received from location A1 (Mansory Quarry company), while thirty (30) questionnaires were received from location A2 (Stone work Quarry company). Items for which responses were sought included demographic characteristics of the respondents, residents' choice of location, their perception on the environmental challenges arising and the coping strategies adopted. Respondents were asked to give their opinion on the perceived of each variable (environmental challenges) that affect the built-up environment in Akure on a five point Likert scale: Strongly Agree = 5, Agree = 4, Undecided = 3, Disagree = 2, Strongly Disagree = 1.

Factor analysis by principal Components was adopted in the data analysis for the purpose of partitioning perceived environmental challenges as variables into factors as they affect the built-up environment. The factor

analysis is to summarize the interrelationship and establish levels of variance in decision variables as they affect the given phenomenon. A factor is a linear combination of variables. The linear combination is not chosen arbitrarily, but in order to capture the relationship among the variables, factor analysis uses the correlation or covariance among a set of observed variables to describe them in terms of a smaller set of unobservable variables (Tucker and MacCallum, 1993, Olorunleke, 2006).

The factor Analysis model is given as

$$(X_i/ y, \lambda, f_i\ m) =\ y\ + \lambda f_i + \varepsilon_i \qquad (1)$$
$$(P \times 1)\ (P \times 1)\ (P \times m)(m \times 1)\ (P \times 1)$$

Where: y is the overall populations mean Vector

λ is the factor – loading matrix,

f_i is the factor score

m is the number of factors

p is the observed variables

ε_i is the error variance

i is the number of observation.

In factor analysis, attention is paid to the central limit theorem. Here the errors **(ε_i)** are assumed to be normally distributed with mean 0 and constant variance. Factor scores and errors are independent. Factor analysis also assumes that all variables are dependent and there are no independent variables.

3.1 Variables Used in the Analysis

The following variables, which are considered as the perceived environmental challenges arising from quarry activities, were used.

(a) Noise Pollution arising from Quarry Operation (NPQO)

(b) Land Vibration from Rock Blasting (LVRB)

(c) Flying Rocks Everywhere (FRE)

(d) High Occurrence of Erosion (HOE)

(e) Air Pollution from Quarry Operation (e.g Heavy Dust Everywhere) (APQO)

(f) Acidic Rain Water (ARW)

(g) Destruction of Biodiversity (DOB)

(h) Risk of Building Collapse (RBC)

(i) High Occurrence of Damaged Crops (HODC)

(j) Decrease in Farm Products (DFP)

(k) Increased Loss of Soil Nutrient (ILSN)

(l) Oily and Shiny Water Surface (OSWS)

(m) Heavy Settlement at the Bottom of Water (HSBW)

(n) Water Producing Irrigation Odour (WPIO)

(o) Floating of Dust on Water Surface (FDWS)

(p) Prevalence of Sickness and Diseases arising from Open-Mine Pit (PDOM)

(q) Death of Little Children in the Mine Pits (DLC)

(r) Degradable Land Cover (DLC)

(s) Open-Mine pits Breeds Mosquitoes (OMBM)

(t) Nauseating Stench on the Environment (NSE)

4.0   Data Analysis and Discussion of Results

4.1   Analysis of Existing Situation: Location/Spatial Distribution of quarry Infrastructure in Akure North (the Study Area) using GIS
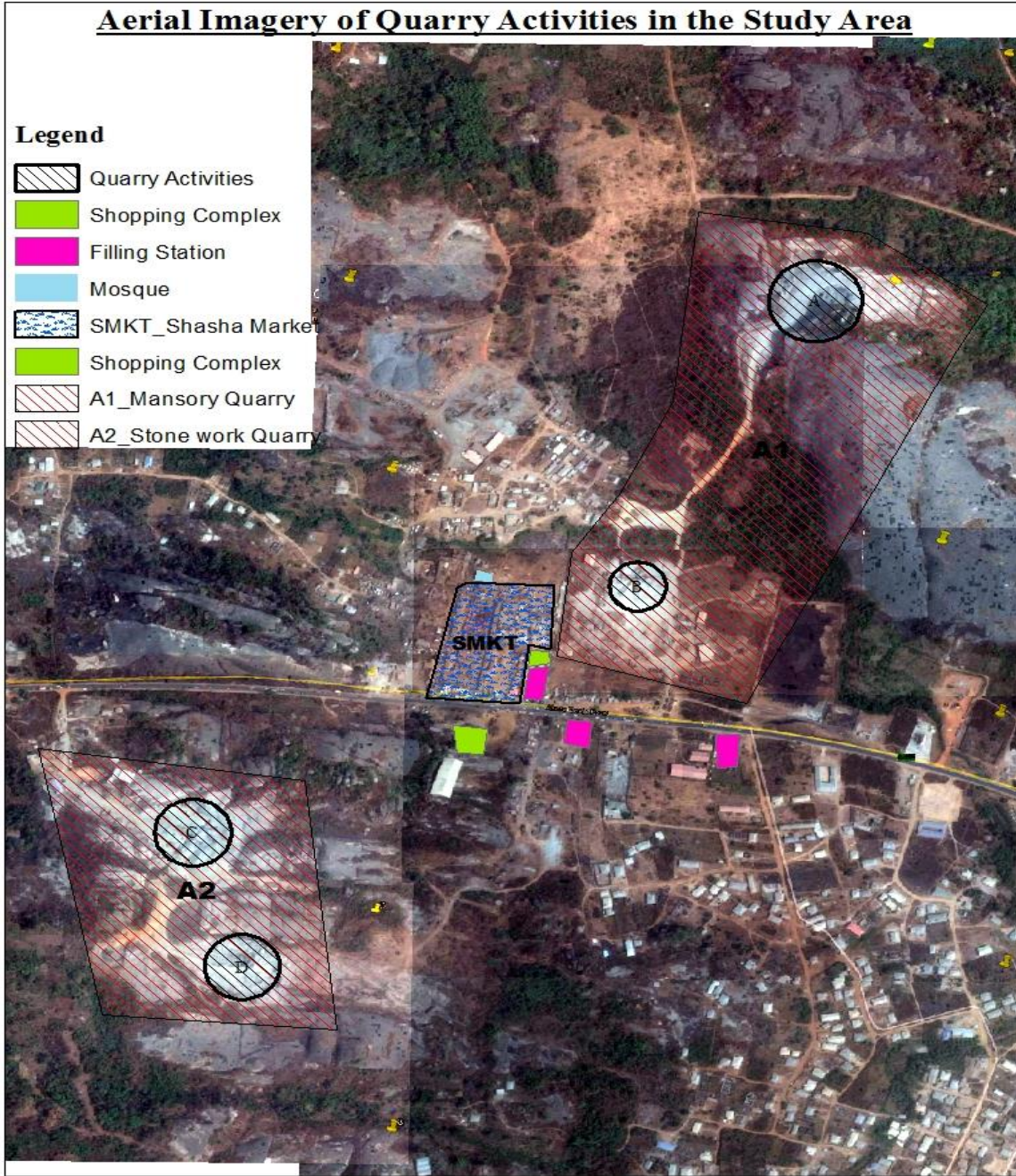
Figure 2: map showing location of quarry sites on generic land use in Akure North.

Figures 2 shows existing situation of the location of quarry sites in Akure North (the study area). It can be seen that quarry site environment are gradually enveloped into built –up area while schools, shopping complex, filling stations, central mosque and main market are now in close proximity.
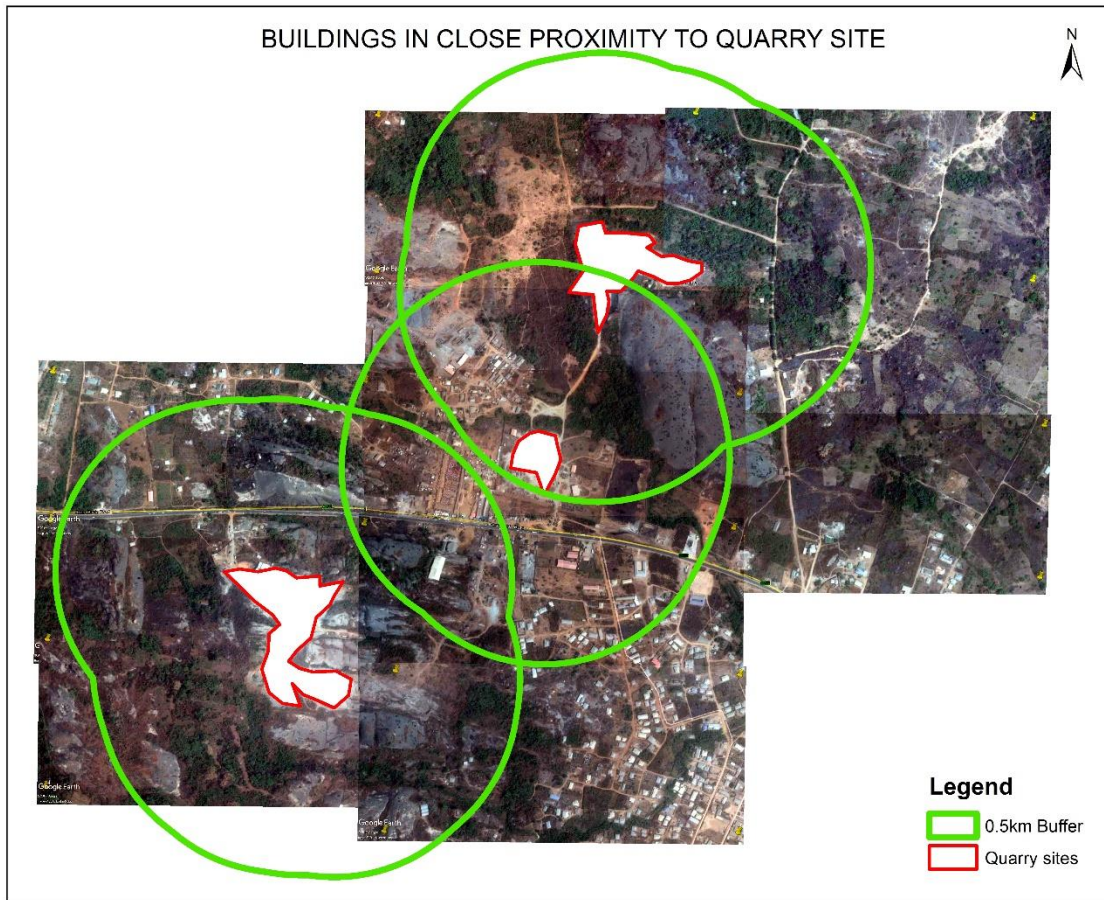
Figure 3: map showing Buffer limits of quarry sites and residents in close proximity.

Figure 3 revealed 2 cases of quarry activities/operation (such as blasting, drilling etc.) overlapping in the study area. These were derived after a buffer area of 0.5km drawn around each quarry site. The implication is that, such overlap of quarrying will culminate in multiplication of any adverse negative effect on its environment (pollution, noise, health hazards and aesthetics) with devastating consequences on schools, market, filling stations and residents of the areas. Hence, this can be attributed to lack of consultation with Physical Planning Authorities before acquiring land in this environment.

4.2 Assessment of perceived environmental challenges arising from Quarry Activities

The analysis of the demographic characteristics of the respondents is presented in Table 1 below.

Table 1: Demographic Characteristics of Respondents.

Demographic Characteristics	Variables	Frequency	(%)
Age	Below 30yrs	46	51.1
	31-40yrs	20	22.2
	41-50yrs	16	17.8
	Above 50yrs	8	8.9
	Total	**90**	**100**
Sex	Male	44	48.9
	Female	46	51.1
	Total	**90**	**100**
Educational Status	No formal education	38	42.2
	Primary education	21	23.3
	Secondary education	22	24.4
	Post-secondary education	9	10.0
	Total	**90**	**100**
Occupation	Civil servant	2	2.2
	Mining and Quarry	11	12.2
	Artisans/ Trading	34	37.8
	Farming and livestock	10	11.1
	Transport	23	25.6
	Students	10	11.1
	Total	**90**	**100**
Residency duration	1-5yrs	47	52.2
	6-10yrs	30	33.3
	11-20yrs	13	14.4
	Above 20yrs	-	-
	Total	**90**	**100**
Farming Experience	Below 5yrs	52	57.8
	6-10yrs	23	25.6
	Above 10yrs	15	16.7
	Total	**90**	**100**

N = 90. Source: Field Work (2018)

Table 1 revealed that 51% of the respondent's age are below 30yrs while the environment are populated with 51% of female. 42% of the respondent had no formal education while the most occupation are artisans/ trading with 38%. This inferred that the respondents are mostly involve in commercial activities within the environment. A close look at Table 1 also revealed that the residents' duration of living in the environment has 52% in less than 5yrs while 58% of farmers residing in the environment had less than 5yrs farming experience.

Table 2: Factors responsible for residents' choice of location

Variables	Mean	Rank
Nearness to Market	4.567*	1
Nearness to workplace	3.844	2
Good Gsm network	3.600	3
Good Access road	3.511	4
Affordable rent	3.378	5
Constant Electricity Supply	3.244	6
Nearness to Children's School	2.244	7

N = 90. Source: Field Work (2018)

From Table 2 above, the overall response from respondents in study area shows that Nearness to Market, Nearness to workplace and Good Gsm network with mean responses of 4.567, 3.844 and 3.600 respectively are the major factors that motivate their choice of location. From the table, there is evidence that residents' wants to locate close to Market place; hence, they do not feel bad about residing near Quarry sites irrespective of the environmental challenges arising from their operation as shown in aerial imagery.

4.2.1 TEST OF SAMPLING ADEQUACY

The Bartlett's test of sphericity was used in the test for the appropriateness of the sample from the population and the suitability of factor analysis. It tests for the adequacy of the sample as a true representation of the population under study (Alese and Owayemi, 2004).

Table 3: KMO AND BARTLETT'S TEST OF SPHERICITY

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.850
		2111.637
Bartlett's Test of Sphericity	Df	190
	Sig.	.000

The Bartlett's test in Table 3 shows a chi-square of 2111.637and a significant level of 0.000, which is an indication of the adequacy of the sample. The Kaiser-Meyer-Olkin (KMO) test is another measure of sample adequacy. It is an index for comparing magnitudes of the observed correlation coefficients between all pairs of Variables. It is small when compared to the sum of the squared correlation coefficient. A KMO value of 1 represents a perfectly adequate sample. A KMO of 0 represents a perfectly inadequate sample. The KMO value in Table 3 is 0.850, which shows that the sample is reasonably adequate.

4.2.2 EXTRACTION METHOD: PRINCIPAL COMPONENT ANALYSIS

Twenty variables were used in this study. When subjected to factor extraction by principal component all the variables were found to be useful for this study. Factor analysis was used to assess the multivariate relationship among the factors (environmental challenges) affecting the residents around quarry site in Akure, Ondo State based on frequency of occurrence. The analysis was conducted using Principal Component Analysis (PCA) (extraction method) and Varimax with Kaiser Normalization (rotation method) to make factors easily interpretable. The number of factors to be retained was specified on the basis of social science rule which state that only the variable with a loading equal to or greater than 0.4 in absolute terms and percentage of Variance greater than 1 should be considered meaningful and extracted for factor analysis (Akinwamide, 2018). The result presented in Table 4 and 5 below was obtained based on this rule.

TABLE 4: TOTAL VARIANCE EXPLAINED (ROTATION SUMS OF SQUARED LOADINGS)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.132	62.299	62.299	9.490	47.449	47.449
2	2.719	11.194	73.493	3.155	15.774	63.223
3	1.111	4.574	78.067			
4	.954	3.928	81.995			
5	.839	3.454	85.450			
6	.761	3.132	88.581			
7	.482	1.984	90.565			
8	.413	1.702	92.267			
9	.382	1.573	93.840			
10	.289	1.191	95.031			
11	.240	.987	96.018			
12	.218	.898	96.916			
13	.184	.756	97.672			
14	.157	.645	98.317			
15	.132	.545	98.861			
16	.100	.412	99.273			
17	.078	.322	99.595			
18	.044	.182	99.777			
19	.033	.135	99.912			
20	.021	.088	100.000			

TABLES 5: ROTATED COMPONENT MATRIX VARIMAX

Variables	Factor 1	Factor 2
NPQO	.577	
FRE	.806	.535
LVRB	-.653	
DFP	.867	.417
ARW	.758	
DOB	.964	
ILSN	.927	
HSBW	.667	
WPIO	.943	
FDWS	.952	
DLC	.909	
OMBM	.917	
RBC		.782
HODC		.883
APQO	.447	
OSWS	.472	
DLCM	.520	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

All factor analysis produced two factor groupings with Eigen values of 2.719 to 15.132 while the variance cumulative percentage is 73.493% as shown in Table 4 above. Rotation converged in 3 iterations.

Table 4 and 5 shows that the first cluster of factors accounted for 47.449% of the total challenges arising from quarrying while the second cluster factors accounted for 15.774%. These two clusters of factors together have a total cumulative percentage of 63.223% of the total perceived challenges arising from quarry activities in Akure, Ondo State.

Factor 1 – Environmental Pollution Challenges

Fifteen items are included for Factor 1. All the items relate to environmental pollution factors arising from quarry sites. These factors are:

- Noise Pollution arising from Quarry Operation
- Flying Rocks Everywhere
- Land Vibration from Rock Blasting
- Decrease in Farm Products
- Acidic Rain Water
- Destruction of Biodiversity
- Increased Loss of Soil Nutrient
- Heavy Settlement at the Bottom of Water
- Water Producing Irrigation Odour
- Floating of Dust on Water Surface
- Degradable Land Cover
- Open-Mine pits Breeds Mosquitoes
- Air Pollution from Quarry Operation (e.g Heavy Dust Everywhere)
- Oily and Shiny Water Surface
- Death of Little Children in the Mine Pits

Thus, they were labelled 'Environmental Pollution Challenges' and had a total variance of 47.449%.

