

ARCHISEARCH

INTERNATIONAL JOURNAL OF ARCHITECTURE AND ENVIRONMENT

ISSN 2141-9019

2017

Volume 7, Issue 1



ARCHISEARCH

International Journal of Architecture and Environment

Volume 7 Issue 1



Published by The Department of Architecture, University of Lagos
Lagos, Nigeria

© 2007

Editorial Board
Dr. Abdullahi Abubakar
Dr. J. J. Maina
Dr. R. B. Tukur
Arc. R. H. Ibrahim

Chairman, Editor-in-Chief
Secretary, Associate Editor
Associate Editor
Assistant Secretary

Volume 7 Issue 1 (2017) ISSN 2141-9019

Cover image:

Exterior render by Kharbal Kaltho
(kjkaltho@gmail.com, 0703 975 5565)

Cover design and journal layout:

J. J. Maina

This publication is typeset in Times New Roman font size 12 at the Department of Architecture, Ahmadu Bello University, Zaria. Articles published in this journal represent neither the views of the Editor-In-Chief nor the Department of Architecture, Ahmadu Bello University. Responsibility of opinions expressed and accuracy of facts rests solely with individual authors.

Copyright© 2017

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means electronic, mechanical or otherwise without the written permission of the publishers.

ARCHISEARCH is an international peer reviewed journal dedicated to the publication of high quality original research towards the advancement of theoretical and practical aspects of the built and natural environment. The journal disseminates academic research findings on issues that deal with architectural research and development, environmental problems, planning, design, management and construction regarding architectural science, education and technology. The journal provides a forum for discourse and scholarship between teachers and researchers in Architecture and the Built Environment.

Papers addressing the following themes are particularly invited:

- Innovative trends in Architecture, Planning, Construction and Design
- Student, Staff and Practice related perspectives on Design, Planning and Construction education
- Innovative learning environments
- Sustainable Architecture
- Interdisciplinary studies and collaborations in the Built Environment
- Sustainable technologies application and energy related studies in design
- Landscape and Urban studies
- Culture, Design and Architecture
- Entrepreneurship and Business opportunities in Design, Planning, Construction and Architecture
- BIM, Construction and Project Management

GUIDE FOR AUTHORS

Manuscripts must be written in British English, typed on one side of A4 (230 x 210mm) sheets with 250mm margins. Papers should be between 6,000-8,000 words inclusive of references.

Papers must strictly adhere to the following to be eligible for assessment:

- Title, author's full names (first, middle and surname last), institutional affiliation and corresponding author's email
- An Abstract not exceeding 250 words providing the purpose, methodology, significant results, conclusion and implications of the research/study findings. The abstract should clearly state why the research is important particularly to those not necessarily in that field. Also provide at least **5 keywords in alphabetical order**.
- Introduction outlining the Background to the study; Problem statement; Aim, objectives, hypothesis, premise or research question(s) as well as organization of paper
- Literature review
- Methodology/research instruments
- Results/Findings and Discussion
- Conclusion, Acknowledgements and/or Appendices
- **References according to the latest APA style**

SUBMISSION INSTRUCTIONS

Authors should submit papers electronically to the **Editor-in-Chief** and Secretariat via the journal email address provided below:

archisearchjabu@gmail.com

Submissions should be accompanied by a scanned proof of payment/teller(s) of **N6,000** non-refundable assessment fee payable to the Journal account number provided below:

Account name: ARCHISEARCH Journal
Account number: 310 5096 516 (First Bank Plc.)

EDITORIAL ADVISORY TEAM

Professor H. T. Sa'ad
Department of Architecture
Ahmadu Bello University, Zaria Nigeria

Professor E. A. Adeyemi
Department of Architecture
Covenant University, Ota

Professor S. Zubairu
Department of Architecture
Federal University of Technology
Minna

Professor M. M. Garba
Department of Building
Ahmadu Bello University, Zaria
Nigeria

Professor K. Bala
Department of Building
Ahmadu Bello University, Zaria Nigeria

Professor W. B. Qurix
Kaduna State University
Kaduna

Professor U. A. Zanzan
Department of Architecture
University of Jos, Nigeria

Professor O. A. Olotuah
Department of Architecture
Federal University of Technology, Akure,
Nigeria

Professor J. B. Kaltho
Department of Urban and Regional
Planning
Abubakar Tafawa Balewa University,
Bauchi

Dr. A. S. Salisu
Department of Architecture,
Ahmadu Bello University, Zaria

Dr. M. D. Ahmed
Department of Architecture
Ahmadu Bello University, Zaria Nigeria

Professor M. L. Sagada
Department of Architecture,
Ahmadu Bello University, Zaria

Dr. J. O. Popoola
Department of Architecture
Ahmadu Bello University, Zaria
Nigeria

Professor A. Adamu
Department of Urban and Regional
Planning
Ahmadu Bello University, Zaria

Professor A. D. Ibrahim
Department of Quantity Surveying
Ahmadu Bello University, Zaria Nigeria

Dr. H. T. Kimeng
Department of Architecture
Ahmadu Bello University, Zaria

Dr. S. N. Oluigbo
Department of Architecture
Ahmadu Bello University, Zaria

Dr. S. B. Garba
Department of Architecture
University of Qatar, Doha
UAE

Professor T. Arayela
Department of Architecture
Federal University of Technology,
Akure
Nigeria

Dr. Y. M. Ibrahim
Department of Quantity Surveying
Ahmadu Bello University, Zaria

Professor O. O. Ogunsote
Department of Architecture,
Federal University of Technology,
Minna, Nigeria

Dr. I. U. Hussain
Department of Architecture
Abubakar Tafawa Balewa University,
Bauchi

Professor M. O. Ogunrayewa
Department of Architecture
University of Jos, Nigeria

Dr. D. Ayeni
Department of Architecture
Federal University of Technology, Akure,
Nigeria

Dr. N. E. Suleiman
Department of Architecture
Kaduna State University
Kafanchan Campus, Kaduna State

Professor J. A. Fadamiro
Department of Architecture
Federal University of Technology, Akure,
Nigeria

Table of Contents

RESIDENTIAL MOBILITY PREFERENCES AND ATTRIBUTE IMPORTANCE AMONG WORKERS IN THE COSMOPOLITAN CITY OF KANO

Hamza Babangida & Binta Fatima Yahaya 1

CARBON DIOXIDE CONCENTRATIONS AND INDOOR AIR QUALITY IN RESIDENTIAL BUILDINGS IN KADUNA METROPOLIS, NIGERIA

Buhari Mohammed Manzuma, Ikemefuna Mbamali, Andrew Mhya Stanley & Maaruf Sani 17

AN ASSESSMENT OF THE EFFECTIVENESS OF HEALTH AND SAFETY COMMUNICATION STRATEGIES IN THE CONSTRUCTION INDUSTRY

Ranti Taibat Adebiyi, Olubola Babalola & Ganiyu Amuda-Yusuf 26

VALIDATION OF INTEGRATED ENVIRONMENTAL SOLUTIONS-VIRTUAL ENVIRONMENT SOFTWARE FOR OUTDOOR AIR TEMPERATURE AND RELATIVE HUMIDITY SIMULATIONS

