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London South Bank University (LSBU), London, United Kingdom

PROCEEDINGS

of

THE JOINT INTERNATIONAL CONFERENCE JIC 2016

on

21st Century Habitat: Issues, Sustainability and Development

21st - 24th March 2016

held at

The Federal University of Technology, Akure (FUTA) Nigeria.

EDITORS:

Prof. Ebohon, Obas J.

Dr. Ayeni Dorcas A.

Prof. Egbu, Charles O.

Prof. Omole, Felix K.



JOINT INTERNATIONAL CONFERENCE

21ST CENTURY HUMAN HABITAT: Issues, Sustainability and Development

**PROCEEDINGS OF THE JOINT INTERNATIONAL CONFERENCE
(JIC) AKURE, NIGERIA**

Monday 21 – Thursday 24 March, 2016

Editors

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PEER REVIEW PROCESS

The quality of the contents in this publication is guaranteed through thorough review process of abstracts submission and screening. All accepted papers were subjected to a blind peer review process. Papers in the various subthemes were reviewed by a minimum of two referees; from the abstracts submission through to the full paper submission and finally, the reviewers' reports were sent back to authors for modification and final submission.

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FOREWORD

This Joint International Conference is about sustainability in its wider sense.

Sustainability suffuses all we do and is, arguably, the world's most talked about concept and, perhaps, least understood. This is partly due to the level of complexity associated with how the discourse around sustainability issues is framed; how the contexts associated with it are imagined; how the challenges associated with it are addressed and grappled with, and how the resources and solutions offered are meaningfully operationalized. The lens at which we use to view sustainability is seemingly the problem and the solution at the same time, and therein lies the conundrum.

Sustainability is an important area of discourse, as it pertains to how we work and how we lead our lives, now, while considering the lives, communities, and workplaces of future generations. At the same time, few would question the power that lies within a collective and a channelled effort, where there is sense-making, joined up thinking, and the sharing of lessons learned in addressing key sustainability issues in pursuant of key 21st century human habitat needs, expectations and desires.

It is pleasing to see some level of agreement in the recent UN Sustainable Development Summit (2015) held at the UN headquarters in New York, and around the 17 Sustainable Development Goals.

A host of stakeholders have a significant role to play in this regard, not the least of which are governments, practitioners, communities, academics, the third sectors, and users. The wider architecture, engineering and construction (AEC) sectors consume in excess of one-third of our energy use; over one quarter of all raw materials; and about half of our water use. In addition to this all other sectors are serviced or service the AEC sectors. The issue becomes one of interconnectedness and complexity, calling for interdisciplinary, joined-up, and holistic considerations. There is much to know and share.

This joint international conference particularly sets out to explore some of the developments, challenges, innovations, environmental friendly and adaptability offerings around sustainability. It also offers the scope to address, real estate, valuations and management concepts and practices. In addition issues around landscape design, tourism, remote sensing and industrial design are explored. There is also a growing interest around education and professional ethics, which are further explored and discussed. Similarly, both developing and emerging economies are grappling with issues around physical planning, urban renewal and urban poverty. These important issues are to receive due coverage during the conference. Same goes with issues around architecture and national development in both emerging and developed countries.

A number of developed and developing economies continue to experience major unrest and challenges leading to massive immigration across countries and continents, and security issues. At the same time, the low oil prices raise significant economic challenges to development. Housing provisions, in terms of sustainability and affordability, also continues to be an issue in a number of countries and continents. As built environment academics and researchers, these changes would have an impact on us in one way or the other. No doubt, it would form an interesting area of debate in our conference.

For this Joint International Conference, the call for papers elicited 320 abstracts. The International Scientific Review Committee has also worked tirelessly to uphold standard of quality and consistency of the papers. After the two stage blind review processes, we have 201 accepted papers. This means that if your paper have been accepted for the conference, and is in the proceedings, then you should feel very proud of your achievement. It is pleasing to note that a good proportion of the papers have come from both new researchers, including those engaged in their PhD studies, as well as established researchers and academics. The papers have also come from over 12 countries. Similarly, the topics are wide, covering different aspects of sustainability research and practice.

It is also worthy of note that the content of the papers reflect the use of different research methodologies and philosophies.

We hope that this conference affords us the opportunity to address some of the challenges that confront research, practice, policy making, education and the wider areas of sustainability, in this very interesting and challenging time.

We also look forward to the usual networking which is one of the hallmarks of such international conferences; to renewing old acquaintances and making new friends during the conference.

Prof. Ebohon, O. J.

Dr. Ayeni, D. A.

Prof. Egbu, C. O.

Prof. Omole, F. K.