Factor 2 – Farm Degradation and Building Collapse Challenges

Factor 2 has four components. They include:

- Risk of building collapse.
- High occurrence of damaged crops.
- Flying rocks everywhere.
- Decrease in farm products factors.

These factors were labelled 'Farm Degradation and Building Collapse Challenges ' with a variance of 15.774%.

4.2.3 Coping Strategies adopted by the residents

Residents' adopted diverse coping strategies to overcome the adverse effects of quarrying in order to sustain their livelihoods and living conditions.

Table 6: Coping Strategies adopted by the residents

Strategies Adopted	Mean	Rank
Move away from the house during blasting	4.489*	1
Live with the effects of the pollution	4.389*	2
Use alum to clean the affected water	3.656	3
Diversification into commercial activities	3.489	4
Change Farm site to a farther distance	2.556	5
Complain to the Quarry authorities	2.200	6

N = 90. Source: Field Work (2018)

Table 6 revealed the most common coping strategies employed by the respondents were to move away from the house during blasting with the highest mean score of 4.489 ranked 1st, live with the situation with mean score of 4.389 ranked 2nd, Use alum to clean the affected water with mean score of 3.656 ranked 3rd while other measures includes diversification into commercial activities, and change farm site to a farther distance with mean score of 3.489 and 2.556 respectively. The least used coping strategy was to complain of the situation to the concern authorities of the quarries with mean score of 2.20. Hence, the presence of a main market in close proximity to the quarry sites enjoyed by the residents might have put them at disadvantage in decision making.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The foregoing study has evaluated residents' perception on environmental challenges arising from quarry activities in Akure. The locations selected in the study area is gradually becoming a slum with the rate of people's influx and uncontrolled development around quarry sites. Environmental challenges examined in this study majorly affected the residents of the communities in the study area. The result of the factor analysis reduced the variables necessary for the optimum evaluation of perceived environmental challenges arising from quarry activities in Akure into two factors namely environmental pollution, and farm degradation and building collapse. The two factors produced a cumulative loading of 63.22%. Following the above discoveries, there is an urgent need for Federal and Ondo State governments to critically look into these factors in order to monitor the activities of quarrying in Akure, considering the effects on resident's health. Surprisingly, detrimental conditions on properties was somewhat neglected by the residents as the population continued to increase because of the influx of more people to the study area in search of commercial activities (such as trading, artisan, transportation etc.). Therefore, community residents should be educated on the danger of building house close to quarry sites, while quarry owners should ensure that

international standard of safety is strictly adhered to by the operators in Nigeria. There is also the need for future research to assess the relative satisfaction of occupiers of properties on rental value in close proximity to quarry sites in Akure.

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THE EFFECT OF COASTAL ENVIRONMENT ON RESIDENTIAL PROPERTY VALUES: A REVIEW OF LITERATURE

By

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Abstract
In coastal environment, studies have revealed a wide range of structural, locational, neighbourhood and environmental attributes to account for their effects on property values. This study observed that the trends in studies on effects of different sectors of the coastline on coastal housing market have been largely progressive in continents like America, Asia and Europe but rather slow in Africa countries like Nigeria. In this review, an attempt is made to provide a common classification for housing attributes based on studies that employed hedonic pricing models and categorize findings from a number of coastal housing studies. The review also noted that measurable but varied price premium were paid for attributes such as beach nourishment, water views and clarity by buyers for proximate properties to the coastline. The paper therefore recommends more studies of effects of coastline features on property value particularly in developing countries like Nigeria so as to reveal the peculiarities in their coastal regions.

Key words: *Coastline, Housing Attributes, Coastal Amenity, Climate Change, House Price.*

1. Introduction

All the continents of the world are surrounded by water bodies such as oceans and sea. The Coastline is the meeting point of continent's land and the oceans while its members include the beaches, cliffs, caves, arch, headland and estuaries that line up at the end of the land (Encyclopaedia Britannica, 2009). The land mass stretching from the inland limit of tidal or ocean spray influence, to the outer of the continental shelf within 60 to 200 kilometres of the coastline, characterised by inter-connections amidst neighboring ecosystems and directly influenced by both the land based and human activities is define as the coastal area (Creel, 2003; Amosu, Bashorun, Babalola, Olowu, & Togunde, 2012).

Interestingly, proximity to the coastline, a coastal amenity and housing attribute is one of the driving forces of urban coastal dynamics. It impacts population, economic development, and the residential property value. The range of other attributes tested in hedonic price models has evolved significantly and varies across studies. Conversely, there are global issues concerning coastlines exacerbated by climate change in recent times (Bin, Poulter, Dumas, & Whitehead, 2009; United Nations Department of Economic & Social Affairs

[UNDESA], 2014; Jin, Hoagland, Au, & Qiu, 2015). Understanding tenants and/or homeowners housing welfare and the behaviour of the property market in coastal environment in this context is a primary concern for real estate experts, real estate investors and developers, coastal managers or urban planners, policy makers, and researchers.

Meanwhile, academic literature studying the relationship between different features of the coastline and residential property values are somewhat limited, although popular in developed countries in extant literatures of property value modelling (Bond, Seiler, & Seiler, 2002; Makinde, & Tokunboh, 2013). Other features aside climate change ancillary effects include water view, water clarity, beach width and coastal protection measures or policy interventions such as retreat, beach nourishment and hard structures. This review finds common housing attributes in literature and examines the different coastline features and their effects on residential property values. The remainder of this study is organised as follows. The next section reviews the global indices of coastal areas. Based on coastal real estate literature, section 3 attempts a common classification of housing attributes that have been utilized in the hedonic price models. Section 4 presents empirical studies on effects of coastline features on residential property values. In section 5, findings and recommendations are presented.

2. Global Indices of Coastal Areas
Since ancient times, coastal areas have been supporting or driving the activities of man (in terms of transportation channel and trade, recreation and tourism) and offer him both tangible and intangible benefits (such as provision of secured livelihoods and decent jobs, regional security beauty, calmness and aesthetic value and regulation of air quality)

across the world (Bin, Crawford, Kruse, & Landry, 2008; Fu, Song, Sun, & Peng, 2016; Parker & Oates, 2016; Alo, 2017). These coastal benefits have impacted on coastal populations and boost the economy of host countries of respective coastal environment. The coastal zone of the world comprises only 4% of the world's land area with huge populations across the countries of the world (Onyema, 2016). In the United Kingdom for instance, 23% of its total land area lies within 10 kilometres of the coast and 17 million people out of its total population of 65.6 million live within this coastal zone (Office for National Statistics, 2017). Since 1980, the 673 coastal counties in the United States have witnessed an increase of 33 million people and as at 2003, approximately 153 million people amounting to 53% of the total population lived in the nation's coastal fringe that makes up 17% of its contiguous land area (Gopalakrishnan, Smith, Slott, & Murray, 2009; Bin et al., 2009; Below, Beracha, & Skiba, 2015; Campbell, 2015). In Australia, over 80% of Australia's population live in Australian coastal zone (Voice, Harvey, & Walsh, 2006; Kirkpatrick, 2011).

In Asia, about 1,000 people arrive in China's large coastal cities each day; while up to 50% of the Bangladesh population lives in coastal areas and similar number lives in coastal areas in northern Africa (Creel, 2003). In West African countries, Senegal, housed about 4.5 million people which is 66.6% of its national population in Dakar coastal area (Amosu et al., 2012) and in Nigeria, about 30 million people, which is 21% of the national population live in coastal cities (Ekanade, Ayanlade, & Orimoogunje, 2008). These coastal populations around the globe have continued to increase despite recent issues of climate change (Walls, Magliocca & McConnell, 2018). As at today, more than 4 billion people which is more than half of the world's population live within 200 kilometres

to the coastline, while sixteen (16) out of the twenty-three (23) world mega cities are located in the world coastal belt (Creel, 2003; Doukakis, 2005; Xu, Peng, Xu, Xiao, & Benoit, 2009; Amosu et al., 2012; Boateng, 2012; Murali, Ankita, Amrita, & Vethamony, 2013).

Beyond population impact, Coastal areas have been contributing significantly to the economy of nations. In the developed economies such as the US, coastal areas contribute 37% of the country's employment and 42% of the national Gross Domestic Product (GDP) (Fu et al, 2016). Countries such as Ghana, Benin, Togo and Sierra Leone in Africa have most of the activities that form their major national economies in the coastal areas (Amosu et al., 2012). In Nigeria, the coastal areas account for 70% of national economic output (Van-Bentum, 2012). The coastal diverse benefits and alarming population growth are been capitalised upon by real estate market operators and or real estate developers resulting in worthwhile residential property investments in coastal areas. For example, in the United States, the value of coastal real estate has appreciated at an average of 7% per year over the last 50 years while a typical coastal property worth from 8% to 45% more than an otherwise comparable inland property within this same area (Bin et al., 2009).

3.   Hedonic   Price   Model   and Operationalization of Housing Attributes in Coastal Areas

In this review, a number of coastal real estate literature that have utilized the hedonic price models to investigate the relationship between house price and housing attributes were reviewed. Within the property price model, the buyer or home owner or renter relate the price of the property to its various attributes thus obtaining their marginal contributions or hedonic prices. As such, the rent or sale price is the dependent variable. Independent variables thus describe the property itself, for example number of bedrooms, distance to shopping center, and school in the property neighbourhood.

It is observed that review of housing attributes that are frequently used in coastal property hedonic price studies have received little attention. Almost two decades ago, Wilhelmsson (2000) suggested frequently used housing attributes in hedonic price models. Thus, it is necessary to explore which attributes are used most frequently in literature across different studies for coastal areas. With this review, common housing attributes employed in coastal property hedonic price studies will be captured. This in particular will guide future studies on choice of variables particularly in developing countries where academic literature studying the relationship between proximity to coastline and demand for residential properties are limited. As reported in Table 1, about 21 articles during the years 2001 to 2016 have been reviewed. The studies reviewed give credence to the theoretical findings that the fundamental determinants of residential housing prices are grouped into structural, location, neighbourhood and environmental attributes.

Table 1: Overview of Reviewed Studies

S/No	Study	Study Area/Continent	Sampled Residential properties	Journal/source
1	Parsons & Powel (2001)	Coastal Delaware/North America	266	Coastal Management
2	Bond et al. (2002)	Cuyahoga County/North America	190	Journal of Real Estate Research
3	Bourassa, Hoesli & Sun (2005)	New Zealand/Australian Countries	231,190	Journal of Real Estate Literature
4	Jim & Chen (2006)	China/Asia	652	Landscape and Urban Planning
5	Leung, Wong & Cheung (2007)	Hong Kong/Asia	220	International Real Estate Review
6	Bin et al. (2009)	North Carolina/North America	92,066	www.researchgate.net
7	Gopalakrishnan et al. (2009)	North Carolina/North America	1,662	Conference Paper
8	Mar-Iman, Hamidi & Liew (2009)	Malaysia/Asia	528	Malaysian Journal of Real Estate
9	Blackwell, Sheldon, Lansbury & Vaught (2010)	South Carolina/North America	88,967	The Review of Regional Studies
10	Udechukwu & Johnson (2010)	Nigeria/Africa	83	The Lagos Journal of Environmental Studies
11	Baranzini & Schaerer (2011)	Switzerland/Europe	12,932	Journal of Housing Economics
12	Conroy & Milosch (2011)	California/North America	9,755	J Real Estate Finan Econ
13	Gordon, Winkler, Barrett, & Zumpano (2013)	Alabama/North America	1,051	Journal of Real Estate Research
14	Hansen & Benson (2013)	Washington/North America	20,883	The Coastal Business Journal
15	Makinde& Tokunboh (2013)	Nigeria/Africa	145	Conference Paper
16	Atreya & Czajkowski (2014)	Texas/North America	35,586	Technical Report
17	Wyman, Hutchison & Tiwari (2014)	South Carolina/North America	589	Journal of Real Estate Research
18	Below et al. (2015)	North Carolina/North America	13,106	Journal of Real Estate Research
19	Walsh, Griffiths, Guignet & Klemick (2015)	Maryland/North America	200,000	Technical Report
20	Dumm, Sirmans & Smersh (2016)	Florida/North America	214,326	Journal of Real Estate Research
21	Fu et al. (2016)	Florida/North America	319,507	Ocean & Coastal Management

Following the review of the articles, 34 structural variables have been identified to have been employed in hedonic price studies. Table 2 presents these structural attributes and the number of times each of them appeared. The most common structural attributes included in hedonic price studies evidence from the 21 articles from 2001 to 2016 are home square footage, age of the house, number of bathrooms, number of bedrooms and lot size. The frequency of occurrence of these 5 variables range approximately between 50% and 80%. Averagely occurring common structural variables that appeared between 6 to 10 times include construction condition/quality, residential building type, multistory or number of floors and presence of garage. The category of the fairly appeared structural variables are those that appear 4 times and

they are presence of fire place, presence of air conditioning, floor level and swimming pool.

The outcomes of the most frequently, averagely and fairly occurring structural attributes suggest that these factors are likely to be affecting greatly residential property values either positively or negatively. From the literature review therefore and depending on the climatic conditions of the various geographical areas across the coastal belt, it is proposed that the choice of structural attributes to be included in hedonic models can come from these 13 structural variables. For instance in dry, tropical and temperate regions, variable such as "presence of fire place" may not be important and as such may not be important for inclusion in hedonic price models. Whereas such variable assumes an important role in cold and polar regions.

Table 2: Occurrence of Structural Variables in the Reviewed Studies

S/No	Structural Variables	Number of times each variable appears
	Variables that appear most	
1	Home square footage	17
2	Age of the house	16
	Variables that appear between 11 to 15 times	
3	Number of bathrooms	13
4	Number of bedrooms	13
5	Lot size	11
	Variables that appear between 6 to 10 times	
6	Construction condition/quality	9
7	Residential bdg type	8
8	Multistory/No of floors	7
9	Presence of garage	6
	Variables that appear 4 times	
10	Presence of fireplace	4
11	Presence of air conditioning	4
12	Floor level	4
13	Swimming pool	4
	Variables that appear thrice	
14	Basement	3
15	Holding type (freehold/leasehold)	3
	Variables that appear twice	
16	Roof style	2
17	Deck	2
18	Hardwood floor	2
19	Ownership type	2
20	External wall	2
	Variables that appear once	
21	Number of baths/toilets	1
22	Carport square feet	1
23	Modernized	1
24	Lot position	1
25	Lucky floor level	1
26	Height of building	1
27	Patio square feet	1
28	Level of facilities/service	1
29	Size of bedroom	1
30	Size of living room	1
31	Size of kitchen	1
32	Domestic Quarters	1
33	Type of foundation	1
34	Window orientation	1

Location and neighbourhood attributes are also very important to the hedonic price studies in coastal areas. The typical variables of these classes of housing attributes used in hedonic price models is therefore a concern. Table 3 presents the attributes used to describe location and neighbourhood subsets of the hedonic price models in the empirical studies. Following the review of the 21 empirical studies, 14 location and 13 neighbourhood variables respectively were utilized in hedonic price models. It is observed for both categories, that location and neighbourhood were described by varied range of attributes as each of the empirical studies operationalise the location and neighbourhood variables in different manners. As such, it is not feasible to have common classification of the attributes that are used frequently for hedonic price models in literature studying the relationship between house prices and housing attributes in coastal areas. This corroborate the opinion of Aluko (2011) that the choice of location and neighbourhood attributes to be included in any study is influenced by the prevailing environmental conditions and relative importance of the variables in the study area.

Table 3: Attributes describing location and neighbourhood in the reviewed studies

Types of housing attributes	Attributes	References
Location attributes	Distance to the nearest subcenter	Bourassa et al. (2005); Blackwell et al. (2010)
	Distance to the CBD	Bourassa et al. (2005); Mar-Iman et al. (2009); Baranzini & Schaerer (2011) and Dumm et al. (2016)
	Proximity to railway stations/distance to nearest railroad	Leung et al. (2007) and Atreya & Czajkowski (2014)
	Distance to nearest school (e.g primary school)	Baranzini & Schaerer (2011) and Atreya & Czajkowski (2014)
	Distance to nearest public transport stops (bus route)	Baranzini & Schaerer (2011) and Atreya & Czajkowski (2014)
	Distance to nearest park	Atreya & Czajkowski (2014)
	Distance to work	Makinde & Tokunboh (2013)
	Proximity to fitness centre	Dumm et al. (2016)
	Proximity to cemetry	Dumm et al. (2016)
	Proximity of recreation park	Dumm et al. (2016)
	Distance from house to downtown	Conroy & Milosch (2011)
	Distance to new town centre	Jim & Chen (2006)
	Distance from house to nearest freeway	Conroy & Milosch (2011)
	Proximity to golf course	Dumm et al. (2016)
Neighbourhood attributes	Neighborhood property is located	Parsons & Powel (2001); Bourassa et al. (2005); Leung et al. (2007); Mar-Iman et al. (2009); Blackwell et al. (2010); Udechukwu & Johnson (2010); Gordon et al. (2013); Hansen & Benson (2013) and Walsh et al. (2015)
	Neighbourhood maturity	Mar-Iman et al. (2009)
	Neighbourhood security	Makinde & Tokunboh (2013)
	Availability of quality school (elementary)	Conroy & Milosch (2011) and Makinde & Tokunboh (2013)
	Appearance of nearby improvements	Bourassa et al. (2005)
	Quality of landscaping in the neighborhood	Bourassa et al. (2005)
	Surface of urban parks	Baranzini & Schaerer (2011)
	Condition of mobile home park	Dumm et al. (2016)
	Condition of road network	Makinde & Tokunboh (2013)
	Regularity of power supply	Makinde & Tokunboh (2013)
	Availability of recreational facilities	Makinde & Tokunboh (2013)
	Slope/elevation of land	Bourassa et al. (2005) and Bin et al. (2009)
	Exposure to traffic noise	Jim & Chen (2006)

Furthermore, the fundamental environmental variable in hedonic price models for coastal real estate studies from our review is variable describing distance of property to the coastline. Table 4 provides an overview of the attributes describing environmental externalities in the reviewed studies. As observed, water view and distance band about the coastline have been the major and frequently used variables in the hedonic price models to measure coastal amenity. Walsh et al. (2015) however noted that measuring proximity to the coastline using distance band has advantage over alternative specifications.