Bulus Markus 39

AN ASSESSMENT OF QUANTITY SURVEYORS PARTICIPATION IN THE EVOLVED ROLES OF THE PROFESSION IN THE 21ST CENTURY

Mustapha Abdulrazaq 54

GROWTH AND CHALLENGES OF URBAN SPRAWL IN SULEJA, NIGER STATE

Olusegun Owoeye Idowu, Abdullateef Iyanda Bako, Chukwudi Bernard Ohadugha, Abdulazeez Ola Abdulyekeen & Wakeel Adeyemi Raheem 63

NATURAL VENTILATION IN LEARNING ENVIRONMENTS: A STUDY OF SOME CLASSROOMS IN YOLA, NIGERIA

Olusegun Moses Idowu 79



GROWTH AND CHALLENGES OF URBAN SPRAWL IN SULEJA, NIGER STATE

¹Olusegun Owoeye Idowu, ²Abdullateef Iyanda Bako, ¹Chukwudi Bernard Ohadugha,
³Abdulazeez Ola Abdulyekeen & ²Wakeel Adeyemi Raheem

¹Department of Urban and Regional Planning, Federal University of Technology Minna,
Niger State

²Department of Urban and Regional Planning, University of Ilorin, Kwara State.

³Department of Surveying and Geoinformatics, University of Ilorin, Kwara State.

Corresponding email: alibbako@yahoo.com

Abstract

This paper aimed at examining the growth and challenges of urban sprawl in four selected peri-urban neighbourhoods of Suleja: Maje, Paulossa, Chassa and Gwazunnu. The objectives are to: examine the pattern of development; determine the factors responsible for the spread; and analyze the challenges of urban sprawl development. The data employed were from primary and secondary sources. The primary data were sourced from questionnaire administration. A systematic random sampling method was used in the selection of 320 respondents in these four neighbourhoods. The questionnaire was analyzed using descriptive method. The Google earth image maps of the neighbourhoods were downloaded and geo-referenced using ArcGIS software 10.2. The study revealed that the peri-urban areas exhibited different characteristics of urban sprawl; the proximity of the town to Abuja (64.3%), ethnicity and religion (56.5%), displacement (91.6%) strongly influenced the pattern of peri-urban development, while the challenges of peri-urban areas showed insecurity of tenure (87%), accessibility to community facilities (98.4%), lack of infrastructure (98.4%), and poor physical planning (100%). Thus, the suburbs of Suleja are increasingly spreading, therefore, participatory planning approach, and refurbishment of facilities and development of comprehensive land use planning are required for effective monitoring of development.

Keywords: Development, Growth, Urbanization, Urban Planning, Urban Sprawl.

INTRODUCTION

The world's urban areas are now home to nearly half of humankind. Kofi Annan, the former General Secretary of the United Nation in 2001 emphasized that, the world has entered into the realm of urban millennium, a period with a remarkable difference in innovations, for an irresistible urban growth (UN-Habitat, 2001; Idowu, 2015). The industrial revolution of the 18th century began the current phase of urban growth, which the world is facing in the recent time (UN-Habitat, 2001). The growth of the world population since the turn of the 19th century and particularly after the World War II has been unparalleled in the history of the world. With the increased population, the phases of urban settlements are changing rapidly, with the semi-urban areas and medium-sized towns turning into full urban town (Obateru, 2005; Idowu and Olaniyan, 2009; Idowu, 2015).

UN-Habitat (2001), presented the global report on the collective implications of the growing population of the world during the two hundred years (19th and 20th centuries) of global economic expansions. It was published that the cities which grew at less than 30 million in that century, now recorded more than a population of 3 billion at the beginning of the 21st century, with over 500 cities harbouring thousands of people. This implies that, the planet earth hosts a range of population of people across the world. Other studies also established that, the process of urban growth will, however, continue as this

century advances. The prediction is that, there will be an increasing urban agglomeration in all regions of the world by 2050 (UN-Habitat, 2008; 2011; 2013; United Nations, Department of Economic and Social Affairs, Population Division - UNDESA, 2014; 2015).

Consequently, growth is a natural phenomenon in life, therefore it is expected that cities and towns should grow (Popoola, 2014). Meanwhile, the growth of cities and towns increasingly subjected the urban environment into dramatic problems which ranges from social to physical and environmental problems. The negative implications of urbanization and urban growth are widely linked to several problems such as urban sprawl development (Durieux, Lagabrilie, and Nelson, 2008).

Urban sprawl has been used to describe a wide variety of the undesirable aspects of urban growth; it is consciously referred to as, unplanned and uncontrolled development resulting in poor and much unplanned urban fringe. There is growing concern and awareness about urban sprawl and its consequences across the world, as urban system are evolving and emerging in surprising ways (Downs, 1999; Torrens, 2006. Feng, 2009). It is agreed as one of the problems affecting the course of development, both in the developed and the developing countries.

On the perspectives of urban sprawl Torrens (2008), Liu and Jiang (2011) and Idowu (2015), however, maintained that, the term 'urban sprawl' is characterized to

INTRODUCTION

The world's urban areas are now home to nearly half of humankind. Kofi Annan, the former General Secretary of the United Nation in 2001 emphasized that, the world has entered into the realm of urban millennium, a period with a remarkable difference in innovations, for an irresistible urban growth (UN-Habitat, 2001; Idowu, 2015). The industrial revolution of the 18th century began the current phase of urban growth, which the world is facing in the recent time (UN-Habitat, 2001). The growth of the world population since the turn of the 19th century and particularly after the World War II has been unparalleled in the history of the world. With the increased population, the phases of urban settlements are changing rapidly, with the semi-urban areas and medium-sized towns turning into full urban town (Obateru, 2005; Idowu and Olaniyan, 2009; Idowu, 2015).

UN-Habitat (2001), presented the global report on the collective implications of the growing population of the world during the two hundred years (19th and 20th centuries) of global economic expansions. It was published that the cities which grew at less than 30 million in that century, now recorded more than a population of 3 billion at the beginning of the 21st century, with over 500 cities harbouring thousands of people. This implies that, the planet earth hosts a range of population of people across the world. Other studies also established that, the process of urban growth will, however, continue as this

century advances. The prediction is that, there will be an increasing urban agglomeration in all regions of the world by 2050 (UN-Habitat, 2008; 2011; 2013; United Nations, Department of Economic and Social Affairs, Population Division - UNDESA, 2014; 2015).