ACKNOWLEDGEMENTS

A conference like this would be impossible to run without the help and assistance of a huge number of volunteers who have worked tirelessly to ensure its success. Our special thank you goes to the Local Organising Committee and Sub-committees, the International Organising Committee, and the International Scientific Review Committee who have worked tirelessly to meet all deadlines for paper review and for upholding the high standard of academic quality.

A special mention of Dr. Dorcas Ayeni, who also took on the majority of the organisational and administrative burden for the conference.

Thank you also goes to, Prof. F.K Omole, Arc. Olufemi Samson Adetunji, Mr Bayode .T, Dr Adelabu Samuel, Mr Ewuonwu Obiora and Mary Samson. Who were instrumental in the arrangement of papers for the conference proceedings and making sure that we were “ready to go” for the printers.

We are grateful for the support received from The Federal University of Technology Akure (FUTA), London South Bank University, UK and De-Montfort University, Leicester, UK.

A huge thank you goes to the Vice Chancellor and the Chief Executive Officer of the Federal University of Technology Akure (FUTA), Prof. A. G Daramola, for his vision in sowing the seed for this joint conference. We are also indebted to the Dean of School of Environmental Technology (FUTA), Professor J.A.B Olujimi, for his unwavering support in the organisation of this conference. We equally extend our gratitude to all Heads of Department in the School of Environmental Technology, senior academic members of staff of FUTA and all sub-committee members for their various supporting roles, and for the opening of the conference and the welcoming of national and international delegates.

A number of organisations, industrialists and academics have supported the conference in a number of ways. We are thankful for their kind generosity and support.

A special thank you to the Keynote Speakers; Professor Olunride Lafe and Professor Charles Egbu.

Finally, we are also indebted to members of the professional and non-academic staff of FUTA for their support in the organisation of the conference, and making sure that all who attended the conference had a worthwhile and enjoyable time during their stay in FUTA, Akure, and in Nigeria.

Prof. Charles Egbu

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The Federal University of Technology Akure (FUTA) was established in 1981 to give prominence to training in technology and applied science and to assist in ensuring rapid technological and industrial development of Nigeria. The University which formally took off in 1982, has grown tremendously since its establishment to become the best University of Technology in Nigeria. Currently, it has 30 academic Departments spread within eight (8) schools. FUTA is located in Akure, the capital town of Ondo state, Nigeria. The vision of the university is to be one of the best Universities of Technology in the world, committed to carving out an enviable niche for itself as a centre of excellence, epitomized by high quality programmes, products and contributions to the society. The mission is to promote technological advancement of Nigeria through emphasis on programmes that will engender the development of such products and services in which the Nation possesses great comparative advantage. In doing this, the university is committed to providing a conducive teaching and research environment attractive enough to retain highly motivated leading academics capable of channelling research outputs to meeting peculiar national needs. Through its research output, train and produce highly technological –oriented and self-reliant high level manpower committed to self-employment as basis for national development.



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KEYNOTE SPEAKERS

Biography of **Professor Charles Egbu**

(PhD FRICS FCIOB FAPM FRSA FHEA)

Professor Charles Egbu is Dean of School of the Built Environment and Architecture at London South Bank University, England, UK, where he holds the Chair in Project Management and Strategic Management in Construction. His First Degree was in Quantity Surveying [First Class Honours] – Leeds Metropolitan University, UK, and he worked briefly as a site Quantity Surveyor for a large UK construction company. His Doctorate was obtained from the University of Salford, UK, in the area of Construction Management. He is a Fellow of the Royal Institution of Chartered Surveyors (FRICS); a Fellow of the Chartered Institute of Building (FCIOB), a Fellow of the Association for Project Management (FAPM), a Fellow of the Royal Society for the Encouragement of Arts, Manufacture and Commerce (FRSA), and a Fellow of the Higher Education Academy (FHEA). He is currently a Member of the Policy Board of the Chartered Institute of Building (CIOB). He was until 2014 a Director and member of the Board of Trustees for the Association for Project Management (APM), and Chairman of the Professional Standards and Knowledge (PS&K) committee of the Association for Project Management. He has lectured, nationally and internationally, at undergraduate and postgraduate levels in areas such as construction economics, contract procurement, project management, construction management, construction process improvements, sustainable development, and Innovation & knowledge management in complex environments. His research is in similar areas, where he has attracted in excess of £25m from many research funding bodies – nationally and internationally. He is an author of 12 books in Construction Management, Knowledge Management, Sustainable Development, Refurbishment Management, and Health & Safety in Construction. He is currently a Member of the Peer Review College of the UK Economic and Social Sciences Research Council (ESRC). He was a member of the Peer Review College of the UK Engineering and Physical Sciences Research Council (EPSRC- 2006 – 2009). He also sits on many editorial boards, and national and international scientific committees to do with research in construction management, project and programme management, innovation and knowledge management, and sustainable development. He was the Chair of the Association of Researchers in Construction Management (ARCOM: 2010 – 2012). He is a Visiting Professor to a number of Universities in Europe, Africa, and Asia. He has supervised over 25 PhD students and examined over 60 PhD candidates world-wide; and has acted as an External Examiner to many undergraduate and postgraduate programmes in many universities all over the world. He has contributed over 350 publications in various international journals and conferences and has hosted, chaired and spoken at many conferences in his areas of expertise. In addition, he has produced many practitioner-based reports, policy and guidance documents, and conducted many workshops and seminars internationally in his areas of discipline. He is also a member of the International Council for Research and Innovation in Building and Construction's Working Commission, where he is a co-ordinator of the CIB W102 on "Information and Knowledge Management", and the CIB W117 on "Performance Measurement in Construction".