Other environmental amenities that were used include water clarity, beach width, distance of house from hill and views of green spaces, mountain and golf course. Conversely, there are global issues concerning coastlines exacerbated by climate change in recent times (Bin et al, 2009; UNDESA, 2014; Jin et al, 2015). Hence, studies such as Atreya and Czajkowski (2014) and Below et al. (2015) have used flood risk and erosion rate variables respectively to account for in estimation the effect of environmental disamenity on residential property value.

Table 4: Attributes describing environmental externalities in the reviewed studies

Environmental attributes	References
View variables (such as water, lake and ocean)	Bond et al. (2002); Bourassa et al. (2005); Udechukwu & Johnson (2010); Baranzini & Schaerer (2011); Hansen & Benson (2013); Makinde& Tokunboh (2013) and Wyman et al. (2014)
House distance to the beach/coast/shoreline/water/coastline/bay/ocean	Parsons & Powel (2001); Bourassa et al. (2005); Jim & Chen (2006); Leung et al. (2007); Bin et al. (2009); Gopalakrishnan et al. (2009); Conroy & Milosch (2011); Hansen & Benson (2013); Atreya & Czajkowski (2014); Wyman et al. (2014); Below et al. (2015); Walsh et al. (2015); Dumm et al. (2016) and Fu et al. (2016)
Water clarity	Walsh et al. (2015)
Beach Width	Gopalakrishnan et al. (2009)
Other view variables (such as green spaces, mountain and golf course)	Jim & Chen (2006) and Wyman et al. (2014)
Distance from hill	Leung et al. (2007)
Land erosion rate	Below et al. (2015)
Flood risk	Atreya & Czajkowski (2014)

4. The Effects of Coastline on Residential Property Value

The effects of different aspects of coastline on property value have been extensively researched into in the developed countries. Two phases of research in the hedonic studies across the coastal areas of the world are observed following this review. The first phase concentrated on the sectors indicating effects of coastal amenities and or positive externalities on residential property value. These coastline sectors include coastal protection measures of policy interventions, water clarity, beach width and water view. Studies on the capitalisation effects of coastal protection measures on house prices for example were conducted early by Parsons and Powel (2001), Kriesel and Friedman (2003) and Gopalakrishnan et al. (2009), among others. Each of these studies found beach nourishment to increase waterfront and non-waterfront property values more than other policy interventions. A study of Walsh et al. (2015) analysed 14 Maryland counties

and found positive impact of water clarity on waterfront property prices in ten of the counties, seven of which were statistically significant while the waterfront impact was insignificant in the four other counties. Gordon et al. (2013) concentrated on condominium sales along the Gulf coast of Alabama to account for value effect of positive externalities such as better views, increased privacy and noise reduction associated with their location. Their hedonic model estimated that units on higher floors earned price premium of over 12% than ground level units while corner units sell at a premium of 3% over interior units.

Studies have also shown that the price premium for water views vary by geographic area. Lake view in Cuyahoga County, Ohio was found on average to generate price premium of around 54% (Bond et al., 2002), proximity to water bodies raised housing price to 13.2% (Jim & Chen, 2006) in Guangzhou, China while maximal view of water in Geneva-Switzerland generate a rent premium up to 57% (Baranzini & Schaerer, 2011). In Nigeria, water (lagoon) views, on average, added N2.59million to sales prices of homes with view more than homes without view in Victoria Garden City, Lagos (Udechukwu & Johnson, 2010). A later study within the same area by Makinde and Tokunboh (2013) concluded that full view on average increased the housing price by 47.9%. A study of Conroy and Milosch (2011) suggested that proximity to the coast has a large and positive effect on the value of a house in San Diego County, California. From the review of these hedonic studies, one can conclude that measurable but varied price premium were paid for water views, water clarity and beach nourishment by buyers for proximate properties along the coastline.

Beyond studies that provided evidence on the value capitalization effect of coastal amenities, Bourassa et al. (2005) contended that the implicit prices of the presence of a water view and other aesthetic externalities in coastal areas, given that their supply are limited should change with the residential real estate cycle. The authors examined how the implicit prices of the presence of a water view, the appearance of nearby improvements, and the quality of landscaping in the neighborhood change with the residential real estate cycle from 1986 to 1996 for the three largest urban areas in New Zealand and found that implicit prices of the aesthetic externalities move with the real estate cycle. In a later paper, Hansen and Benson (2013) basically replicate their findings using data from coastal city of Bellingham, Washington. Using sales data from South Carolina, Wyman et al. (2014) found that higher quality waterfront properties were relatively better protected in the real estate bust than lower quality interior properties. Like Bourassa et al. (2005) and Hansen and Benson (2013), Dumm et al. (2016) concluded that the price performance of value of view of specific waterfront property types change across the phases of real estate economic cycle using sales data from the Tampa Bay, Florida housing market.

The second phase of research in the coastal housing market is driven by the issue of climate change related threats. There are global climate change issues concerning coastlines which have some attendant spatial features with array of effects upon any development along the axis (Kalaugher, 2007; Bin et al, 2009; Urama & Ozor, 2010; UNDESA, 2014; Jin et al, 2015). So, researches have now begin to explore the effects of coastal disamenities and or negative externalities associated with the coastline on house prices. However, we observed that while some studies have focused on the future economic costs of sea level rise to communities on a larger scale, others

estimated the pecuniary advantage or disadvantage derived by buyers of residential properties in proximity to the coastline.

Further, four counties in North Carolina were studied by Bin et al. (2009) and the conclusion drawn revealed that the potential impact of sea level rise scenario of 81cm on coastal real estate by 2080 is estimated at about $1.2 billion. While Fu et al. (2016) in a spatial hedonic approach indicated that inundation of 3-foot (91.44cm) sea level rise could cost Hillsborough and Pinellas County, Florida over 300 and 900 million dollars respectively for the real estate market alone by 2050. In Nigeria, Agboola, and Ayanlade (2016) estimated the varying proportions of total land area of Eti-Osa local government area of Lagos State that will be submerged under different sea level rise scenarios. The future distortions in the housing and land market on larger scales in the absence of policy interventions of government were estimated in these studies.

In Carteret County of North Carolina, Bin and Kruse (2006) have shown that properties located within a flood zone and vulnerable to wave action are associated with higher property values than those within a flood zone that are not prone to wave action. Atreya and Czajkowski (2014) also found that homes in high risk coastal areas, on average sell for more than homes in moderate to minimal flood risk areas in Galveston County, Texas. The outcome of the standard hedonic regression method, used by Below et al. (2015) for the Dare County, North Carolina led to the conclusion that buyers do not factor erosion risk into the purchase price of property, unless the property is either very close to an eroding beach or is located in a rapidly eroding area.

The preponderances of findings of these studies suggest that substantial price premiums are derived by buyers of residential properties in close proximity to the coastline despite the climate related threats along this axis. However, these studies are from the percept of the buyers of residential properties while most of the studies are carried out in developed countries. Meanwhile, studies such as Aliyu (2010) and Acheampong and Anokye (2013) argued that drawing housing related information from tenants other than homeowners or buyers will assist to better understand housing issues. Understanding the pecuniary advantage or disadvantage derived by both buyers and renters of residential properties along the coastline particularly in developing countries where scanty of such studies exist, we observed from our review will also be opportunities for researchers for further studies in coastal housing market.

5. Findings and Recommendations

This review revealed commonly employed structural attributes within the bandwidth of residential location choice literature. With this review, the most typically used structural attributes in hedonic price studies in coastal housing market from 2001 to 2016 are home square footage, age of the house, number of bathrooms, number of bedrooms and lot size. Although silent on type of housing market, the earlier review of 28 hedonic price studies from 1990 to 1995 by Wilhelmsson (2000) established that living area, number of bathrooms, age, garage and lot size are the most common used structural attributes. The outcome of this review suggest that for coastal housing market analysis, the variable "presence of garage" has fallen out of choice for inclusion in hedonic price models in recent time while the variable "number of bedrooms" assumes a prominent role. Consequently, based on the occurrence of structural variables in the reviewed studies and depending on the climatic condition of a coastal area, 13 structural variables are recommended as important for inclusion in

property hedonic price models. These variables are home square footage, age of the house, number of bathrooms, number of bedrooms, lot size, construction condition/quality, residential building type, multistory or number of floors and presence of garage. Others are presence of fire place, presence of air conditioning, floor level and swimming pool.

Moreover, we found that each of the empirical studies reviewed operationalise both location and neighbourhood variables in different manners. However, based on our literature review, the following classification of location variables is suggested to guide future studies on the choice of variables most especially in developing countries where there is limited studies on the relationship between proximity to coastline and demand for residential properties:

1. Distance variables indicating accessibility from houses to places of employment such as distance to the central business district (CBD), distance to the nearest subcenter, distance to work, distance to new town center and distance to downtown.
2. Distance variables describing accessibility to the various means of transportation including proximity to railway stations/nearest railroad, distance to nearest public transport stops or bus route, distance to nearest park and distance from house to nearest freeway.
3. Distance variables showing accessibility to social and public services such as proximities to fitness center, recreation park, golf course and cemetery.

On the other hand, the following classifications are proposed for neighbourhood variables:

1. Layout of neighbourhood including the various neighbourhoods within the study area housing the properties sampled and neighbourhood maturity (whether developed or less developed). Others are appearance of nearby improvements, quality of neighbourhood landscaping, surface of urban parks and land elevation.
2. Neighbourhood security.
3. Neighbourhood amenities including availability and quality of social and public facilities such as school, mobile home park, road network, power supply and recreational facilities.
4. Neighbourhood disamenities such as exposure to traffic noise.

Finally, it appears from our review that the desires for proximity to the coastline by buyers of residential properties are strong and outweigh the negative externalities associated with the coastline. The conclusion of each of the studies on the relationship between coastline features and residential property values call for more studies from the percept of property buyers and renters particularly in developing countries like Nigeria to reflect the peculiarities of their regions.

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THE IMPACT OF CLIMATE CHANGE ON HEALTH IN NIGERIA

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Abstract
Climate change has adverse consequences on human health as well as exacerbates health risks. Climate change was certain as human death so long as population increases and economic activities generate gaseous wastes, thus resulting in the increase of anthropogenic carbon dioxide (CO2). Society illusion implicated in climatic change amplifies health risks, and can increase morbidity rate to catastrophic levels. The study utilized multiple data sourcing method: Personal observation, oral interview, questionnaire and focus group discussion, a number of statistical tools were employed in this study. These include: descriptive statistics, Z-score and regression analysis. This paper addresses possible illusions on climatic risks and investigates health risks that could arise in Nigeria from climate change. We employed structured survey to elicit risk perception responses on health risks and climate change from health personnel in Nigeria and other citizens. We adopt Z-score and simple regression analyses to test the extent of relationship between climate change and morbidity rate and descriptive statistics on society illusion on climate change. This study found that there was prevailing illusion on climate change and there was significant evidence for increase in health risks and morbidity rate instantiated by climatic variability. We recommend the introduction of stiff penalties for poor waste management, deforestation, awareness campaign for climate change and health risks. We suggest various insurance contracts like flooding insurance and weather insurance to manage the catastrophe levels of health risks from climate change. There is need for heightened awareness among the general population on climate change and health risks. Community leaders, churches and mosques have relevant roles to play in guiding the people to understand climate change consequences. Government in Nigeria could exploit the bond market to manage the consequences of climate change on Nigerian health infrastructure. Climate change can result in catastrophic health risks and further endanger the fragile social security's system, if not strategically managed. Planting of trees and conscious effort to dissuade deforestation should be essential part of public discourse and policy. Then finally, a comprehensive action plan of our cities to ensure planning standard compliance in cities to give a pleasant and aesthetic environment friendly to the teaming population in the country. Weather insurance policy cover by organizations was adopted for credit rating. Flooding risk could be an additional cover under health and life insurance policies. An emergent health care strategy by government to respond to health risk pandemic caused by climate change should focus on malaria, meningitis, cholera, high blood pressure and pneumonia.

Keywords: *Catastrophic risks, Climate change, Health risks, Implication, Risk perception, societal illusion.*

1. Introduction
Climate change defined by International panel on climate change (2007) Fourth Assessment Report as "change in the state of the climate that can be identified (e.g. by using statistical test) by changes in mean and/or variability of its properties, and that persists for an extended period typically decades or longer." It was being synonymously termed as global warming, Building national response to climate change (BNRCC, 2008). IPCC (2007) links it to the

changes in global average temperature between (0.74 ± 0.18). The results were fiercer weather lasting for longer cycles; extreme scorching heat, precipitation of rainfall, increased intensity of storms, hurricane, floods, droughts, outbreak of fire, induces earthquake, acid rain, and indirectly connected to malnutrition and poverty. One World guide (2010) describes climate change as a pincer threat based on „advancing Sahara" and flood –prone coastal region that was below or close to sea level. The two threats were present in northern and southern Nigeria respectively. The World Health Organization (WHO) (2006) considers the consequences of global warming are the most pressing problem of the 21st century. The world's climate system is fundamental to supporting continuity of live.

The implications of climate change on human health could be direct and indirect. According to BNRCC the direct consequences of climate change in Nigeria include cerebra-spinal meningitis, cardiovascular respiratory disorder of the elderly, skin cancer, high blood pressure, malaria, cholera and citing UNDP (2005) note the dangers to child and maternal health. The dangerousness of unmanaged climatic variability was increase in morbidity rate caused by exacerbation of old and new viscera health risks like skin cancer, high blood pressure, heat stroke, influenza, psychosis and possibly neurosis. There were fewer studies on impacts on morbidity rate than on mortality rate (Kalkstein and Valimont, 2007). There was a large body of extant literature on the impact of climate change on human health, Kalkstein and Valimont (2007) collations show that medical scientists and climatologists using regression techniques mainly did them.

The attitude of the average citizen in Nigeria towards consequences of climatic change seems to regard it as transcendental and an illusion accompanies its origin, and that was not likely to pose problem. A casual observation of living style in Nigeria like dumping of refuse in canals, usage of perfumes, purchasing second hand cars, waste disposal and mass use of electric generators implicate a low understanding of their effects on climatic changes that requires more elucidation. As it were, global warming could propagate intense earthquakes, storms and flooding with consequential catastrophic risks such as witnessed in Haiti and Japan (Sprung 2009). The culpable illusion and pattern of morbidity require empirical analysis to excite adequate policy responses in Nigeria.

Statement of Problem
Climate change was to a great extent induced by human activities that causes variability in the intensity of heat burning the earth surface and the degree of rainfalls for long period. This could provoke dangerousness of health risks that increases morbidity rate. The mitigation process could be dynamically inclusive if the society develops adequate perceptions of health risks and climate changes, thus removing the illusions thereof.

This study highlights the implications of health risk perceptions and attitude to climatic changes of Nigerians that invariably may contribute to accentuated environmental disasters, and the exacerbation of health risks. These menaces could also be attributed to the poor attitude of Nigerians towards waste disposal. (Ozo 2008/ Kelegbe and Ogeah, 2003).

The consequences of worsening health risks and morbidity rate as an outcome of exacerbation of prevalent diseases and emergent ones like high blood pressure, psychosis, neurosis and congenital malformations as a consequence of effects of climate change on health needs to be exposed to help promote mitigation policies.

Hypotheses for the Study
Ho1: There is no significant relationship between temperature-related morbidity in Nigeria and climate change
Ho2: Climate change has no correlation to the illusion of Nigerians on effects of climatic changes on human health.

Conceptual Framework
Risk perception explains attitude and behaviour of persons in risky situations. There were two perspectives; psychometric paradigm and cultural theory, (Sjoberg, 2003). Slovic (2000) explains that the psychometric paradigm was based on various risks characteristics thereby unveiling the cognitive structure of risk. The people's risk perceptions were related to the attributes of sources of risks, like dread and new risks. Dread was represented by the attributes: catastrophic, consequences fatal, not easily reduced, uncontrollable, risk increasing and involuntary. The factor new risks are indicated by: unknown to those exposed not observable, risk unknown to science and effect delayed. Slovic claims that the higher the score of a risk source on this factor the higher its perceived risk. Cultural theorists led by Douglas and Wildavsky (2003) link risk perception to culture which was associated with four ways of social life: hierarchists, individualists, egalitarians, fatalists.