Consequently, growth is a natural phenomenon in life, therefore it is expected that cities and towns should grow (Popoola, 2014). Meanwhile, the growth of cities and towns increasingly subjected the urban environment into dramatic problems which ranges from social to physical and environmental problems. The negative implications of urbanization and urban growth are widely linked to several problems such as urban sprawl development (Durieux, Lagabrilie, and Nelson, 2008).

Urban sprawl has been used to describe a wide variety of the undesirable aspects of urban growth; it is consciously referred to as, unplanned and uncontrolled development resulting in poor and much unplanned urban fringe. There is growing concern and awareness about urban sprawl and its consequences across the world, as urban system are evolving and emerging in surprising ways (Downs, 1999; Torrens, 2006. Feng, 2009). It is agreed as one of the problems affecting the course of development, both in the developed and the developing countries.

On the perspectives of urban sprawl Torrens (2008), Liu and Jiang (2011) and Idowu (2015), however, maintained that, the term 'urban sprawl' is characterized to

be popular, complex and as well surrounded by controversy. The idea and early studies on urban sprawl is unanimously agreed to start from the United States of America (Hamidi and Ewing, 2014). As rightly observed by Franz et al. (2006) the discussions and researches on urban sprawl were anchored predominately in the context of the urban morphology and land use pattern in the US for a long time, but, it later spilled over to Europe and other regions of the world. Alabi (2009) and several other scholars, however, observed the variations in the degree of urban sprawl between the developed and developing countries, he accepted that there are differences in the challenges of urban sprawl all over the world. The components of urban sprawl, however, have been highly debated by several scholars in the field of urban studies; it means different things to different people. Concomitantly, it remains a hot topic attracting a considerable attention from geographers, planners and social scientists across the world (Downs, 1999; Paul and Tonts, 2005; Frenkel and Ashkenazi, 2008).

Several reports on sprawl begin with the admission that, sprawl has no definite definition, it is a value loaded term and a reference point in many planning literature (Frank, et al., 2000; Adaku, 2014). Other contentious areas in the study extend to the bottleneck associated with the characterization, measurement, causes and consequences (Torrens 2008; Hamidi and Ewing 2014). Several authors have made several attempts to describe how urban

sprawl looks like, without a clear cut accepted features to describe it (Ewing, 1997; 2002; Burchell et al., 1998; Glaster et al., 2001). Franz et al. (2006) on the contrary, however, argued that these features describing urban sprawl are ambiguous; it's jointly reflecting the causes and consequences in the same manner it's presenting what characterized by urban sprawl, while, the existing methods for measuring urban sprawl have been contested worldwide. The entire areas still remain unresolved based on the divergent views of the scholars.

The causes of urban sprawl in the world are universal, but vary in character, impact and challenges (Oueslati et al., 2015). Urban sprawl has not only generated a series of studies and discussions in the developed countries, but also in the developing countries. For instance, in Nigeria, Mabogunje (1968), Olorunfemi (1979), Okewole (2002), Barredo, et al., (2004), Fabiyi (2006), Olujimi (2009) Alabi (2009), Aguda and Adegboyega (2013) among other several scholars have reported the sprawling nature of several urban centres in Nigeria. Barredo, et al., (2004), Olujimi (2009) and Aguda and Adegboyega, (2013), have attributed the rapid increasing urban agglomeration in Nigeria to the prevailing inadequate institutional framework, economic growth and population increase. The unprecedented demographic changes have seriously laid huge challenges on the peri-urban space, mostly in the development of residential

accommodations (Olujimi, 2009, Wapwera et al., 2015).

The proximity of the town to the Federal Capital of Nigeria, place it at advantage for numbers of people to reside and as well works in the Federal Capital Territory, Abuja. However, the expansion of Suleja is not only exhibiting the common urban challenges like, transportation and traffic problems, waste generation and amongst others, but, has witnessed the uncoordinated development at the fringe area of the town. This study examines the factors responsible for the pattern and the problems facing the peri-urban residents.

Study Area

Suleja, lies on latitude $7^{\circ} 31'N$ and longitude $7^{\circ} 58'E$. The town was formerly referred to as Abuja prior to the time of the establishment of the Federal Capital Territory. The town is situated on the Iku

River, a minor tributary of the River Niger at the Abuchi Hills and lies at the intersection of several roads. The Local Government reform of 1976 facilitated the creation of the Suleja Local Government Council from the defunct Abuja Native Authority. The Local Government Council shared boundary with Gurara and Tafa Local Government Councils in Niger State and Gwagalada in FCT. The Local Government land expanses for about 153.4 sq.km land coverage (Fig. 1). This study is centred on four peri-urban neighbourhoods in Suleja. This consists of Maje in the Northern part of the Local Government, Chassa and Paulossa in the Southwest region of the town and Gwazunu in the Eastern part of the town (Fig. 2). The choice of these areas is based on the nature of land and pattern of housing development in Sulaja.

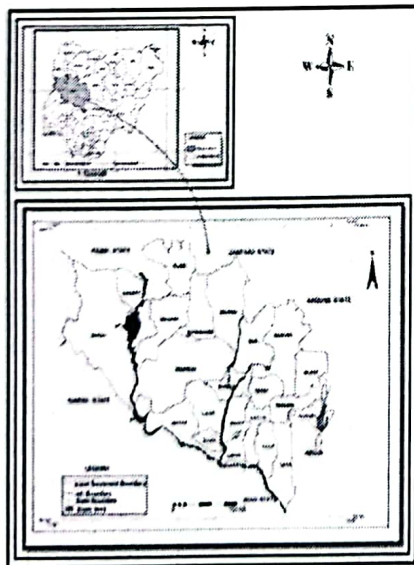


Figure 1: Map of Niger State

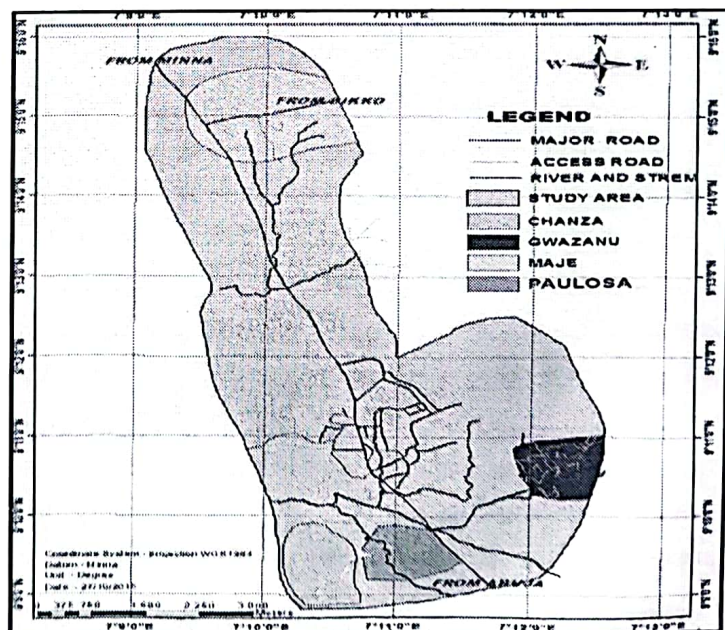


Figure 2: Selected Neighbourhoods for the study.