The two perspectives help the understanding of how societal illusion arises. In medical parlance, Houliston (2006) describes illusion as inaccurate perception. For example, a sting on the floor was mistaken to be a lizard. Perception, she says was the process of forming meaning to something from the stimulus of our senses. This was quite important to understanding inaccurate perception of Nigerians in respect of how climate change can influence a catastrophic dimension to health risks. Societal illusion is a riskier construct because of the aggregate effect on national character or identity whereby every member of the society by their everyday behaviour will unwittingly contribute to global warming.

Literature Review
Climate change is a complex interaction between earth's atmosphere- stratosphere and troposphere -on one hand and land biosphere (Allen, 2004; Solomon et al, 2008). Human activities generate CO_2 and other greenhouse gases as waste by-products, which traps heat from escaping from the troposphere thereby mechanising global warming. To maintain biodiversity, the ocean dissolves the CO_2 and plants absolve it for growth. When the threshold is exceeded, global warming-increase in temperature results. Masters (2011), these facts were incontrovertible; the arguments were the level of confidence that humans were responsible for the gases, thus the word anthropogenic. Figure 1 shows the time series of temperature rise for 150 years.
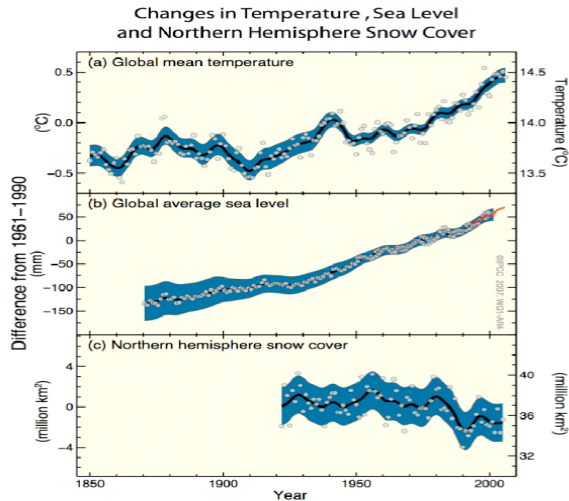
Figure 1: Time series of temperature rise for 150 years.
Source: Fieldwork 2018.

In Nigeria, the consequences of climate change were the advancement of Sahara by 600 metres annually, longer cycle of very harsh weather in forms of excess. The major ones were dry and rainy seasons. Odjugo (2010) classifies the period 1901-2005 into three periods; 1901-1935, 1936-1969, 1970-2005. He identifies the last period as the most critical period of climate change with mean 1.7oC change in temperature over 105 years. Table 2 show the time series of temperature changes within the period. IPCC (2007) is warning that a mean 2oC change by 2050 will have dire consequences on human living conditions.

Table 1: Time series of Temperature changes within the period.

1901	1911	1921	1931	1941	1951	1961	1971	1981	1991	2001
28										*
27.5								*	*	
27						*	*			
26.5				*	*					
26		*	*							
25.5	*									
25										
24.5										

Source: Adopted from Odjugo 2010

Climate change creates overwhelming problems for an already impoverished populace. Flooding was a consequence of climate change from sea level rise and poor infrastructural planning of drainage system. For example, the southern part of Nigeria was prone to flooding, and in particular, Lagos state, the commercial nerve centre of Nigeria was noted to be one meter above sea level (Agbo, 2011), is threatened with possible extinction. Figure three was a typical flooded sub-urban area.

The health risk implication could be deduced to include direct water borne diseases like typhoid, cholera, pneumonia, diarrhoea and malaria. High temperatures were known to amplify ailments like meningitis, measles, chicken pox and it was suspected that new health risks like high blood pressure and dehydration in pregnancy may give higher morbidity rate.

What is Health Risk?

Health risk combines two words that align to explain the concept. WHO (2006) defines health as a state of complete physical, mental and social well-being and not merely an absence of diseases or infirmity. This definition subsists since 1948 and helps to guide us into understanding health risk. The inverse of this definition means the presence of a disease and lack of completeness in physical, mental, and social/emotional wellbeing tantamount to health risk.

In insurance literature, risk means to exposure to danger, chance of loss or loss of opportunity income, and uncertainty concerning the occurrence of a loss (Mehr, 2007, Rejda, 2008). Finance theory explains it as variability from expected value or outcome (Barnejee, 2008 and Olowe, 2008). We adopt The World Health report (2002) definition that says risk is "probability of an adverse outcome, or a factor that increases that probability." A compendium of the definitions of health and risk means health risk is "danger to health", "chance of loss of health", "variability from health", and "worsening of ill health". Business Dictionary (2011) explains that human health risk is the degree of likelihood that one or more exposures to a hazardous substance may have damaged the health of an exposed person.

Climate change is a factor that can increase the frequency and severity, that is probability of ill health or instantiate it. The highest health risk is for sickness to result in death known as morbidity. Climate change might accentuate health risks and morbidity rate.

Although, past researches focused and found significance evidence on correlation between climate change and mortality rates particularly high temperatures and death of the elderly (Bridger et al., 2006; Lye and Ramal, 2007; Jones et al, 2002). Sprung (2009) observes that the elderly suffers from physiological responses and often were unable to increase their cardiac output sufficiently during extreme hot weather. Persinger (2010) links the high fluctuations in temperature to some medical disorders like high blood pressure, heat stroke, bronchitis, asthma, glaucoma, goitre, eczema and herpes zoster. According to him, complications could be expected from these disorders at higher temperatures since the body responds to thermal stress by forcing blood into peripheral areas to promote heat loss through the skin. The sudden surge of blood increases central blood pressure and encourages constriction of blood vessels near the core of the body.

The killer risk causing climate changes is the emission of gases –carbon dioxide (CO_2), methane, (CH_4), nitrous oxide (N_2O) and chlorofluorocarbons- causing greenhouse effect going by the 2007 UN Copenhagen conference on climate changes (WHO, 2006). Nwoke, Nwoke and Ukpai (2009) link the greenhouse effect to the depletion of ozone layer through the photochemical reaction of these gases. Health is endangered when ambient temperature becomes so high that it affects the central nervous system, might influence increase in high blood pressure.
The penetration of ultra violet rays causes skin cancer and we reason that the foetus in pregnant women is at great risk if they were

exposed to high level ultra violet rays as ozone layer continue to be depleted. Global warming causes the sea and ocean levels to rise and during the rainy seasons, it fuels a greater probability of flooding. This aggravates the vulnerability of the poor living conditions to malaria, cholera and pneumonia.

Societal Illusions on Climate Change and Health Risks in Nigeria

Oxford advanced learners dictionary defines illusion as "a false idea or belief about a situation." When applied to climate change and health risks, it could be illustrated as an underestimation of climate changes and the possible relatedness to health risks. We link illusions to risk perception since the latter is the personal or group subjective value, idea or belief associated with the degree of existence of a danger. The daily activities of humans were intuitively based on perception. The qualitative aspect of risk is the construct based on experience and information as well as the perceived or attributed factors of an object (Slovic, 2000). Mitigation strategies will therefore be shaped by individual and collective perceptions of risk. Various studies, factors which influence risk perception are: the characteristics of risk source itself (Slovic, 2000), world views or value attitudes (Dake, 2001; Peters and Slovic, 2006), ethnic-cultural and socioeconomic background (Vaughan and Nordenstam, 2001), and personal variables such as profession (Barke et al 2007). There is need to conduct research into cultural context of what intuitively drive perception of risk of Nigerians.

Societal illusion on climate change in Nigeria seems shaped by lack of experience and information that Slovic emphasized under cultural theory. Another possible factor is the ethnic-cultural background that ascribes everything that happens as an "act of God". This value attitude tends to take away positive responses to protect public goods such as environmental protection. The generation of greenhouse gases through bush burning, use of firewood for cooking, importation and use of second hand cars and mass use of generators which more or less were connected to poverty level and socioeconomic background constitute an illusion of control behaviour. Perception of risk of climate change relationship with health risk affects a voluntary effort of persons in avoiding those acts. This conforms to the cultural theory and psychometric perspectives of risk perception and how it cognitively reflects an illusion. Illusion was observable by a susceptible lack of angst among Nigerians, who dump waste into canals and drainages that may exacerbate flooding and generate CH_4; generate CO_2 by burning refuse in the urban areas, utilizing wood for cooking, use of generators for energy, importation of fairly used vehicles; and releasing $CHCL_3$ from the use of cosmetic perfumes.

Agbo (2011) haps on the presence of illusion particularly in Lagos state where residence have tendency to dump domestic waste in water passages and construct houses illegally to block drains. He alludes that even some of the drains were constructed slanting against the flow of water. The causes of illusion if it exists, whether cultural or psychometric, need empirical evaluation to address the

fundamental errors that were contributing unknowingly to climate change.

Methods and Discussion

This study is descriptive in nature. It utilized both quantitative and qualitative research method. The source of data for this study was basically primary source, a number of statistical tools were employed in this study. These include: descriptive statistics, Z-score and regression analysis.

Descriptive Statistics:

This was employed to describe and summarize the data collected. Simple descriptive statistical techniques such as frequency counts, percentages, means, and standard deviations were employed.

Z-score

This measure was employed to test for significance of morbidity of the diseases. In the survey, a number of diseases were examined. An average Z-score benchmark was determine based on how varied the disease are as well as their potency or severity. This value was used to determine potent disease for regression analysis. In all, four diseases were identified.

Regression Analysis

This was employed to ascertain the relationship between morbidity rate and temperature. It was used to in analyzing data to determine the predictive potency of temperature to morbidity rate from 1970 to 2006. The dependent variable is morbidity rate (Yt) and independent variable is temperature change (Xt).

The implicit form of the model is specified as:

$Y = \alpha + \beta Xt + \varepsilon t$

Where: Yt = Aggregated morbidity rate, Xt = Temperature change

α = Constant term , β = Coefficient, εt = Error term

Figure 2: Flooding after a heavy rain at Lokoja
Source: fieldwork, 2017.

Results

Descriptive Statistics

Table 2 shows the descriptive statistics (i.e. mean and standard) of responses of medical practitioners on frequency of some diseases in Nigeria. The table reveals that the most frequent disease in the list is Malaria, with a highest mean point of 4.51. This shows that malaria is a major health problem in the country and varies by weather such as temperature which allows the carrier of malaria parasites than other diseases. The least frequent observed disease in the list is Cataracts with the lowest mean point of 2.79.

The identified diseases were used in the analysis by regressing the morbidity on temperature changes, and 2 for frequency and severity of diseases respectively. In all, four diseases are determined to have mean points above average values of Z-score. These are malaria, Meningitis, cholera and pneumonia. The four diseases were further aggregated and classified as morbidity rate, i.e. incidence of disease in a time period from a specific population at the beginning of the period. The diseases predominantly associated with temperature change as a result of prevalent climate change in Nigeria over a period of times.

Table 2: Descriptive statistics (i.e. mean and standard) of responses of medical practitioners on frequency of some diseases in Nigeria

Issues	5	4	3	2	1	Mean	SD	variance	z-score
Malaria	32	15	5	1	1	4.41	0.88	0.744	-40.30
Meningitis	29	18	5	1	1	4.35	0.872	0.761	-38.23
Cholera	40	10	3	1	-	4.53	0.760	0.517	-74.07
Diarrhoea	23	15	10	4	2	3.98	1.124	1.264	-22.76
Measles	16	21	9	2	6	3.72	1.250	1.563	-7.5
Chicken pox	6	20	16	5	6	3.33	1.197	1.434	-6.8
Asthma	17	17	13	5	2	3.78	1.110	1.233	-18.92
Skin cancer	18	19	9	7	1	3.85	1.089	1.185	-29.47
Conjunctivitis	6	7	10	16	15	2.50	1.328	1.764	6.98
Pneumonia	15	13	25	1	-	3.78	0.883	0.780	-27.78
Congenital	13	17	8	11	5	3.41	1.311	1.718	-7.30
HBP	25	14	8	6	1	4.04	1.115	1.244	-32.77
Stroke	28	15	5	6	-	4.20	1.016	1.033	-51.85
Heart failure	29	17	6	1	1	4.33	0.890	0.792	38.23
Typhoid	17	14	14	6	1	3.77	1.096	1.201	-20.98
Cataract	8	9	10	15	11	2.77	1.368	1.871	-2.35
Dehydration	8	16	10	13	6	3.13	1.272	1.617	-2,185
Neurosis	13	11	15	11	3	3.38	1.228	1.509	-11.78

Source: fieldwork, 2018.

Table 3: Descriptive statistics of medical practitioners' response to severity of diseases with respect to climatic change

Issues	5	4	3	2	1	Mean	SD	variance	z-score
Malaria	34	16	4	1	-	4.51	0.717	0.514	-61.81
Meningitis	24	19	10	-	1	4.20	0.877	0.769	-34.51
Cholera	29	1	6	1	2	4.273	0.989	0.980	-24.15
Diarrhoea	14	19	17	5	-	3.76	0.942	o.888	-25.45
Measles	14	22	8	4	6	3.63	1.263	1.596	-6.41
Chicken pox	6	17	17	7	8	3.11	1.212	1.469	2.12
Asthma	14	16	16	6	2	3.63	1.104	1.219	-16.67
Skin cancer	10	24	8	6	5	3.53	1.203	1.446	-5.14
Conjunctivitis	13	8	8	13	12	2.94	1.510	2.280	-0.58
Pneumonia	10	20	22	3	-	3.67	0.840	0.706	-18.18
Congenital	7	18	9	13	7	3.09	1.278	1.633	1.644
HBP	20	14	11	6	4	3.73	1.269	1.609	-13.26
Stroke	21	15	8	4	4	3.87	1.253	1.570	-13.37
Heart failure	23	15	8	5	2	3.98	1.152	1.370	-22.55
Typhoid	7	18	13	10	5	3.23	1.187	1.409	-2.46
Cataract	8	10	10	11	13	2.79	1.419	2.013	3.53
Dehydration	8	15	14	10	6	3.17	1.236	1.528	-2,10
Neurosis	6	10	17	14	6	2.92	1.174	1.379	3.65

Source: fielfwork, 2018.

Table 3 shows the severity of some diseases determined in the survey. The data were obtained from the ranking by medical practitioners across the country. From the table, it is observed that highest severe diseases in the list is Cholera, with a highest mean score of 4.63 and Z score 74.07; next to it malaria, 4.41, -40.3; meningitis, 4.35, -38.23; heart failure, 4.33; stroke, 4.2, -51.85; and high blood pressure, 4.04, -32.77.

HYPOTHESES
Hypothesis One
Ho1: There is no significant relationship between temperature-related morbidity in Nigeria and climate change

Table 4 shows the results of data analysis to test the hypothesis at 0.05 significance level using regression analysis.

Table 4: Estimated regression coefficients for the influence of climate change on morbidity rate

Model	Un-standardized coefficients		Standardized coefficient	T level	Sig.level
	B	std. error			
1. Constant	-11264.031	4665.178		-2.414	0.021
Temperature	458.576	169.025	4.170	2.713	0.010
R^2 value=17.4 F-value=7.361 Std.error=922.205					

Source: fieldwork, 2018.

Simple regression analysis was used to determine the influence of climate change on morbidity rate. The table shows the result of the functional forms of ordinary least square regression analysis. The result of the analysis shows the coefficient of determination (R^2) of 17.4% that is, the independent variable (i.e. climatic change) is able to explain 17.4% of the total variation in morbidity rate. Table 4 also revealed that temperature change significantly influence morbidity rate ($p<0.010$). The significance of the extent of morbidity rate could be attributed to the fact that climate change predicts morbidity rate, that is, the higher the climate change, the higher the morbidity rate and vice versa. The result showed that F calculated is 7.361. Meanwhile, F tabulated at 5% is 4.170. Since F calculated is greater than F tabulated, the null hypothesis [Ho], which says there was no significant relationship between temperature-related morbidity in Nigeria and climate change, so, the alternative hypothesis is accepted. The study establishes a significant relationship exists between climate change and morbidity rate in Nigeria.

Hypothesis Two

Ho2: Climate change has no correlation to the illusion of Nigerians on effects of climatic changes on human health.

To indicate whether climate change is not related to the illusion of Nigerians on effects of climatic changes on human health, descriptive statistics is used. Randomly selected university students across the country ranked the likelihood of the attributes causing climate change and environmental behaviours exacerbating effects of climate change.

Table 5: Summary of the Environmental Habits that can cause changes in climate which can result in increase in diseases

	N	minimum	maximum	sum	mean	Std.deviation
Industrial pollution	50	1.00	5.00	115.00	2.3000	1.08214
Poor drainages	50	1.00	5.00	135.00	2.7000	1.06924
Gas emission	50	1.00	5.00	195.00	3.9000	1.12938
Use of generator	50	1.00	5.00	190.00	3.8000	1.08797
Deforestation	50	1.00	5.00	155.00	3.1000	1.42585
Lack of disposal	50	1.00	5.00	125.00	2.5000	1.39152
Use of firewood	50	1.00	5.00	175.00	3.5000	1.04511
Poor maintenance	50	1.00	5.00	153.00	3.0600	1.36142
Use of perfume	50	1.00	5.00	117.00	2.3400	1.15370
Valid N (list wise)	50					

Source: Fieldwork, 2018.

The total value of the five-rating scale for Environmental Habits that can cause changes in climate which can result in increase in diseases, is 15. The mean is 3.5. Mean scores of 3.5 and above formed basis for the acceptance of the results. The above table reveals that three environmental habits met the 3.5 acceptance mean of environmental habits that can cause changes in climate. These environmental habits, which include gas emission from vehicle exhaust, use of generator, and use of firewood are considered

to be major environmental habits that can cause changes in climate.

The remaining six habits; industrial pollutant, poor construction of drainages, deforestation, lack of good disposal, poor maintenance of vehicle and use of perfume poor maintenance did not meet the 3.5 acceptance mean of environmental habit. They were therefore considered as not being environmental habits that can cause changes in climate. This is contradictory to the a priori implications of climate change and human activities causing anthropogenic CO2. It portends a case of inaccurate understanding of the consequences of certain environmental habits to climate change. A case of illusion these actions cannot lead to climate change. Therefore, we reject the null hypothesis [Ho] that climate change was not related to the illusion of Nigerians on effects of climatic changes on human health and accept the alternative hypothesis [H1]. This means that climate change was related to the illusion of Nigerians on effects of climatic changes on human health.

Conclusion

Climate change is speeded up by increase in anthropogenic Co2 and other greenhouse gases plus the depletion of ozone layer which allows the penetration of ultra violet rays. Climate change or global warming cause sea level to rise and the consequences result in flooding from heavy rainfalls induced by precipitation, also from climate change. The deleterious effect of increase in ambient temperature is shown in this study to significantly influence increase in morbidity rate in Nigeria. Four diseases; cholera, meningitis, malaria and pneumonia were

implicated as the major health risks exacerbated by climate change. Societal illusion is underscored in this paper as a nonchalant environmental habit that contributes to global warming in Nigeria.

Recommendations

Health care facilities were considered inadequate in developing economies and exacerbation of health risks in the event of adverse climate will occur. Government health policies should concentrate on providing medical care for diseases identified by this study to be possibly amplified to catastrophic levels namely malaria, meningitis, cholera and pneumonia. Climate change mitigation is by reducing collectively on a global scale the emission of Co2 and greenhouse gases. Nigerian policy makers must be aware of the need to wipe away the prevailing illusion on avoidable bad environmental habits highlighted in this research as industrial pollutant, poor construction of drainages, gas emission from exhaust pipe, use of generator, deforestation, lack of good disposal, use of firewood, poor maintenance of vehicle and use of perfume. Morbidity rate correlation with climate change was a consequence of vulnerability to weak infrastructural systems to climate from flooding and exposure to excessive heat. We suggest various insurance contracts like flooding insurance and weather insurance to manage the catastrophe levels of health risks from climate change.

There is need for heightened awareness among the general population on climate change and health risks. Community leaders, churches and mosques have relevant roles to play in guiding the people to understand climate change consequences. Government in Nigeria could exploit the bond market to

manage the consequences of climate change on Nigerian health infrastructure.

 Climate change can result in catastrophic health risks and further endanger the fragile social security's system, if not strategically managed. Planting of trees and conscious effort to dissuade deforestation should be essential part of public discourse and policy. Then finally, a comprehensive action plan of our cities to ensure planning standard compliance in cities to give a pleasant and aesthetic environment friendly to the teaming population in the country.

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AGRICULTURAL REVOLUTION: A PANACEA TO URBAN FOOD INSECURITY AND DEVELOPMENT IN AFRICA

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Abstract

The rising urban population across the globe is mounting pressure on food system. More than halve of the world population is estimated by the United Nations to live in cities by 2030, this in effect result into increase in food demand. Increased food demand is bound to come from Africa and Asia among others due to 60% increase of the world urban population which is being expected from the two continents. But Africa can feed itself and by extension the rest of the world based on its large expanse of arable land, seasonal rainfall and semi-skilled labour. The study investigated the contribution of agricultural sector output to the growth of domestic economy and discovered a decline in agricultural sector's contribution to the growth of the economy from 60% in the earlier 1970s to less than 26% between 2000 and 2007 which used to be the backbone of Nigeria economy in the areas of employment, revenue generation and food security. Specifically, the study examined food insecurity as one of the challenges posed by rapid urbanization in developing countries and especially in Nigeria. It therefore used South African experience to derive lessons for tackling food insecurity in Nigerian urban areas. More specifically, the study assessed agricultural innovations undertaken in South African drawing out overarching lessons that will inform Nigeria decision on how to better integrate urbanization in national development planning frameworks and processes thereby addressing the problem of food insecurity. Major development that brought about the rethinking of agricultural practices is: the spate of neglect of agricultural sector since the discovery of oil in Nigeria about half a century ago which needs urgent attention. Others are unfavourable government policies on smallholder farmers and inability to attract direct foreign investments by cities in Nigeria. The study then recommends agricultural revolution in the form of establishment of multifaceted and linked global strategy leading to exchange of farm produce and interconnectedness within cities in Africa.

1.0 Introduction

Global demand for agricultural crops is on the increase, and may continue to do so for decades, propelled by a 2.3 billion person increase in global population and greater per capita incomes anticipated through midcentury as analysed by Tilman *et al.* (2011). Currently, the world population is estimated to be over 7billion and requires meeting the food needs of this population. Ironically, Asubonteng (2016) reported that Africa is the fastest urbanising place on earth according to the Oxford Poverty and Human Development Initiative (2015) yet 61% of the population is poor according to the Multidimensional Poverty Index (MPI) and prominently so in West Africa and one in nine are malnourished. In Africa, Agricultural

sector contribution has been described as the backbone of its economy. The World Economic Forum on Africa (2016) attestation to this came up during one of its programmes in Kigali. It was reported that agriculture is the backbone of Africa's economy growth. The possibility of this assertion is not farfetched. Asubonteng (2016) attributed the comparative advantage of Africa in the global economy to its arable land, seasonal rainfall and semi-skilled labour in agriculture.

Food and Agriculture Organisation of the United Nations (FAO) definition of agriculture broadly includes crop cultivation, livestock production as well as fishing, hunting, and forestry. These are the main sources of food for the world's population. The current round of heightened international attention to food security according to Crush and Frayne (2010) can be traced back to 1996 and the World Food Summit in Rome. The Rome Declaration on Food Security noted that 800 million people worldwide were under-nourished and affirmed "the right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger."1 The Declaration's stated objective was to reduce the number of undernourished people by half no later than 2015, a commitment later reaffirmed in the first of the Millenium Development Goal (MDGs) in 2000.2 MDG Goal One included a commitment to halve the proportion of people living on less than a dollar a day and to reduce by half the proportion of people who suffer from hunger (as measured by the prevalence of underweight children under-five years of age and the proportion of the population below the minimum level of

dietary energy consumption). And now, the Sustainable development goal (SDG) 11 hinged on food security. The Millennium Challenge Goal (MCG) of halving world hunger by 2025 may not be feasible if food security interventions do not consider rethinking agriculture in both rural and urban areas.

Crush and Frayne (2010) in the book 'the invisible crisis in Africa' reported the predictions of United Nation (UN) that by 2020, the urban population of less developed countries will exceed the rural population and continue to climb thereafter. Over the next 30 years virtually all of the anticipated three billion increase in the human population is expected to occur in cities of the developing world. The 2006-7 State of the World Cities Report predicted even higher rates of urbanization for Africa: Cities of the developing world will absorb 95 per cent of urban growth in the next two decades, and by 2030, will be home to almost 4 billion people, or 80 per cent of the world's urban population. It further predicted that after 2015, the world's rural population will begin to shrink as urban growth becomes more intense in cities of Asia and Africa, two regions that are set to host the world's largest urban populations in 2030, 2.66 billion and 748 million, respectively.

Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces. The rapid growth of cities in the developing world, coupled with increasing rural to urban migration, has led to a boom in mega-cities. In 1990, there were 10 megacities with 10 million inhabitants or

more. In 2014, there are 28 megacities, home to a total 453 million people. Extreme poverty is often concentrated in urban spaces and national and city governments struggle to accommodate the rising population in these areas. Therefore, the concept of making cities safe and sustainable   means, ensuring access to safe and affordable housing, food as well as upgrading slum settlements. It also involves investment in public transport, creating green public spaces, and improving urban planning and management in a way that is both participatory and inclusive of the urban poor. Unfortunately, the continent has struggled with food insecurity for many decades in spite of its verse arable land and resources. It therefore means that rethinking agriculture is presently required than later.

Continuing population and consumption growth will mean that the demand for food will increase with the bulk of the demand coming from urban areas where quest for infrastructural development has displaced arable lands meant for agriculture. Growing competition for land, water, and energy, in addition to the overexploitation of fisheries, will affect our ability to produce food, as will the urgent requirement to reduce the impact of the food system on the environment. The effects of climate change are a further threat. But the world can produce more food and Africa can feed itself as well as ensure that it is used more efficiently and equitably. The question requiring an urgent answer remains "Why then do hunger persists in our cities". The answer has provided by series of research done by Agency for Cooperation and Research in Development (ACORD) 2013,

have shown that Africa produces 130% of what could meet its food needs but 60% is usually lost. $35 billion is used to import food while 80% of farming system is done by household and mostly women in the rural space and this portend the reason Sub-Saharan Africa remains the most poverty stricken region in the world. This influenced the need to engage in knowledge sharing.

The situation is not in any way different in Nigeria. Michael (2017) opined that the contribution of the agricultural sector to the growth of the domestic economy of Nigeria was relatively significant prior to early 1970s; and however, as the oil sector emerges as the major export earner of the economy, the agricultural sector's contribution to the growth of the economy declined from 60% in the earlier 1970s to 40%, 30% and less than 26% between 2000 and 2007. Export crops like cocoa, cotton, groundnut, rubber, palm oil and palm kernel that initially contributed up to 65% and 75% of the foreign exchange earnings and which was the main source of revenue of the government through export product, suddenly declined its contribution to total RGDP due to agricultural sector neglect, as oil sector emerged in the economy. The contribution of the sector to total real gross domestic product in Nigeria declined from 48% in 1970s to 20% and 19% between 1980 and 1985. The decline in the sector's performance to total RGDP was attributed to high revenue receipt recorded from the sales of crude oil products during the era of oil boom during 1970s to early 1980s, occasioned by the Middle East war of 1973 and the analysis showed an estimated 1% increase in the value of agricultural sector output would result to 1.9% increase in real

GDP (Michael 2017). This paper acknowledges the need to bring together all stakeholders and channel different resources into making food available and affordable for the urban poor through its multifaceted and linked global strategy. The concern however remains as African cities began to experience rapid urbanization which is expected to witness more and faces a host of challenges ushered in by urbanization which includes food insecurity, best practices in agricultural needs to be explored and replicated in order to achieve food resilient African cities.

2.0 Urbanisation and food Security

Urbanization

Global food demand has increased as a result of growth of cities which reduces millions of hectares per year of arable lands (World Bank 2015). United Nations (2017) report on the state of urbanization in Africa also revealed the new and emerging trends is the wave of urbanization that is sweeping across most of Africa. Indeed, while Africa's population is currently estimated to be 40% urban, in less than 20 years, it is projected that more than 50% of Africa's population will be living in urban areas, and by 2050 this will have risen to 60%. If the projections are realized, this will profoundly change the profile of the continent, and will present a challenge for policymakers in their efforts to manage urbanization strategically for Africa's structural transformation. Urbanization is multidimensional in nature, as it affects the social, economic, political, cultural and environmental aspects of development in a cross-cutting way. The rapid urban transition unfolding in Africa presents both opportunities and challenges. Evidence around the world suggests that linking economic and urban development generates positive interactions and spill overs that improve productivity and well-being. The role that urbanization plays in the transformation of the continent is recognized in the 2030 Agenda and in Agenda 2063, nevertheless, the integration of urbanization into African national and regional policy frameworks as a cross-cutting factor has been limited (UN, 2014). Few African countries have adequately integrated urbanization in their national development plans as a mega trend of considerable proportions shaping all aspects of development, including employment, poverty and inequalities. Yet, planning plays a fundamental role in determining a country's development objectives, as well as to ensure a rational allocation of national and external resources to support strategic development goals. Thus, development planning can be a vehicle to harness urbanization for African countries' long-term inclusive and sustainable development vision and goals. A strategic national response to the urbanization wave in Africa must also be accompanied by strategic sectoral national policies. Such policies are important instruments to optimize the opportunities, and minimize negative externalities of urbanization, while being informed and guided by national development planning vision, goals and objectives. It is in this context that the Urbanization Section of Social Development Policy Division/Urbanization Section (SDPD/US) of ECA has prepared a report on the integration of urbanization in national development planning. The main aim of the report is to strengthen member States'

knowledge and capacities in integrating urbanization into national development planning frameworks and processes to promote inclusive and sustainable cities for Africa's structural transformation.

In order to ensure that that the young population flooding the urban centres and cities supply; do so in ways that are environmentally and socially sustainable; and ensure that the world's poorest people are no longer hungry, the challenge requires changes in the way food is produced, stored, processed, distributed, and accessed that are as radical as those that occurred during the 18th- and 19th-century Industrial and before the oil boom.

Food security

Food security exists when at all times; all people have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO, 1997). The concept connotes of four dimensions namely Physical Availability of food (supply and demand); Economic and physical Access to food (affordability and preference) Food Utilisation (nutrition) and the stability (sustainability) over time. Several factors such as the low productivity, economic shocks, political instability and poor weather conditions may affect these dimensions and their stability (FAO, 1997). Figure 1 below illustrates the decline in prevalence of Africa's undernourished while the numerical count rises giving an indication of the persistence of hunger on the continent.
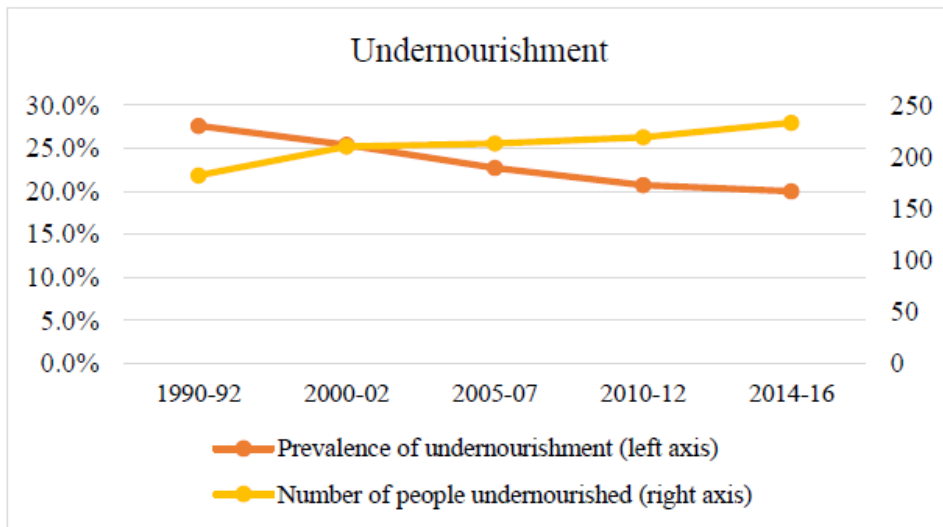

Figure 1: Undernourishment in Africa, 1990 – 2015
The State of Food Insecurity in the World (SFIW), 2015 adapted from Asubonteng 2016

Emerging and pressing threats to food security have been amplified by poverty, rapid urbanisation, population growth, hiking food prices, conflict and civil strife, misguided policies as well as weak institutions and failing markets, climate

change, reduced productivity and investments and increased demand for food with population growth.

Food Quality

Another aspect of the food security is food quality. This consists of a bundle of characteristics/attributes which depict food utility and performance. These attributes include food safety; nutritional value; packaging and production processes. They influence the interactions between food demand, supply, and market prices. For instance, it is assumed that a rational consumer with the ability and willingness to pay would pay a higher price for food based on its safety and/or packaging values. These semantics play out fairly well in high income countries where policies, regulations, and profitability motive nudge food producers into quality assurance.

Asubonteng (2016) opined that exported food from Africa does not usually end up on retail shelves (exception of South Africa) in developed and emerging countries for quality reasons. In 2014, Kenya recorded low agricultural exports due to the poor quality of products and this led to a national Standards and Market Access Programme (SMAP) which runs till 2017. The United Nations Industrial Development Organization (UNIDO) iterated that the compliance of quality standards was essential for regional (i.e. Africa) and international trade. When major agricultural importing entities like European Union, USA, Japan among other institute food quality standards they eventually act as trade barriers for the exporter. The food industry in Africa becomes attractive for investment and

admission into the global food economy (market) only when consumers perception and demand of quality are met. Tester (2010) briefed on reducing agricultural inputs especially those of nitrogenous fertilizers, which could in effect reduce environmental degradation caused by emissions of CO_2 and nitrogenous compounds from agricultural processes and also increase crop's ability to maintain yields with lower water supply and quality will be critical. Both international and local consumers increasingly demand quality in food. Researchers acknowledged setting food standards or regulations nationally affects prices, variety, and quantity supplied by producers. Depending on how the supply chain firms strategically adjust to these policies, prices may increase affecting affordability and eventually food security.

Owning to the fact that the focus of this research, apart from seeking the continent is food secure also looks into its potential as the world food basket through agro-food trade. A major motive of investor-exports is competitiveness and market access which may either be addressed or deterred by policies in quality standards at both country and international levels. Hence the quest is not only for food to be available and affordable but also of high quality.

Smallholder Farming

The smallholder is the spine of the agricultural sector and instrumental in the food security fight according to FAO. They form 70% of the world's vulnerable, food insecure and poor but produce 70% and over 80% of food consumed globally and in Africa respectively. Many models have emerged out of the necessity to involve the smallholder farmer into the agri-business. Vorley *et al.*

(2009) reported smallholders-inclusive business models in Vietnam as one with focus on making the smallholder farmer spearhead revamping the agriculture sector and increased income. Inclusiveness of small-scale producers in the agenda for food security is necessary for a holistic solution. Several types of research in the region show that these farmers practice subsistence farming to provide food for their families first and then sell any surplus. The African Forum for Green Revolution (AFGR) in its advocacy puts the smallholder farmers at the fore front of economic development of the Africa region through agricultural productivity. This system would be logically efficient if the farmers were not faced with several predicaments; drought and adequate access to the weather forecast, labour-intensity, and disease, resource and input constraints, land tenure issues, limited extension services, poor transport network to markets among others.