METHODOLOGY

This study employed both primary and secondary sources of data collection. The primary data was sourced from questionnaire administration. In all, 320 copies of questionnaire were administered on the peri-urban residents across the four neighbourhoods (Maje, Paulossa, Chassa and Gwazunnu). Based on the fact that population of the neighbourhoods were not available, house count system was adopted in order to estimate the population of the neighbourhoods. Using an average of household size of 6 per family, a total of 3,200 households were estimated for the four neighbourhoods. For this purpose, 10% was adopted as the sample size. The systematic sampling method was used in the questionnaire administration, due to the streets and lanes that can be accessed. The first building in each lane was selected randomly, while subsequent samples were selected at an interval of eight buildings. The data were analyzed using descriptive method of data analysis. The secondary data comprise of the Google Earth image data of the four neighbourhoods. These were downloaded via internet and were geo-referenced. The existing buildings and other features such as roads and rivers were digitized using ArcGIS 10.2 software.

RESULTS AND DISCUSSIONS

Residential Land Development and Pattern in Peri-urban Areas of Suleja

The digitization of the google earth image of the selected four neighbourhoods

revealed the residential land and pattern of development in Suleja peri-urban areas. For instance, Maje, covers 567,246.01m², the area exhibited a continuous pattern of development it shows an intense development of unused land and forming unbroken fashion of development. The settlement is, however, supported by major access linking Kaduna – Abuja road and bounded by the Minna – Suleja regional road (Figure 3), it developed outward spread of low density in ribbon low pattern along major suburban highways.

Paulossa covers 548,017.88m² in the area coverage and exhibited clustered pattern of development. The development pattern in the area has been affected by the nature of the terrain of the area, reflecting a series of environmental challenges affecting the community. Due to the natural feature (river and mountain) the settlement is bounded westward by river and eastward by the Suleja – Abuja road. These features bunched the growth and development of the neighbourhood tightly, minimizing the amount of land for development of residential or nonresidential units (Fig. 4).

Chaza neighbourhood covers about 49,361.87m² area. This peri-urban neighbourhood is a low density area surrounded by open spaces (Fig. 5). It exhibits a continuous pattern of leap frog development and it has the potential to extend toward any direction. Gwazunu, the fourth neighbourhood has the total coverage of 638,277.60m². The settlement

is characterized as clustered pattern, bounded by roads and rivers

This analysis implies that, the pattern of development exhibited in the peri-urban area of Suleja (clustered or continuity

growth), were based on the nature and configuration of the terrain of the area. In most cases, this area is a relatively unstable land-form, this determines the pattern of the development which any of these areas are exposed to.