Asubonteng (2016) observed from the Africa Competitiveness Index, 2015 that myopic concentration on smallholder agricultural development may not yield our desired output. A sustainable approach is to encourage Foreign Direct Investment (FDI) in form of loans and stocks in agricultural sector at all scales. However, the World Bank report on Human Development in Africa in 1981 records investments in similar smallholder programs across the region that failed. The report cited mismanagement, over employment of staff, poor maintenance, underutilisation of expensive machinery and infrastructure. Frelat *et al.* (2015) found out from their survey of about 13000 households in 93 sites and 17 African countries that

produce an income from their farms were inadequate for the families. Households with a positive significance of being food secure had other off-farm income sources. Market access was shown to be very important to the smallholder farmer. The volatility of the local markets to food price fluctuations limited the ability of the subsistence farming to generate enough income or create more jobs. This calls for the involvement of stakeholders at all levels of government as suggested by this paper.

Competitiveness of the Agriculture sector

Food security is viewed as another form of security and perhaps as important as political, economic, socio-cultural and religious security (Asubonteng, 2016). Within the region, development should be structured to reflect the role agriculture and food security play in making cities competitive. Central to this is the positions adopted by developed countries in the Organisation for Economic Cooperation and Development (OECD) mainly USA, Netherlands, United Kingdom, Israel, Korea, Germany and France and partners like Brazil and China on agricultural policies to ensure the right use of nutritiously affordable food which is continuously available for their citizens. In Africa, food is not a human right as other countries like India and these top economies have instituted. Few countries have put this right into law (UNDP, 2012). Regional policy and perception need to be oriented to put food on the small scale as oil, coffee, cocoa, and others.

Exploring the Global Competitive Index (GCI) and the top agricultural producing countries illustrate silent but relevant characteristics such as food security, agricultural investment, and trade. Such

countries have diversified economies which are captured in intra and inter sectorial and interdisciplinary policies. The concept of competitiveness is linked to productivity which is likely impact on Africa. A country or region becomes more competitive in the production of a commodity if the relative costs – resource supply, labour, technology, and energy are much lower than other producers of the same good or service. Agriculture like other sectors is directly or indirectly affected by chain turbulences of the economy, globalisation, urbanisation as well as fluctuating commodity prices. According to FAO (2015) investment must be sought to make cities resiliently competitive. Figure 2 reveals countries attracting investment leading to increased competitive status.

Data for companies investing in Africa in the food & tobacco sector between January 2003 and July 2016.						
Destination Country	Projects	Capex	Avg Capex	Jobs Created	Avg Jobs	Companies
Egypt	61	3,156.7	51.7	18,621	305	42
South Africa	46	1,562.4	34.0	8,797	191	29
Nigeria	43	1,917.8	44.6	12,605	293	26
Morocco	36	879.8	24.4	7,845	217	31
Kenya	30	466.3	15.5	6,066	202	24
Uganda	26	417.7	16.1	4,522	173	17
Mozambique	24	2,659.2	110.8	12,222	509	20
Ghana	23	1,639.0	71.3	13,324	579	21
Cote d'Ivoire (Ivory Coast)	22	1,231.2	56.0	7,843	356	13
Tanzania	19	456.1	24.0	3,822	201	12
Zambia	17	1,045.9	61.5	9,054	532	14
Ethiopia	16	996.1	62.3	6,326	395	15
Algeria	13	319.8	24.6	2,550	196	9
Angola	12	401.3	33.4	3,200	266	7
Tunisia	11	898.1	81.6	5,086	462	8
Cameroon	8	2,496.2	312.0	6,647	830	7
Rwanda	7	124.0	17.7	1,276	182	5
Senegal	6	78.4	13.1	755	125	6
Gabon	5	166.6	33.3	1,389	277	5
Namibia	5	204.9	41.0	1,393	278	5
Zimbabwe	5	169.3	33.9	1,241	248	5
Congo (DRC)	4	108.2	27.1	960	240	4

Source: FDI intelligence from the Financial Times Ltd, 2016

The determinants used are: Domestic market Growth Potential; Proximity to Markets or Customers; Regulations or Business climate; natural resources, infrastructure and logistics, government support, lower costs, skilled workforce availability and attractiveness.

3.0 Rural-Urban Linkages: The South African Experience

The KPMG's Report on performance of agricultural sector in South Africa (2012) showed that the sector contribution to South Africa's Gross Domestic Product (GDP) declined gradually over the past 10 years, from 2.7% in 2000 to 2.5% in 2010.

However, despite agriculture's reduced contribution to the country's GDP, the sector remains vitally important to the South African economy. With 8.5 million people directly or indirectly dependant on agriculture for income and employment, it was a sector in need of robust initiatives and support. The report acknowledged agriculture sector as a potential employment creator and one capable of achieving key development objectives, particularly through commercial farming and agro-processing initiatives.

While analysing the national situation, only 12% of South Africa's surface area is suitable for crop production with the biggest challenge being the availability of water. The South African agriculture sector is characterised by diversity and incorporates crop production, horticulture, animal production, dairy farming, fish farming, and game farming. In economic terms, the sector comprises a highly developed commercial sub-sector geared towards export, as well as a smaller subsistence sector though there is much diversity and fluidity within these categorisations. South Africa remains a major exporter of agricultural produce and ranks highly on many products. It is currently the world's leading producer of avocadoes, clementines, and ostrich products. With this background, South Africa brought about agricultural innovation through what they termed Agro-Park.

Agri-parks which is farmer controlled provides the catalyst around which rural industrialization takes place. At the initial stage, agri-park was supported by government to ensure economic sustainability. One of the identified benefits is to strengthen partnership between government and private sector stakeholders to ensure increased access to services (water, energy, transport) and production on the one hand, while developing existing and create new markets to strengthen and expand value-chains on the other. Equally important is to maximise benefit to existing state land with agricultural potential in the provinces, where possible. Other benefits are: maximise access to markets to all farmers, with a bias to emerging farmers and rural communities;

maximise the use of high value agricultural land (high production capability); maximise use of existing agro-processing, bulk and logistics infrastructure, including having availability of water, energy and roads thereby support growing-towns and revitalization of rural towns, in terms of high economic growth and promote rural urban linkages (Motswiane, 2016; and DRDLR, 2018). The Agric-Park Innovation involves both traditional and advanced crop and livestock breeding, as well as the continuing development of better chemical, agronomic, and agro-ecological control measures.

The strategy involves:

1. The Farmer Production Support Unit (FPSU) - a rural small-holder farmer outreach and capacity building unit that links farmers with markets. The FPSU does primary collection; provides some storage, some processing for the local market, and extension services including mechanization.
2. The Agri-hub (AH) - a production, equipment hire, processing, packaging, logistics, innovation and training unit.
3. The Rural Urban Market Centre (RUMC). The RUMC has three main purposes;
i. Linking and contracting rural, urban and international markets through contracts.
ii. Acting as a holding-facility; releasing produce to urban markets, based on seasonal trends.
iii. Providing market intelligence and information feedback, to the AH and FPSU, using the latest Information and communication technologies.

South African Department of Rural Development and Land Reform (DRDLR) working together with the Department of

Agriculture, Forestry and Fisheries; the Economic Development Department; the Department of Science and Technology; Department of Trade and Industry, the Department of Cooperative Governance, the Department of Small Business Development, the Department of Water Affairs and Sanitation, the Department of Environmental Affairs, their respective agencies and the private sector have embarked on rolling-out Agri-parks to all 44 Districts in South Africa, including the ThabaNchu area in the Mangaung Metro. See Figure 3. The project was meant to kick start the Rural Economic Transformation. As a network it enables a market-driven combination and integration of various agricultural activities and rural transformation services. The Agri-park comprises three distinct but interrelated basic components which is worthy of commendation due to its impact on securing the country and by extension the continent (Motswiane, 2016).
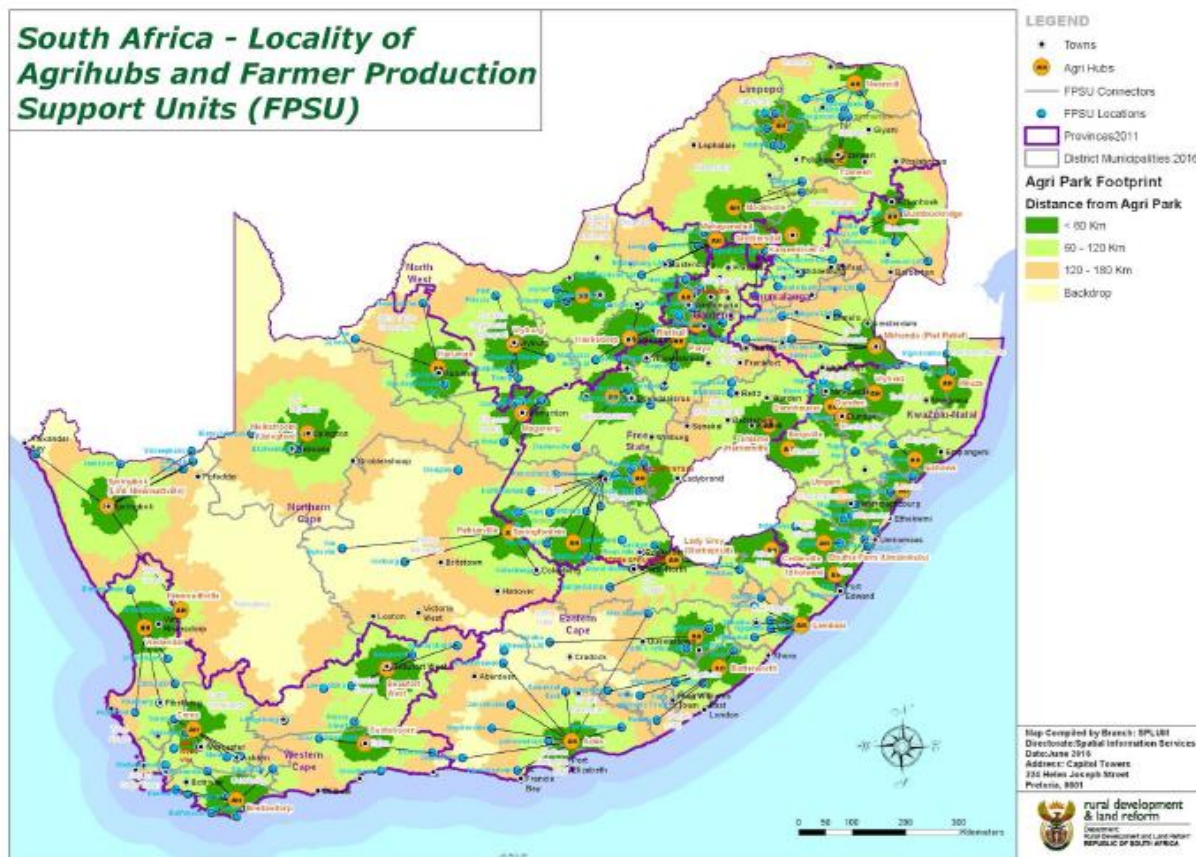

Figure 3: Agri-Park Network
Source: Department of Rural Development & Land Reform, Republic of South Africa, 2018.

4.0 Lessons for Nigeria

South Africa demonstrated how with low land much can be achieved through technology and farmer led initiatives. This informs the analysis of South African experience and lessons that Nigeria could gulp out to better its agricultural performance owing to the amount of arable land available for agricultural purposes which in turn would attend to urbanization challenges of food insecurity and unemployment. Therefore suffice it to say, that lessons abound:

1. In bridging the gap in food demand and supply, local food producers requires technical knowledge and skills to increase productivity and tolerance of crops to drought, salinity and other climate change effects which is provided at the agric hub to small holder farmers. Although more food is needed for the rapidly growing human population, food quality also needs to be improved, particularly for increased nutrient content.

2. Mapping out of small holder farmers and their location within cities, towns and villages would really help in bringing together stakeholders in urban food security; identify their strength and challenges as well timely dissemination of relevant information necessary for increased agricultural food chain and income generation. This can be achieved through the effective deployment of planning tools and technology. The essence is to reduce wastages, improve food supply and distribution and achieve sustainable development.

3. The strategy involves transforming rural areas into hub of activities in terms of food production and linking same to the urban areas for processing, packaging and marketing of the food products. This serves as a veritable way of retaining a larger percentage of population rushing to urban centres in search of better living and end up adding to the vulnerability of the urban poor to food insecurity.

4. Land is one of the three main factors of production and for agriculture, it is the most essential. The nature of land tenure in the Africa is mostly dual; statutory and Indigenous African tenure (customary). Hence defining land as a mere productive tool is a blunder more so for a region such as Africa. The smallholder farmers should have access to secured land for agriculture purposes in both the rural and urban areas. With this in mind, foreign investment in agricultural infrastructure could increase which would lead to increased productivity of land and labour to its fullest potential.

5. The strategy ensures maximum use of available infrastructure including water supply. Climate change is expected to intensify the low productivity of the rain-fed agricultural sector of the Africa which already suffers extensively from the unreliability of the seasonal rains and severe droughts. Human activities involving pollution of rivers and streams through irresponsible disposal of industrial waste into water bodies

which could serve as alternative water supply for irrigation should be discouraged. To meet the nutritional needs of the rapidly growing Africa population, other innovative systems of improving water productivity even as other factors are enhanced are essential. Conversely, for sustainability, agriculture management should ensure freshwater supply is not disrupted because accessibility to clean and safe drinking water is part of food security.

5.0 Conclusion

Rethinking agriculture for Africa means increased productivity while investing in technological innovations tailored towards reducing wastages and blocking avenues through which there has been losses. This is certainly one of the ways of providing urban security and meeting the crisis of urban poverty and food insecurity as propelled by rapid urbanization in developing countries like Nigeria. Establishing an effective urban rural linkage through transformed transportation system and informed policies on multi-level agricultural strategy in addition to access to markets guarantees sustainable transformation of lives of rural dwellers. Beyond achieving sustainable development of cities, the continent becomes food resilient with less dependence on importation of food products and a hub of foreign investments. Engaging the model of agric park ensures food availability at all times, with high nutritious content and affordable. This is made possible by discovering the strength of individual states within the country, involvement and

inclusiveness of these cities within the country in all sectors of food security. Nigeria can feed itself and the regional surplus could be moved out in continental trade within Africa. This can invariably be extended to the rest of the world.

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COLLABORATIVE FRAMEWORK FOR SUSTAINABLE FLOOD RISK MANAGEMENT

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Abstract

The unpredictable weather events driven by climate change phenomenon enhanced frequent flooding in previously safe flood plains and littoral settlements. The severity of flood related disaster reached an all-time high in 2012, spreading over 18 states of the federation. The severity prompted the usual Federal Government reactive flood management approach. The piecemeal protective flood management option is not making desired impact. There should be national safety chain to address flood protection, preparedness, response and recovery. This paper advocates for collaborative flood risk management framework to reduce cyclical farmland degradation, infrastructure devastation, property destructions and increasing loss of human life. The paper is underpinned by collaborative inquiry and risk management theories. Collaborative flood risk management demands a clear-cut understanding of probable locations for future flood occurrence and necessary principles and strategic actions to reduce the impact without moving the problem to other geographical locations. On this platform flood risk management is not tackled on political administrative boundaries basis but within natural boundaries of river catchments. It puts demand for synchronization of Federal, State, Local Government and local flood districts flood related activities. Expectations from Federal Government include generation of comprehensive national flood risk management policies with defined national flood risk maps. State Government expectations include provision of specific State flood risk management strategies and flood risk maps. Local Government follow the same pattern. In the absence of City government, State and Local Government collaboration should consider the preparation of local districts flood maps and flood risk management plan. The inputs of all stakeholders including traditional institution, community-based organisations, non-governmental organizations, and prevailing River Basin Authority are important. The choice of flood management at local flood district should be influenced by flood type, flood plain ecological characteristics and available finance.
Keywords: *Flood Risk; Collaboration; Flood Risk Plan; Flood Maps*

1.0 Introduction

The global impact of flooding is astronomical since the last quarter of twentieth century. Over 3700 flood disasters are on record with a colossal economic consequence (Nkwunonwo *etal*,2015). The severities of floods posed tremendous danger to humanity. Floods cause about one third of all deaths, one third of all injuries and one third of all damages from natural disasters (Askew, 1999).The unpredictable and extreme weather events driven by climate change phenomenon enhanced frequent flooding in previously safe flood plains and littoral settlements. Climate change powered ocean surge and dramatic rainfall pattern drive tidal flooding devastating impact on littoral communities that depend largely on peasant farming and aquatic resources for their livelihoods. Other groups affected by flood related natural disaster are urban poor and estate developers lured by relatively cheap sub urban lands on broad flood plains. The last three decades witnessed a shape increase in the frequency of flood related

destructive impact in nearly all states of the federation. Bagauda dam disaster in Kano is a reference point (NEST, 1991). The impacts result in sharp increase in water borne diseases, loss of lives, properties, buildings, bridges and farm estates threatening the nation's food security.