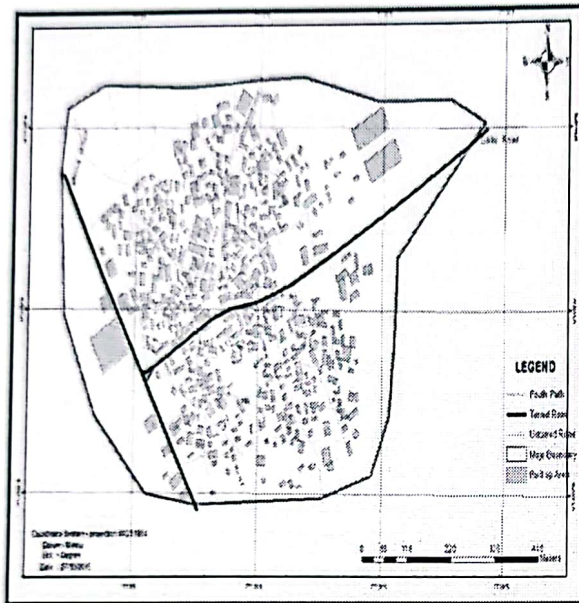


Figure 3: Development Pattern of Maje Paulossa

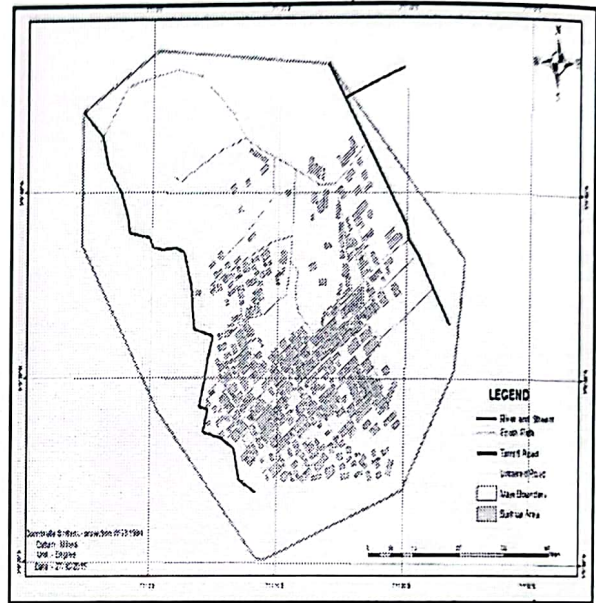


Figure. 4: Development Pattern of Chassa

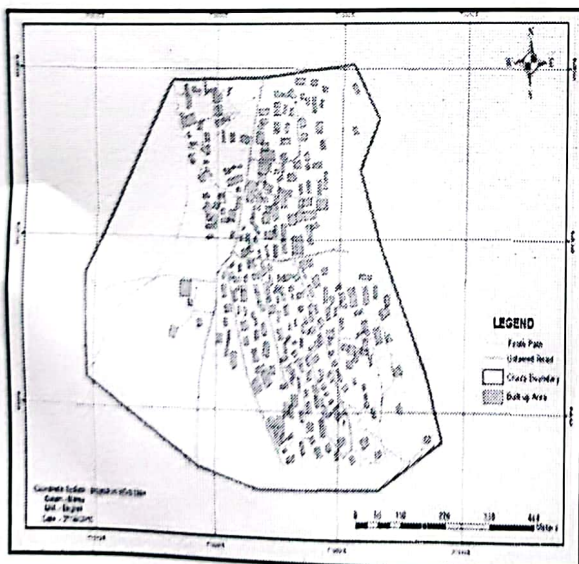


Figure 5: Development Pattern of Chassa

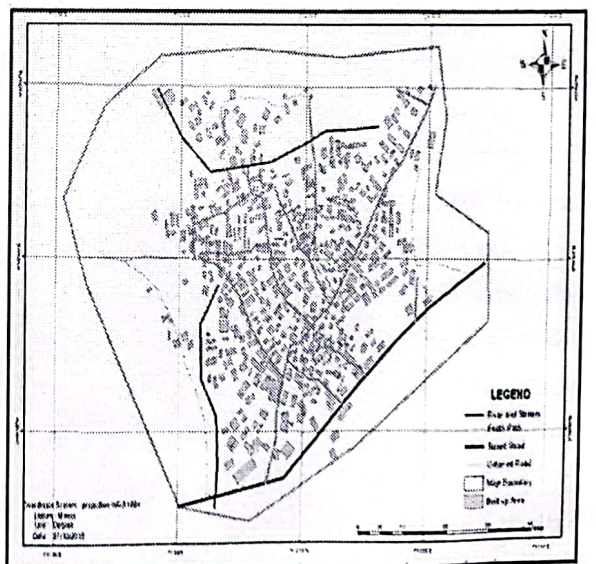


Figure 6: Development Pattern of Gwazunu

is characterized as clustered pattern, bounded by roads and rivers

This analysis implies that, the pattern of development exhibited in the peri-urban area of Suleja (clustered or continuity

growth), were based on the nature and configuration of the terrain of the area. In most cases, this area is a relatively unstable land-form, this determines the pattern of the development which any of these areas are exposed to.

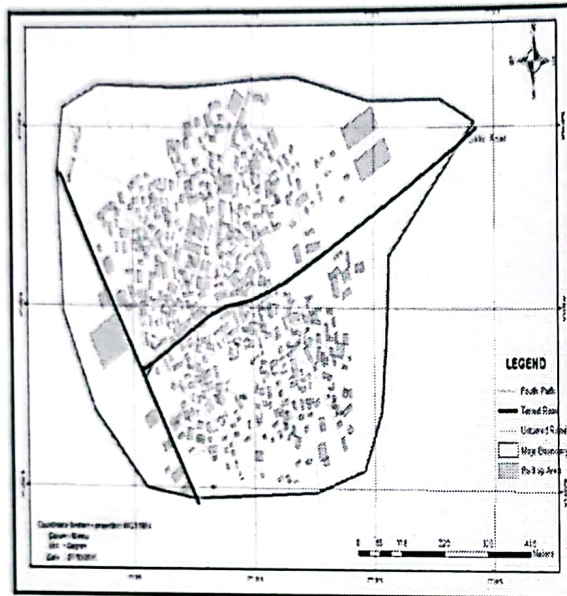


Figure 3: Development Pattern of Maje Paulossa

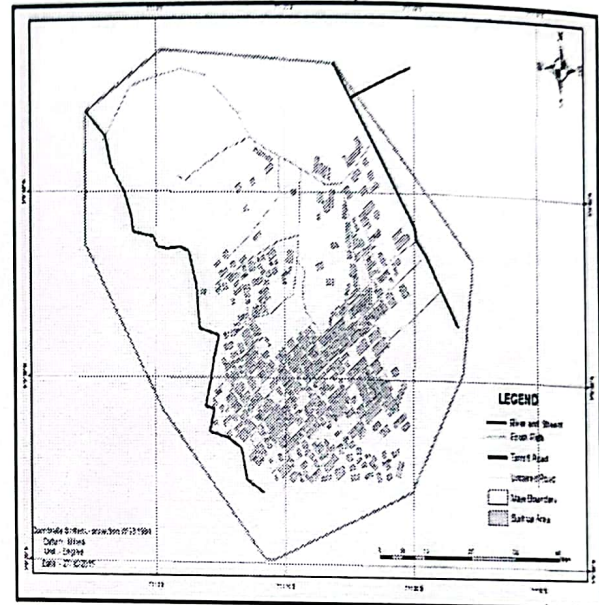


Figure. 4: Development Pattern of Chassa

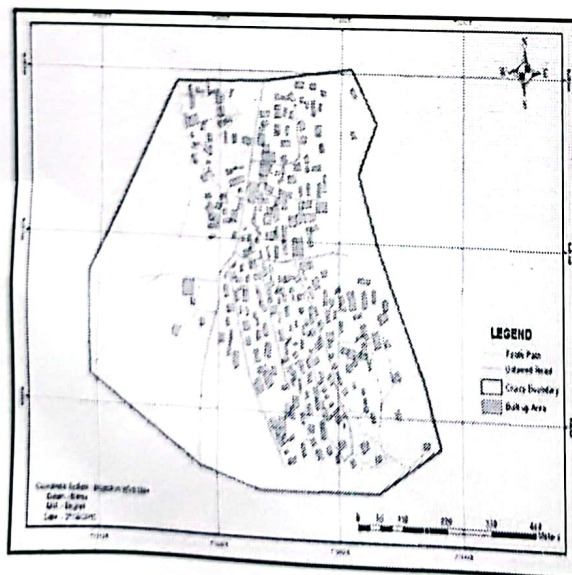


Figure 5: Development Pattern of Chassa

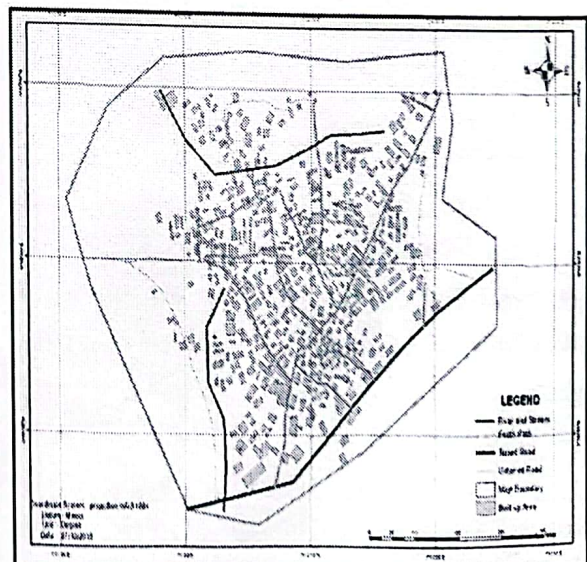


Figure 6: Development Pattern of Gwazunu

Factors Influencing Peri-urban Sprawl in Suleja

The factors examined are the proximity of the location to the Federal Capital Territory, Abuja, the price of land, the rate of growth of the selected neighbourhoods, ethnicity and religion and the displacement of the residents from their previous areas due to conflict. Table 1 reveals that, 100% of the respondents agreed with location of the neighbourhoods and their proximity to the FCT as a factor that contribute to urban sprawl, this is also the same with the price of land. Majority of respondents (56.5%) admitted that population increase naturally

influence the growth of Suleja peri-urban areas. Ethnicity and religion has 98.1%, while 90% of the respondents subscribed to the growth as a result of displacement of some people from the FCT and the occurrence of civic conflict and disturbance in some parts of Suleja. Furthermore, 96.1% of the respondents disagree to the fact that infrastructural provision has contributed to the growth of the areas, as well as the proximity of their place of work to where they live. Nevertheless, 99.4% of respondents maintained that, high rent of housing accommodation contributed to the expansion of Suleja.