The severity of flood related disaster reached an all-time high in 2012, spreading over 18 states of the federation including Kogi, Taraba, Benue, Kwara, Anambra, and Bayelsa (Punch, 2012). 420 recorded death, tens of thousands internally displaced people and hundreds of square kilometres of farmland washed away. According to Nkwunonwo, *et al* (2015), over US$17 billion properties were destroyed; 1100 deaths; and 11 million Nigerians affected. The severity prompted the Federal Government emergency rescue and relief operations (Guardian Newspaper, 2012). This is a reactive flood management approach. While relief efforts are welcome they do not often solve the problem of annual loss of lives, properties and farm lands. This leaves residents having to recover and restart their living arrangement all over again. Such situation hinders resident's efforts to improve their capacity to develop, prosper and enjoy quality of good life. Obeta (2014) submission is that the current national approach to flood management is not efficient to minimise flood hazards in the Nigeria. Literature on flood protection and management at the Federal and State levels are not really in short supply. Most of these studies emphasised either flood typology or causal agents (Daffi, *et al*, 2014); human and environmental impacts of flood hazard (NEST, 1991); flood modelling (Ikusemoran,*et al.* 2013); climate change phenomenon and flooding(Chiadikobi,*et al*, 2011); and the usual post flood humanitarian

efforts to encourage flood victims (Nkwunonwo, *et al*, 2015).It is dealing with the symptoms not the cause of the symptoms. Piecemeal protective approach to flood management and selective engineering structures witnessed in the last three decades are not making desired impact. It gives the citizens the impression that flood control is government responsibility. Argument against this notion is based on moral issue. If flooding affects everybody in the locality, then the same local people should be consulted in fashioning out mitigation and adaptation measures. Besides, flooding does not respect economic class, religion, political, administrative and bioregional boundaries. Therefore, protective solutions against flooding should not be seen strictly as government responsibility. Rather everybody should be responsible for protecting properties and lives from menacing impact of flooding.

There should be national safety chain to address flood prevention, protection, preparedness, response and recovery. Such integrated safety measures looks at worldwide paradigm shift in resolving flood issues from flood protection to flood risk mitigation (Evers,*et al.,*2012). This is based on the principle of flood acceptable risk in a locality. IPCC, (2007) traced reasons for this shift to unprecedented increase in flooding events and flood driven damages in the last twenty years. This is in addition to the global discourse on how to manage natural hazards especially the position of governance structure (Evers,*et al*.,2012). Flood risk management results from comprehension of flood hazard probability; vulnerability in spite of protective measures; and the derived consequences of applied mitigation measures. It sees integrated solution

to flood disaster through the window of participatory planning. This paper advocates for collaborative flood risk management framework to reduce cyclical landscape degradation, infrastructure devastation, property destructions and waste of valuable human life.

2. Flood Control in Nigeria

Nkwunonwo, *et al* (2015) group efforts to address the threats of flooding into "institutional approach, actions by local communities and the general public, actions by humanitarian agencies and actions by research institutions and the media". Proactive responsibility regarding flood area protection is currently in the purview of Federal Ministry of Environment and its equivalent bodies on State Government level. Ineffectiveness of Local Government and absence of city governance total exclude grass root stake holders from flood related decision making. Unfortunately excluded local stake holders including traditional institution, community based organizations, landlord associations, residents of poor informal settlements and ordinary city people bear the brunt of annual flood hazards. At Federal level, flooding events in the last few decades clearly show preference for reactive protection options that takes place after sessions of destructive flood regimes. Reactive approach often manifest in piecemeal soothing disaster management through (NEMA) and its equivalent at state government level and subsequently waiting for the next round of devastation. The two governance levels active flood protection organisations considerations for flood risk zoning and communication; spatial planning towards disaster management; organised

private sector involvement; and defined insurance management schemes are found wanting.

Historical antecedent of national flood management framework is traceable to the establishment of Natural disaster Departments at Federal and State Government Ministry of Works during the first three development plans between1962 and 1980 (Obeta, 2014;Nkwunonwo,*et al*, 2015). The mandate of the various Natural Disaster Departments was to create public awareness, compile relevant flood data and conceptualise effective flood response strategies. The mandate influenced the urban drainage system and the introduction of flood structural measures. The 1988 establishment of Federal Environmental Protection Agency unit in Federal Ministry of Works and the 1999 Federal Ministry of Environment redefine flood control institutional approach. While FEPA focused on flood policies development FME flood control improvement was twofold namely assessment of flood prone areas of the various watersheds and preferment of appropriate mitigation measures (Nkwunonwo, *et al* (2015). Flood and Erosion Control Department of the Ministry categorised recurrent flood phenomenon into low lying coastal areas; Niger Benue Basin; and rapidly growing cities. As noted by Obeta (2014) the incessant flood incidents necessitated the establishment and improvement of relevant institution's contribution to flood disaster management. Included are National Emergency Management Agency (NEMA); State Emergency Management Agency (SEMA), National Commission for Refugees (NCR); National Environmental Standards and

Regulations Enforcement Agency (NESREA); Nigerian Meteorological Agency (NIMET), Nigeria Hydrological Services Agency (NIHSA);Building Nigeria's Response to Climate Change (BNRCC) and recently (FEMA) saddled with responsibility of evolving Issues relating to flood insurance. While BNRCC focus on climate change issues, NISHA mandate include provision of qualitative hydrogeological data towards assessing national water resources. National Emergency Management Agency and State Emergency Management Agency currently works as post flooding relief bodies providing temporary succour to flood victims. Nkwunonwo *et al* (2015) noted that "humanitarian response to flooding in Nigeria" is evident in the Ogunpa River fluvial flooding at Ibadan, Banguada dam flood disasters that claimed thousands of human lives in mid 1980s and 2012 national flood disaster. NEMA equivalents on local government basis, are yet to be effectively activated and this is directly connected with the governance system that minimises power at the grass root. While each of these bodies work independently to meet set targets, collaborative initiative towards flood risk planning and management at federal governmental level is not given adequate attention. Therefore National flood planning and management institutional framework is not as organised as portrayed (Nkwunonwo *et al*, 2015 and Obeta, 2014). There is urgent need to synchronise the efforts of these agencies towards proactive flood risk mitigation.

With the exception of Lagos State, flood related institutional frame work at state level is weak and skewed towards emergency activities through State Emergency Management Agency. The frequency of tidal, fluvial and pluvial flooding types in recent years and the associated public agony endeared flood control mechanism to the government of Lagos State. Lagos State remains the only State with a form of Flood Preparedness Plan that place emphasis on flood prevention, mitigation and recovery. The Lagos Flood Abatement Gang – a unit in Lagos State Drainage Department is particularly effective in the annual flood sensitization program and enforcement of setback standard from urban drainage corridors. The Lagos State Drainage Department divide the state in to into high, medium and low flood-risk areas for easy administration. But the link to Local Government Councils is weak and minimises flood control efforts at the grass root. This is in addition to lack of synchronization of flood concerns and activities by various State Ministries including Ministry of Physical Planning, Environment, and Lagos State Emergency Management Agency (LASEMA), Ministry of Waterfront Development, Agriculture, Local Government and organized private Sectors. It is not that various Local Council, flood prone littoral communities and other local stake holders are not concerned on the incessant flooding activities, but adopted Federal and State Government flood control measures are on ad-hoc basis; not synchronised; and not proactive. The care for human element is missing while regulators at all levels of governance see intervention as contractual obligations. It is now a reality that best practices in flood risk reduction should be based on the cliché of "living with floods and not fighting them" (Nkwunonwo *et al*, 2015).

Such paradigm shift demands collective decision making.

3. **Collaborative Flood Risk Management**

Collaborative inquiry is a participatory approach in which proponents and stakeholders cooperate at various stages of decision making process towards a common flood mitigation and adaptation solutions. The participatory approach provides for greater influence of stakeholders in the investigation process and a higher level of support for the practical implementation of derived solutions (Warger & Burnette. 2003). The difference between collaborative inquiry and consulting approach towards problem-solving is nesting development in democratic process. While participatory action is bottom-up existing developmental process is top-bottom giving professionals and governmental apparatus to lord self-invented solutions on the will of the people. Local participation in flood risk management provides many reasons why all stakeholders should be incorporated into the decision-making processes. Brandon (1993) and Cater and Lowan (1994) identified three major issues on local participation in planning and management namely moral issue, economic and good environmental reasons. On moral issue, they opined that if flooding affects everybody in the locality it is imperative that the same local people are consulted in fashioning out mitigation and adaptation measures. Environmental issues demand that flood prone localities be understood from the perspectives of geomorphological formation and human and ecosystems interaction. The issue of prevailing human and ecosystem interaction dovetail into socio economic reasons for encouraging participatory

approach in the planning and management. As noted by Cater and Lowan (1994) if the interests of local people are to be secured, genuine and long-lasting benefits must be put in place. This is better achieved through participatory study (Warger & Burnette. 2003). Piecemeal approach to flood protection efforts and selective engineering structures witnessed in the last three decade is not making desired impact. This is due to an established fact that flooding is a complex natural event driven by complicated causes and consequences that no individual, single organisation and governmental agency can solve with a magic wand. Effective solutions and management then demands collaborations between diverse organisations, governmental ministries, agencies, nongovernmental organisations, community development bodies and individuals. Community on this platform is not village but a broader definition of stake holders in identified and geo-referenced flood prone areas. Stakeholders can be either at national platform, state, local government or city scale. Collaborative flood risk management perspective is justified through the submission that flood conscious people and community are ready to protect their lives, properties and secure precious means of livelihood.

4. **Sustainable Flood Risk Planning and Management**

Flood management is underpinned by the insurance industry concept of risk management. Flood risk is a product of three factors namely hazard, exposure and vulnerability. Kobayashi and Porter (2012) mathematic explanation of this relation as

$$\text{Flood Risk} = \text{Hazard} \times \text{Exposure} \times \text{Vulnerability}$$

is interesting. Flood hazard refers to a scenario where the possibility for destruction and loss of life is influenced by terrain liable to flooding. Hazard increases with physical attributes of the flood velocity and length of time the land is inundated. Damayanti, (2011) definition of hazard as 'potentially damaging physical phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation' is very instructive. Hazard is then a measure of destructive probability of flood phenomenon. This gives desired meaning to Daffi, *et al* (2014) explanation of flood hazard as probability of particular flood event happening in a geo referenced location leaving a trail of destructive properties, loss of human life, emotional imbalance and ecological degradation. Adopted parameters for describing flood hazards include flood extent, water depth, flow velocity, rate at which the water rises and duration. Structural measures are engaged in modifying flood hazard through control of flood frequency, flood extent and degree of inundation. Such measures include detention basins, dams, levees, dikes, channel diversion, river channel improvements and watershed management (Kobayashi & Porter, 2012).

Flood exposure addresses how developmental activities infiltrate the natural course of flood corridor. Flood exposure modification is achieved through land use policies and strategies including zoning, property acquisition, and development control, building control, flood-proofing buildings and building on platforms. The core of modifying flood exposure is about how future development is made compatible to flood plain processes and redefining compatibility of existing land use to flood risk processes. The adoption of non-structural measures is tailored to modifying vulnerability exposure. Included are community preparedness, community awareness, flood forecasting and warning mechanisms, post flood recovery actions and flood insurance. Vulnerability on the other hand is the distinction in flood damage assessment between real damage and potential damage. Each of these three components of flood risk can be modified to bring relief to the people as well as the ecosystem through acceptable risk paradigm. The principle of acceptable risk in a geographical area is often influenced by a single disaster incident. Three possible windows are explored in flood related acceptance risk including individual risk, societal Risk and economical cost- benefit analysis (Kolawole *et al*, 2011). While individual acceptable risk addressed the probability of loss of life, society risk assessment looks into total number of causalities due to a disastrous phenomenon. Societal risk is evaluated on three levels namely ecological risk, public- health risk and socio-economic risk. The bottom line of acceptable risk principle is to understand the vulnerability of an area to flood disaster.

This paradigm shift demands flood risk management that accommodate all stake holders in spatially defined vulnerable areas. Flood risk management is the planning, derivation of policies and strategic actions and their implementation towards the management of flood uncertainty and protection of lives and

properties against its adverse impacts (Department for Environment, Food and Rural Affairs, 2011). Flood risk management is not about flood hazards which addresses the scenario when prevailing flood exceed the capacity the landscape and its human settlements can cope. Rather it focuses on the possibility and the consequences of hazard eventuality (Flood Risk Management – Scotland, 2012). It is an established fact that adverse flood consequences trigger chains of socioeconomic disasters. The principal goal of flood risk management is to identify means of reducing the likelihood negative impacts of flooding in geographic setting (Flood Risk Management –Scotland, 2012). Flood risk management spatial extent includes the entire flood plain. Flood plain is the land area that is hydraulically and ecologically connected to Main River, creek, or lagoon and is periodically inundated due to normal hydrological process (Department for Environment, Food and Rural Affairs, 2011). Therefore, flooding is a natural process beneficial to the reinvigoration of flood plain ecological process within accepted capacity level and maintaining much needed biodiversity index. This is why a comprehensive flood risk master plan would involve the development of strategies and specific actions for dual purposes. The first is to reduce losses and secondly to increase catchment efficiency through leveraging opportunities that flood provides. Flood risk management planning on any geopolitical set up is achieved via a three interrelated steps namely flood risk assessment, flood risk strategy and flood risk plan. Whether national, state, local council or city scale these three

steps must be understood to enhance sustainable flood risk planning program.

4.1 Flood Risk Assessment
Flood Risk Assessment makes clear the causes, effects of flooding and areas highly prone to different types of floods on spatially defined area. It emanates from the facts that erratic climate influence in recent decades team up with unsustainable use of fragile geomorphic formations to increase devastating effect of diverse flood types. Flood Risk Assessment demands a threshold based on empirical data on which impacts of floods are considered significant. Demographic data, developmental activities, integrated transportation schemes are variables to be considered. It is geared towards approximating flood potential; understanding dynamics of floodplains relative to land use that aggravate floodway destruction responsible for life and property loss; and providing people oriented planning and design solutions. It is imperative to understand the type of flooding in operation in a particular flood prone area. This assessment provide the opportunity to consider the likelihood of flooding relative to estimated impact on man, his economy, heritage and supporting landscapes and appropriate strategic actions. At Federal level for example, National Flood Risk Assessment should evaluate the probability of flood occurrence, flooding types and the capability of bioregional landscapes to contain storm water at peak inundating periods in flood prone areas of all States. State and local governments are also expected to follow the same pattern. The ultimate goal is the identification and characterisation of local flood districts on three tier governance level.

4.1.1 Types of Flooding

Three categories of flood types are common in Nigeria namely tidal, fluvial and pluvial flooding. 850 kilometres of Nigerian coastline is threatened by tidal flooding. The severity in recent decades is traceable to climate change powered ocean surges. Tidal flooding is stimulated by storm surge, wind driven wave sand heavy rainfall. Globally the intensity and frequency of high tides is on the increase. High tides induced by tropical storms, hurricane, intense offshore low pressure system often overrun barrier islands(including Lagos State sand barrier-lagoon bio-region) and push seawater up coastal rivers and inlets, blocking the downstream flow of inland runoff. While storms with high wind speeds cause tall and powerful waves, low pressure fronts cause sea levels to rise above normal levels. High tide levels vary through the lunar and solar cycles and when superimposed upon other tidal variations result to surge into creeks, river corridors and lagoon blocking downstream storm water. That accounted for the flood experienced along the 200 kilometres Lagos sand barrier-lagoon islands in 2011 compounded by fluvial effect of releasing water from Oyan Dam upstream Ogun River Basin.

Fluvial Flooding occurs in the floodplains of rivers when the capacity of water courses is exceeded as result of rainfall within catchment areas upstream. This results from the level of precipitation and water runoff volumes within water shed of river. Flooding along rivers is a natural and inevitable part of life along the river plain. In Nigerian river system, June to October is considered the main period for river flooding. Blockages of water courses and flood channels

may also lead to ponding and rising water levels. River defences may then be overtopped due to increased water levels or breached by larger objects of debris carried at high water velocities. Flooding from rivers has in recent years increased dramatically. Flash flooding can occur in steep catchment area and is far more immediate. This often results from intense storms dropping large amounts of rain within a brief period of time. It happens when heavy rain collects in a stream or gully, turning the normally calm areas into instant rushing current. The quick change from calm to ranging river is what catches people off guard making flash floods very dangerous. The 2012 massive flooding that claim 400 lives and devastated villages, towns, highways and farm lands in 8 states is better understood from the perspective of fluvial flooding that cut across three river basins including Upper Benue, lower Benue and Lower Niger River Basin Authorities . The severity of 2012 flood impact is traceable to four factors. First is the relatively flat Benue and Niger Rivers flood plain. Secondly the cumulative effects of encroachment on fragile riparian ecosystem for farming and annual bush burning for hunting expedition. Erratic weather pattern increase high volume of rainfall within short period. The scenario is compounded by the sudden release of excess water from Lagdo dam upstream in Cameroun Republic without adequate preparation by Lower Benue River Basin Authority to warn numerous communities downstream on impending danger. On national platform there are no physical flood control measures downstream along the two major rivers (Rivers Niger and Benue) including retention dams, detention ponds and flood wall to control the characteristic fluvial flood experienced on the

agriculturally suitable flood plains. Regional developmental control on fragile flood plain landscape is neither articulated to restrain construction and farming activities. Change in flood plain land cover patterns, increased size of impermeable surfaces in low lying settlements, deteriorated hydraulic properties of rivers, absence of institutional framework and climate change aggravated the Rivers Benue and Niger flooding process.