Table 1: Factors Contributing to Urban Sprawl Development in Suleja

S/No.	Factors	Degree of Influence				
		SA	A	U	D	SD
1	Proximity to Abuja	198(64.3%)	110(35.7%)	-	-	-
2	Cheap land for building	219(71.1%)	89(28.9%)	-	-	-
3	Natural population growth	-	174(56.5%)	20(6.5%)	-	114(37.0%)
4	Ethnicity/Religion	174(56.5%)	128(41.6%)	6(1.9%)	-	-
5	Displacement due to conflict	119(38.6%)	163(52.8%)	13(4.2%)	-	13(4.2%)
6	Availability of infrastructure	-	-	12(3.9%)	223(72.4%)	739(23.7%)
7	Proximity to place of work	-	11(3.6%)	1(0.3%)	156(50.6%)	140(45.5%)
8	High rent of housing accommodation at the city centre	145(47.1%)	161(52.3%)	2(0.6%)	-	-

Note: SA= Strongly Agree; A=Agree; U= Undecided; D= Disagree; SD= Strongly Disagree

Source: Author, 2015

Challenges of Peri-urban Sprawl Development in Suleja

The challenges of peri-urban sprawl development in Suleja are; problem of tenure on landed property, insecurity accessibility to public facilities, lack of infrastructure and poor physical planning

strategy. Table 2, revealed that, about 87% of the respondents agreed that insecurity of tenure on the land acquired by the residents' poses a serious challenge for the people living in the sprawled area. Similarly, insecurity of life and property within the core area (56.2%) influences the development of the peri-urban area.

Majority (98.4%) of the respondents attested that access to community facilities remains a common challenge affecting the residents of the peri-urban areas. Lack of public infrastructure (98.4%) was a major challenge affecting the peri-urban areas

and their residents. Poor physical development of the area was identified by all the respondents of the peri-urban area as one of the major challenges affecting peri-urban residents in Suleja.

Table 2: The Challenges of Urban Sprawl Development in Suleja

S/No.	Challenges	Degree of Significance				
		SA	A	U	D	SD
1	Insecurity of tenure	14(4.5%)	254(82.5%)	10(3.2%)	2(0.6%)	28(9.1%)
2	Insecurity of life and property	136(44.2%)	37(12.0%)	5(1.6%)	50(16.2%)	80(26.0%)
3	Accessibility to community facility	197(64.0%)	106(34.4%)	5(1.6%)	-	-
4	Lack of infrastructure	138(44.8%)	165(53.6%)	5(1.6%)	-	-
5	Poor physical development	114(37.0%)	194(63%)	-	-	-

Note: SA= Strongly Agree; A=Agree; U= Undecided; D= Disagree; SD= Strongly Disagree

Source: Author, 2015

The Physical Characteristics of the Neighbourhoods

The physical characteristics of the selected peri-urban neighbourhoods (Maje, Paulossa, Chassa and Gwazunnu) are revealed in Table 3. The physical features investigated are layout plan, the types of building, which range from traditional to modern or owners' occupied houses. The building conditions in the peri-urban

neighbourhoods are of different categories and are inadequate, similarly, the condition of accessibility connecting most of the houses in the peri-urban areas are untarred, poor and inadequate. Based on the infrastructure such as water and power supply, the finding shows that the residents of the areas relies more on the water vendors and the well water, while the electricity supply to the neighbourhoods are irregular in supply.

Table 3: Physical Characteristics of the selected Peri-urban Neighbourhood

Features	Maje	Paulossa	Chassa	Gwazanu
Neighbourhood Layout	Unplanned residential landscape, presence of other complimentary land use like commercial area and industrial areas.	Unplanned residential area and presence of other complimentary land use.	Unplanned residential area and presence of other complimentary land use.	Unplanned residential area and presence of other complimentary land use.

Building Type	The buildings presence ranges from traditional houses to modern '. There are mixed use of buildings especially for the buildings along the major highways.	The buildings in this area are predominantly modern, and are mostly owners occupiers houses, with just few of them as tenement	The buildings in this area are predominantly traditional; it's mostly owners' occupiers' houses.	The buildings in this area are predominantly modern, and are mostly owners occupiers houses, with just few of them as tenement
Building Condition	The buildings in this area are of different categories, mostly, the houses are inadequate.	Buildings in this area are of different categories, reflecting the status of the residents of the area.	Buildings in this area are of different categories, reflecting the status of the residents of the area.	Buildings in this area are of different categories, reflecting the status of the residents of the area.
Condition of Access	Apart from the major access road, all other roads connecting houses were untarred and are in poor condition	The access roads are fair within the neighbourhood	The access roads are poor within the neighbourhood	The access roads are fair within the neighbourhood
Water Supply	Water supply to this neighbourhood is inadequate, as quite number of the population relies on water vendors and well	The neighbourhood was not connected to water mains.	The neighbourhood was not connected to water mains.	The neighbourhood was not connected to water mains.
Electricity Supply	Not regular	Not regular	Not regular	Not regular

Source: Author 2015.

Functionality and Satisfaction of Existing Facilities

In the survey conducted, the existing facilities (both community services and utility) include; health, education, water supply, electricity supply, organized waste dump sites and community centre. Based on the study on the functionality of the

facilities (Table 4); 100% of the respondents attested that, both the health care facilities and the educational facilities were functional. Over quarter of the respondents agreed to the fairly performance of the water supply and educational facilities, while 73.7% and 72.7% supported that water supply and transformers available are not functional.

Also, 97% and 100% of the respondents admitted that, the refuse disposal and community centre were not functional.