Pluvial flooding in Nigerian cities is unprecedented in the last 40 years. This is not unconnected to climatic anomalies especially severe rainfall, inefficient urban drainage system, poor soil infiltration capacity enhanced by compaction and hard surfaces, inefficient urban planning development control departments, unabated informal settlement on sensitive flood plains and speculative developers encouraged by developmental sharp practices on fragile landscapes (Nkwunonwo , 2015 & Chiadikobi, *et al*, 2011). The crux of the matter is that urbanisation in Nigeria has never been accompanied by corresponding strategies that respect environmental dignity. This is not only dignity of healthy urban ecosystem but also that of symbiotic human system.

4.2 Flood Risk Strategy
Strategic frame work for flood risk management is built on the concept of flood risk management (Kobayashi and Porter, 2012). It looks at three interacting instruments namely institutional framework, planning process and safe guards to mitigate adverse impacts. Institutional framework as the most desired foundation is hinged on effective legislation, policy statements and structural organization with required technical skills.

Planning process are implemented measures that safeguard lives, private assets, public infrastructures and contextual ecosystem. Flood Risk Strategy focus on identifying different types of flood prone areas on either national, state, local government or city scale. Since such areas disrespect geopolitical boundaries it is necessary to classify them as Local Flood Districts. Suffice to mention that no two Local Flood Districts are the same. While flood in one area is pluvial, it may be tidal in another and fluvial in yet another. In most cases it may be a combination of two or all of the three types. The production of Flood Risk Management Strategies is better led by a central administrative body (Flood Risk Management –Scotland, 2012). If the proponent of Flood Risk Management is a Federal Government, then one of the environment related agencies or ministries takes the responsibility for National Flood Risk Management Strategy. If the project initiator is from a State Government the similar body will be in charge of State Flood Risk Management.

4.3 Flood Risk Plan
Flood risk Management Plan identifies hazards and risks from rivers, the sea, surface water, groundwater and reservoirs especially dams. It equally define show governmental flood regulatory bodies engage local people in a 'flood district' to manage flood risks. Each identified "local flood district" demands proper analysis, synthesis and solutions influenced by sustainable policies, strategies, available technology and funding. In effect these are areas for the production of flood risk management plans. Delineation of 'local flood districts' takes account of river catchment

boundaries, adjoining brackish wetlands to creeks and lagoon formations, urban boundaries, Local Government Council boundaries, State and coastal influence as critical variables. Each Local Flood District requires the production of local flood risk plan. Flood risk plan is a very important physical document defining local flood district. Flood risk map should be able to identify most vulnerable flood area and estimate the number of people that will be affected by floods in a particular district. Flood risk Plan document defines who the stakeholders are on national, regional and local scales. While inter-ministerial collaboration at Federal and State level provide opportunities for various units to compare notes on policy generation and implementation strategy; local district focus on implementation of such policies.   Local districts stakeholders may include Local Government authorities, State Government, Drainage Department in Ministry of Environment, highways authorities, Inland Waterways, Coast Management Department, corporate bodies, community base organizations and individuals. Choice of governmental agency to be saddled with the preparation of Flood risk plans should consider Federal or State government ministerial influence on watershed management, coastal zone management and waterfront development authority. At Federal level River Basin Authorities stand at prime position to lead in generating National Flood Risk Management Plan

5.0 Framework for Collaborative Flood Risk Management Planning
There is an urgent national consciousness that sustainability is more than a cliché. It is a way

of thinking to safeguard finite earth resources in our localities. Collaborative flood risk management demands a clear-cut understanding of probable locations for future flood occurrence and necessary principles and strategic actions to reduce the impact without moving the problem to other geographical locations. This philosophical approach to flood planning and management provide a window for efficient investment of public fund and engagement of appropriate actions at points of greatest risk. On this platform flood risk management is not tackled on political administrative boundaries basis but within natural boundaries of river catchments that often disrespect political boundaries. Typical example of absence or poorly administered flood related International Law of Common is the 2012 Lagdo Dam management process upstream Benue River in Cameroun Republic. Sudden release of excess water from the dam compound the fluvial flooding experienced in Rivers Niger and Benue flood plains downstream. Ajide (2012) traced this action to vagueness of "stipulations of Article III, paragraph 3 reached during Session 5 of the 2011 Nigerian-Cameroun Joint Commission" on the international management of the 25-year-old Lagdo dam.

Uncoordinated and poorly managed cooperation between Ogun River Basin Authority, Lagos and Ogun States on the release of water from Oyan Dam upstream Ogun River to Lower Ogun River Basin is a local example. The two States, like other states in the federation, within the same river basin should possess legally binding documents bearing in mind docility of River Basin Authorities. As noted by Kobayashi and Porter (2012) flood risk management planning should

ordinarily constitute the hub of River basin master planning.   That is, flood risk management policy development should focus on making pragmatic decisions on associated risk and defined flood prevention, protection, preparedness, response and recovery strategies and measures within watershed framework or river basin system. This is not so in Nigeria for now. It is advisable that the various River Basin Authorities should re define policies, goals and objectives to accommodate the prime position of flood risk planning in addition to water resources management, rural development, renewal energy, food security and sum total natural resources sustainable planning towards socio-economic empowerments of the people.

Flood risk policies demands the definition of acceptable risk and how to achieve it; basic policy for river or coastal plain improvement; and river or coastal plain improvement master plan. Such policies take cognisance of comprehensive flood control measures on Federal, State, River Basin, and Local District scales in the achievement of national flood risk management. Collaboration on each of these scales should be seen horizontally and vertically with the goal of productive flood risk management (Figure 1). While vertical addresses participatory agreement between the three-tier governance structure, horizontal refers to collective inputs by stakeholders at Federal, State, Local Government and local flood risk zones.
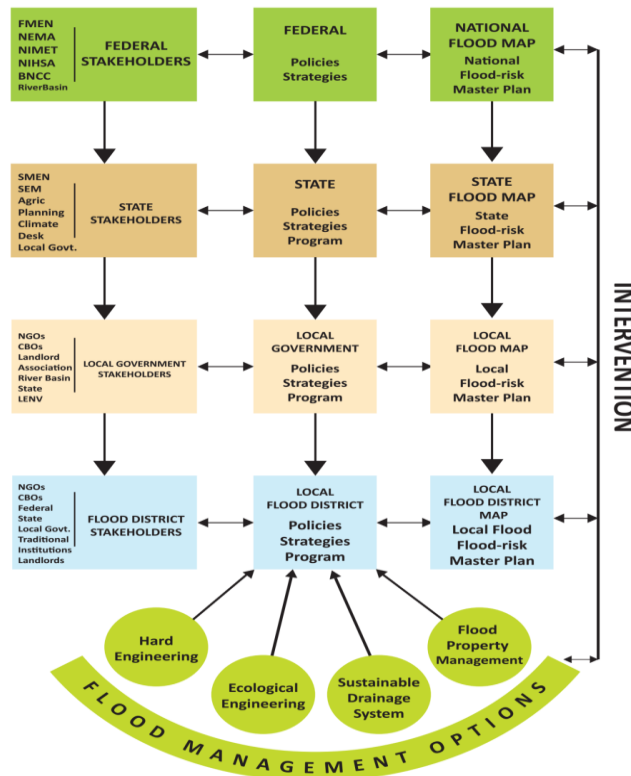

Figure1: Propose National Framework for Collaborative Flood Risk Management Planning

Expectation from each of the three-tier governance level and the grassroot local flood district differ. It includes and not limited to the following:

1. Expectation from Federal Government within collaborative sustainable flood risk management includes generation of comprehensive national flood risk management strategy with defined national flood risk management maps.

2. It is the responsibility of each State Government and Local Government to closely study Federal flood policy documents and domesticate them appropriately. State Government expectation include provision of specific State flood risk management strategy, flood risk management maps showing detailed local flood districts on bioregional basis. Generation of local flood districts should ordinarily fall within the domain of Local Government. This provides opportunities for inventory of stake holders across geopolitical boundaries. Much more is the cooperation with adjacent State Government on River Basin basis.

3. In the absence of City government, State government should consider the preparation of city flood prone areas highlighting topographic features, vegetation and current physical developmental activities. Identification of stakeholders beyond local flood risk area is equally important

4. Stakeholders in particular local flood district should be all encompassing including traditional institution, community-based organisations, NGOs, and Land Lord associations. Soft engineering flood management, sustainable drainage systems and flood property management options are better executed at this scale.

6.0 Flood Management Options

The choice of flood management to mitigate flooding at local flood district is influenced by flood type, flood plain ecological characteristics and available finance. Flood mitigation looks at two broad categories namely structural measures and non-structural measures. Structural measures are hard engineering flood control options. Non-structural flood management options include flood warning, land-use planning, public awareness and emergency responses. In most flood risk management both structural and non-structural measures are engaged depending on flood sources, characterise and type of impacts.

6.1 Hard Engineering Option

Dam and reservoir construction are age old structures built along the course of a river in order to control the amount of discharge. Water is held back by the dam and released in a controlled way. The water can then be used to generate hydroelectric power, for recreation purposes and agricultural. Building a dam can be very expensive, and sediment is often trapped behind the wall of the dam leading to erosion further downstream. Settlements and agricultural land may be lost when flood gates are opened to discharge excess water. Breakwaters and sills are the most common structures that are built offshore. Breakwaters are structures placed offshore to dissipate the energy of incoming waves. The dissipation of

wave energy allows drift material to be deposited behind the break water. The amount of deposition depends on the site characteristics and the design of the breakwater. Because breakwaters are located beyond the surf zone, they are exposed to large wave conditions and arc therefore usually massive structures. They are frequently constructed of rock with an armour stone or concrete armour protective layer. Other hard engineering flood management options include building floodwalls, levees, channelization, bridges, culvert, and construction of embankments.

6.2 Ecological Engineering Flood Management Option

Adopted conventional planning to mitigate flooding over the years had been 'hard' engineering solutions including retaining walls, massive concrete channels, dams, levees and sea walls.As noted by ProAct (2008), they are very expensive and in certain cases had not worked as designed. In others, they are accompanied with unforeseen negative consequences. This was the case of Bagauda dam disaster that washed away 18,000 houses and rendered 200,000 people homeless in Kano (NEST, 1991). In recent years, consideration for the use of less expensive ecological engineering alternative to reduce the threats from many natural hazards is on the increase. It is a 'soft' engineering approach, where natural ecosystems or enriched planted degraded wetlands are used as buffers against many flood related natural hazards (MEA, 2005). Research works have shown that partially destroyed mangrove forest by storm surge will regenerate naturally, while the maintenance cost for a dilapidated concrete sea wall remains high (ProAct, 2008). Floodplain

ecosystems including mangroves and riparian vegetation reduce the magnitude of storm surges by absorbing storm energy, reducing flow depths and velocities, and enhancing sedimentation. The principle is that the greater the friction a wave encounters the greater the energy that will be dispersed. ProAct (2008) study shows that a 50 meter band of Avicennia species reduced a one meter high wave to just 0.3 meter while a 100 meter buffer of Sonneratia forest reduced wave energy by up to 50 percent. Protected ecosystem constitute coastal and flood plain defence lines safe guarding lives, properties and grey infrastructures. Soft engineering technique fall within a biomorphic flood control planning approach refer to as Sustainable Drainage Systems (SuDS).

6.2.1. Sustainable Drainage Systems (SuDS).

Sustainable Drainage System is a philosophical change in how urban storm water is managed to a more efficient nature based integrated approach that closely looks at the issue of water quantity, water quality and the wellness of city wetlands. It is fitting human cultural system in natural ecological system. The philosophy behind SuDS is to mimic natural drainage processes by controlling flood risk at source. It is dependent on capturing rainwater, enhancing evaporative and infiltration processes close to source and directing the remaining to the nearest watercourse at pre development rate and volumes. Cities that engage sustainable drainage system testify to its ability to minimise the impacts of urban runoff by capturing runoff as close to source as possible and then releasing it slowly. In addition to run off control mechanism SuDS reduces storm water pollutants through sedimentation and

natural bioremediation. SuDS as urban storm water control techniques is in four broad categories namely control of rainwater at the source; Infiltration trenches and filter drains; Swales and basins; and Ponds and wetlands. Onus is on the environmental consultant working with the stakeholders and government regulatory body to clearly state which of these categories suit studied local flood district on city, region or river basin scale.

6.2.2 Flood Property Management Options

Flood property management and response management options collectively constitute adaptation measures towards living in flood prone areas. Building systems design standards; construction, maintenance and development control standards in flood prone areas; land use zoning and traditional agricultural standards in flood plains; flood welfare package system; and traditional sand bags are still commonly used to halt flood waters and defend properties. Adaptation measures believe flooding is one of those ecological processes that man must learn to live with. This mind set is true and necessary in the face of global warming and the associated climate change phenomenon. Four categories of adaptation measures may be explored including flood environmental education programs; proactive planning and people driven developmental control; and effective emergency plans.

6.2.2.1 Proactive Planning and People Driven Developmental Control

Recent developments have shown that flooding is a natural phenomenon that sometimes disrespects some of the most effective legislation and strategic action plans.

However its destructive impacts can be brought to a manageable level through increase preparedness and proactive managerial flood risks awareness. Sustainable land use planning demands avoidance of high risk vulnerable terrains; land use management with minimal flood risks; and sensitive management of land use activities in flood prone areas. Development control is a vital strategy to achieve ordered built environment. Such ordering is dependent on realistic targets, standards and specifications that address anomalies that may hinder urban harmony. Flood risk development control looks at four areas to enhance planning and design with flood natural process. First area looks at proactive planning and development control to utilise the environment to store water, restoring and expanding marshes, or sustaining beaches and shingle ridges to dissipate wave energy and reduce risks to communities. It is adherence to stipulated and approved sustainable drainage system in a city, state or river basin. The second is proactive planning and development control to reduce the impact of new developments on flood plains and sensitive coastal areas prone to regular tidal influences. Included are making developers to conform to standard setbacks from flood prone areas. The third emphasis is speeding up the flood recovery process by incorporating greater resilience measures into the design of new buildings and retro-fitting at flood risk landed properties. Also included are historic buildings, landscapes and districts that need flood resilience measures. This follows periodic editions of building codes and city codes influenced by flood related activities. Development control regulatory offices must then enforce expected foundation that can

support super structure in a defined geographic area. Planning, design and construction of buildings which have in built capability to perform under the influence of flooding activities without noticeable failures and loss of functionality during extreme events are necessary as high population growth rate push urban settlements to fragile landscapes

6.2.2.2 Response Management Options- Effective Emergency Plans

Recent floods in Nigeria made visible the role of emergence organisations. Flood environmental education; Flood warning system; Emergency Evacuation and movement in flood prone areas are the primary response to flood disaster. National Emergency Management Agency, State Governments equivalent, Police, military, private sector, Red Cross and NGOs intervention in 2012 flood is limited to rescue activities that focused on temporary relocation of displaced people to various camp sites and provision of succour for bereaved families. The severity prompted the Federal Government to "release of ₦17.6 billion as direct financial assistance to the affected States and some Federal agencies responsible for disaster management" (Guardian Newspaper, 2012). Often two areas are of interest. The first ensures that emergency plans are in place. The second ensures that effective recovery arrangements are in place.

6.2.2.3 Flood Environmental Education Programs

Flood environment education is getting flooding as an inevitable natural process that has the capacity to wreak havoc, into the consciousness of the people and emphasizing the right way to live with it. These awareness programs often focus on three areas. First is an environmental education awareness program on flood and coastal erosion risks among individuals, institutions and communities. The second is practical and legible warning systems for flooding events and ocean surges in local flood districts. This is particularly important in communities with high illiteracy index. The third is advisory support for individuals and communities to build resiliency to flood events.

7.0 Conclusion

Protection against flooding should not be seen as Government programme to award contracts. Rather everybody must be responsible for protecting properties and lives from menacing impart of flooding. This mind set enhances community participatory approach to flood control. Community on this platform is not village but a broader definition of stake holders either on national platform, state, local government, local flood district or city scale. Successful Flood Risk Management Strategy and Flood Risk Management Plan for Local Flood District demands proper definition of stakeholders; their roles in flood risk management and action delivery expectations. Stake holders in Local flood district may include Federal Government ministry and agency; State Government counterpart; Local Government Council Area; Chamber of commerce and Industries; Corporate bodies; traditional Institution; Community Base Organisation and Non-Governmental Organisations; and every member of the community.

The paradigm shift from flood protection to flood risk mitigation is justified by recent climatic anomalies and uncoordinated

anthropogenic approach to environmental developmental issues. Flood risk management is people driven and based on bottom-up as against overbearing individual professional or regulators solutions to community issues. There is an urgent need for a national flood risk picture across Nigeria. Collaborative flood risk management approach is a proper definition of public responsibility, sharing of goals, pooling resources and energy together to fight a common devastating natural event. This perspective is based on the fact that flood and flooding is no respecter of people, geopolitical boundaries, party affiliations, economic class and religious belief systems. Sustainable management within the context of flood risk management focus on the safety and the wellbeing of the people; the health of ecosystem; minimum waste conscious use of finite resources; strategic security of current and future generations from devastating risks; and improvement of community resiliency, livelihood pattern and liveability. This gives credence to the need for a national thought pattern that decides on a right vision of flood risk management to trigger equitable growth, maximise wellbeing of the current landscapes without denying the next generation their legal opportunity. All hands should be on deck for flood management. While Federal Government strategize on productive flood management policies, State and Local Government are expected to domesticate the same procedure without respect to geo political boundaries. It calls for horizontal and vertical synergy of regulatory bodies, professional bodies, research institutions and local people.

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