Table 4: Functionality of the Existing Facilities

Facility	Level of Functionality		
	Highly Functional	Fairly Functional	Not Functional
Health facility	113(36.7%)	195(63.3%)	-
Primary school	140(45.5%)	168(54.5%)	-
Secondary school	114(37%)	195(63%)	-
Public water supply	-	81(26.3%)	227(73.7%)
Transformer	-	84(27.3%)	224(72.7%)
Disposal of refuse dumped	-	9(2.9%)	299(97%)
Community centre	-	-	308(100%)

Source: Author, 2015.

According to Table 5, all the respondents (100%) were not satisfied with public water supply and the nature of the community centre. Also, 76.3% of the respondents were not satisfied with the power supply and distribution in their area. On the health facility and community market; 19.8% and 18.2% of the

respondents were not satisfied with the services and 57.8% and 43.5% were fairly satisfied. For the educational facility, 61.7% and 66.5% of the respondents were satisfied with the condition of the primary and secondary education facilities, while 38.3% and 33.4% of the respondents were not satisfied the primary and secondary school, respectively.

Table 5: Level of Satisfaction with the available Facilities

Facility	Level of Satisfaction		
	Highly Satisfied	Satisfied	Fairly Satisfied
Health care facility		69(22.4%)	178(57.8%)
Primary school	39(12.7%)	151(49.0%)	118(38.3%)
Secondary school	46(14.9%)	159(51.6%)	103(33.4%)
Water supply			
Public power supply (Transformer)			73(23.7%)
Community centre			

Source: Author, 2015.

This analysis implies that, the basic infrastructure such as, water supply, electricity were grossly inadequate, similarly, sanitation of the peri-urban

environment remains a major concern with reference to waste deposition and management. In addition, the peri-urban neighbourhoods in Suleja lack adequate water for domestic use and for other purposes. In addition, power supply to these areas have been irregular and affecting the socio-economic activity of the area.

Impact of the Challenges of Urban Sprawl Development on Suleja Environ

The Challenges of urban sprawl development in the peri-urban of Suleja basically affects the certain areas, such as; transportation, economic and environment.

- a) **Transportation:** the challenges on transportation are enormous, as it affects the use and travelling pattern of the people using automobiles. Studies by Gordan and Richardson (1997) Glaster et.al (2001) firmly asserted this, with respect to the volume of traffic and distance travel by the residents from the selected neighbourhoods. This has increase the rate of pollution been released into the atmosphere with the use of automobile.
- ii. **Economy:** the effects of market forces are more prominent in the spread of sprawl settlements. The influence of low rental value in these suburb areas and the cheap cost of land are considered high in this study to promote the development of urban sprawl in Suleja. However, this

directly affects the provision of infrastructural facility and services by the government. Based on the household economy; the cost of travelling affects the income of the family or the individual and it invariably causes an increase in the price of commodities in the area.

- iii. **Environment:** the effects of this factor are seemingly numerous. This includes the development in the ecological unstable area, reduction of regional open space, indiscriminate disposal of wastes, increase pollution and higher energy consumption, increase runoff of storm water and risk of flooding, removal of native vegetation and ecosystem fragmentation.

Recommendations

The Findings from this study has shown that there are factors encouraging the spatial growth of peri-urban neighbourhoods in Suleja. However, the spatial expansion is observed to have a serious negative impact on the planning and land administration, malfunction of infrastructure facilities and natural vegetation depletion. The study therefore recommends thus;

1. The collaboration of the government and the neighbourhoods in the development of participatory planning approach system. The land or property title owned by the individual who reside in the peri-

urban areas be regularized. The government to engage in the development of service plots, which will ensure and control haphazard development within the peri-urban areas.

2. Intervention of the government in refurbishing the existing dilapidated facilities and in the provision of new facilities in the peri-urban area, as this will help to support the development of peri-urban area and enhance the quality of the environment.
3. The rate of waste deposition into the peri-urban environment should be discouraged by the government. In respect to this, sustainable waste management approach should be put in place to monitor the environment. To do this, synergy between the community and the government be formed, as this will help to maintain clean and healthy environment across the neighbourhoods in the peri-urban areas.
4. In view of the patterns of development exhibited across the selected neighbourhoods (Maje, Paulossa, Chassa and Gwazunnu) in Suleja, there is need for a comprehensive land use planning and development control strategy, with a view to limiting the uncoordinated outward spread of the neighbourhoods. The comprehensive development plan envisages, to incorporate both the

sustainable development agenda and the climate change framework, so as to reducing the adverse effects of urban expansion.

CONCLUSION

The suburbs of Suleja are increasingly spreading with the evidence of unplanned growing peri-urban neighbourhoods. The proximity of Suleja to the Federal Capital of Nigeria, the relatively low price of land, ethnicity and religion are responsible as the factors encouraging the growth of the town. The challenges such as, insecurity in terms tenure acquired on lands and the rate of disturbance and insecurity in the core area, inadequate infrastructural provision and poor physical planning are prominent among the challenges affecting the peri-urban residents. The impact of the growth in the peri-urban does not only affect the physical environment in terms of the waste generation, but has an impact on the household economy with government expenditure the cost of transportation and travelling distance of the residents. Although, some facilities were available in the areas, the response of the residents on the level of their satisfaction and the functionality of these facilities remain as a big problem.

The study, therefore, recommended that government should ensure participatory planning approach in managing the peri-urban areas, also, refurbishment and provision of facilities for the areas. The government should considered a sustainable waste management strategy

and comprehensive land use planning and control system for effective monitoring of development at the peri-urban area of Suleja.

REFERENCES

- Adaku, E. (2014). Urban Sprawl: A view from Developing and Developed Countries. *African Journal of Geography and Regional Planning*, 1 (6), 193–207. Accessed from www.internationalscholarsjournal.org.
- Aguda, A. S. and Adegboyega, S. A. (2013). Evaluation of Spatio-Temporal Dynamics of Urban Sprawl in Osogbo, Nigeria Using Satellite Imagery and GIS Techniques. *International Journal of Multidisciplinary and Current Research*. Sept/Oct 2013 issue. Accessed online at <http://ijmcr.com>.
- Alabi, M. O. (2009). Urban Sprawl, Pattern and Measurement in Lokoja, Nigeria. *Theoretical and Empirical Researches in Urban Management*, 4 (13): 158 – 164.
- Barredo, J. I., Demichelli, L., Lavallo, C., Kasanko, M. and McCormick, N. (2004). Modelling Future Urban Scenario in Developing Countries: An Application Case Study in Lagos, Nigeria. *Journal of Environment and Planning B: Planning and Design*, 32, 65 - 84.
- Burchell, R. W., Shad, N. A., Listokin, D., Phillips, H., Seskin, S., Davis, J. S., Moore, T., Helton D. and Gall, M. (1998). *The Cost of Sprawl. Revisited Transportation Research Board Report 39*. National Academy Press, Washington, DC.
- Downs, A. (1999). Some Realities about Sprawl and Urban Decline, *Journal of Housing Policy Debate*, 10, 955 – 974.
- Durieux, L., Lagabrilie, E. and Nelson, A. (2008). A Method for Monitoring Building Existing GIS Data. *International Journal of Photogrammetry and Remote Sensing ISPRS*. Accessed from www.sciencedirect.com.
- Ewing, R. H. (1997). Is Los Angeles – Style Sprawl Desirable? *Journal of American Planning Association*, 63(1), 107 – 126.
- Ewing, R. H., Pendall, R. and Chen, D. (2002). Measuring Sprawl and its Impact. S.G.American, Assessed from <http://www.smartgrowthamerica.org/sprawlindeX/MeasuringsprawlPDF>
- Fabiya, O. O. (2006). Urban Land Use Change Analysis of a Traditional City from Remote Sensing Data: The Case of Ibadan Metropolitan Area, Nigeria. *Humanity and Social Sciences Journal*, 1(1), 42 – 64.

- Feng, L. (2009). *Applying Remote Sensing and GIS on Monitoring and Measuring Urban Sprawl: A Case Study of China*. Institute for Regional Development Planning, University of Stuttgart.
- Frank, N., White, S., Peng, Z., Harris, K. and Sanders, W. (2000). *Exploring Sprawl: Findings of a Comprehensive Review of the Literature Related to Sprawl or What do we really know?* Being a paper presented at the Association of Collegiate Schools of Planning, Atlanta, Georgia, 2nd - 5th November, 2000.
- Franz, G., Maier, G. and Schrock, P. (2006). *Urban Sprawl: How useful is this Concept?* In ERSA conference papers from European Regional Science Association. Accessed from www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa06/papers/105.pdf.
- Frenkel, A. and Ashkenazi M. (2008). The integrated Sprawl Index: Measuring the Urban Landscape in Israel. *Annals of Regional Science*, 42, 99 -121.
- Galster, G., Hanson, R., Wolman, H., Coleman, S., and Freihage, J. (2001). Wrestling Sprawl to the Ground: Defining and Measurement an Exclusive Concept. *Housing Policy Debate*, 12, 681 – 717.
- Gordon, P., and Richardson, H. W. (1997a). Are Compact Cities a Desirable Planning Goal? *Journal of the American Planning Association*, 63(1), 95–106.
- Hamidi, S. and Ewing, R. (2014). A Longitudinal Study of Changes in Urban Sprawl Between 2000 and 2010 in United State. *Journal of Landscape and Urban Planning*, Assessed from Science Direct Site, www.elsevier.com/locate/landurbplan.
- Idowu, O. O. and Olaniyan, O. A. (2009). An Assessment of the Changing Phases of Minna City-Centre. *International Journal of Architecture and Environment (ARCHISEARCH)*, 1 (2), 34 – 41
- Idowu, O. O. (2015). Perspectives of Urban Sprawl. Being a PhD Area Paper, Presented at the Staff/Post Graduate Students Seminars, Department of Geography and Environmental Management, University of Ilorin.
- Idowu, O. O., Shaibu, S. I., Adeleye, B. M., Medayese S. O. and Abd'razack, N.T.A. (2016). The Challenges of Urban Sprawl Development in Suleja, Niger State. Paper Presented at the International Conference, 21st -24th March, 2016, at The Federal University of Technology, Akure, Nigeria.

- Liu X and Jiang, B. (2011). A Novel Approach to the Identification of Urban Sprawl Patches to Based on the Scaling of Geographic Space. *International Journal of Geomatics and Geosciences*, 2 (2):, 415 – 429.
- Mabogunje, A. L. (1968). *Urbanization in Nigeria*. University of London Press.
- Obateru, I. O. (2005). *Basic Elements of Planning*. Penthouse Publications Limited Ibadan, Nigeria.
- Okewole, E. A. (2002). *Controlling Urban Sprawl in Developing Countries through Effective Urban Governance*. A Seminar Paper at the Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife.
- Olorunfemi, J. F. (1979). *Inter-censal Population Estimation and Urban Land use Changes in Nigeria*. Being a PhD. Thesis Submitted to the Department of Geography, University of Bristol, United Kingdom.
- Olujimi, J. (2009). Evolving Strategy for Mapping Urban Sprawl in Nigeria. *Human Ecology*, 25 (3), 201 – 208.
- Oueslati, W., Alvanides. S. And Garrod, G. (2015). Determinants of Urban Sprawl in European Cities. *Urban Studies*. 52(9), 1594 – 1614.
- Popoola, N. I. (2014). *The Impact of Peri-Urban Residential Development on Real Property Value in Minna, Niger State, Nigeria*, Unpublished PhD Proposal, Urban and Regional Planning Department, Federal University of Technology Minna.
- Sabo, J. (2015). *Assessment of Urban Sprawl Development and Infrastructure Deficit in Peri-Urban Areas of Suleja, Niger State, Nigeria*. Department of Urban and Regional Planning, FUT Minna.
- Torrens, P. M. (2006). Simulating Sprawl. *Annals of the Association of American Geographers*. 96 (2), 248 - 275 Blackwell Publishing United Kingdom.
- Torrens, P. M. (2008). A Toolkit for Measuring Sprawl. *Journal on Applications of Spatial Analysis*, 1, 5-36.
- UN-Habitat (2001). *The State of the World's Cities 2001: A World of Cities*. UN-Habitat Publications Unit, Nairobi Kenya.
- UN-Habitat (2008). *The State of the World's Cities 2008/2009: Harmonious Cities*. Earthscan. London.
- UN-Habitat (2011). *The State of the World's Cities 2010/2011: Bridging the Urban Divide*. Earthscan. Routledge, Taylor and Francis Group.

- UN-Habitat (2013a). *The State of the World's Cities 2012/2013: Prosperity of Cities*. Earthscan. Routledge, Taylor and Francis Group.
- United Nations, Department of Economic and Social Affairs, (UNDESA) (2014). *World Urbanization Prospects: The 2014 Revision, Highlights*. Population Division (ST/ESA/SER.A/352).
- United Nations, Department of Economic and Social Affairs, Population Division (UNDESA) (2015). *World Population Prospects: The 2015 Revision, Key Findings and Advance Tables*. Working Paper No. ESA/P/WP.241.
- Wapwera, S. D., Mallo, M. D., Jiriko, K. D. and Charles, E. O. (2015). An Analysis of Suburban Development in Jos Metropolis, Nigeria. *Journal of the Nigerian Institute of Town Planners*. 23(2), 15-32.