Professor Charles Egbu

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Biography of **Professor Olurinde E. Lafe**

BSc (UNILAG), DHE (DELFT), MS (CORNELL), PhD (CORNELL)



Director – Centre for Renewable Energy Technology (CRET) & Professor – School of Engineering & Engineering Technology, Federal University of Technology, Akure (FUTA)

ACADEMIC HISTORY Prior to his joining FUTA as Engineering Professor and Director of CRET, Professor Lafe held senior academic positions at a number of universities including the University of Lagos, the University of Dar-es-Salaam, the University of Nairobi, Case Western Reserve University and African University of Science and Technology where he was a visiting distinguished professor of engineering.

SOLVING CHALLENGING PROBLEMS Professor Olurinde Lafe has spent the past 4 decades working on providing engineering solutions to development problems around the world. Professor Lafe has consulted with both governmental and non-governmental agencies including the United States Office of Naval Research - Strategic Defense Initiative Program on the “Star Wars” Project (where special multi-megawatt battery technologies were developed for space weapons), National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), United States Department of Agriculture (USDA), United States Agency for International Development (USAID), United Nations Educational, Scientific and Cultural Organisation (UNESCO), World Vision International and Defense Advanced Research Programs Agency (DARPA).

PUBLICATIONS & PATENTS Professor Lafe has published numerous learned articles and written single and multi-author books. His latest book is “Abulecentrism – Rapid Development of Society Catalysed at the Local Community Level” (Springer, 2013). The development concept abulecentrism is what Nigeria needs in order to move forward. Abulecentrism seeks to achieve rapid and sustainable development of a given society by the strategic execution of projects and the provision of critical services at the local community level. Abulecentrism is built on the philosophy of using small, modular systems, such as a village, as building blocks for developing the greater society. Latest developments in renewable power systems are described extensively in the book.

INVENTIONS Professor Lafe’s research and development efforts have resulted in 9 issued United States patents. His inventions have been implemented commercial and consumer products sold worldwide. Global telecom conglomerate, Nortel Networks, licensed his technology for their e-Mobility accelerator product. SONY Corporation used his invention for transmitting large digital files across the Internet.

CAPACITY DEVELOPMENT INITIATIVES Professor Lafe established the TechAlive Training Programme in Nigeria as a vehicle for capacity development in renewable energy systems. During the Year 2010, one hundred unemployed Nigerian graduates were given a 6-week intensive training in renewable energy (with emphasis on solar power) and clean-power related software engineering. Graduates of the TechAlive Programme are now involved in the design and installation of smart micro-grid community power systems for communities around Nigeria. In September 2012, another set of one hundred unemployed Nigerians were camped and given a 4-week TechAlive intensive training in renewable energy systems. These trainees constitute the pioneering set of workers for a nationwide PAWA774 initiative to generate, transmit and distribute 10MW of clean power in each of Nigeria’s 774 local government areas (LGAs). PAWA774 is an acronym for Providing Alternative Watts for All 774 LGAs.

CHAIRMANSHIP OF POWER REVIEW COMMITTEES Professor Lafe has served as the Chairman of several committees setup to review renewable energy projects around the country. The plants range in capacity from 20MW to 1,200MW grid-tied solar power systems in strategic locations and different regions of Nigeria.

SOLVING NIGERIA’S POWER PROBLEM Professor Lafe has a clear, cost effective, and sustainable solution to Nigeria’s power problem. His idea will provide an accelerated solution to the national electricity challenge, create millions of jobs in every nuke and cranny of the country and energize the economy in each of the 774 local government areas of the country. He has appeared on national television and published articles in national newspapers proffering his solution to the power problem.

Appraisal of Characteristics of Slum Neighbourhood of Minna, Niger State

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ABSTRACT

Slum is a consequential effect of unplanned urbanization in cities especially in developing countries. Insecure tenure, crime, overcrowding, uncollected waste and poor sanitation are problems that often characterized slum neighbourhood. The problems of Slum is not a peculiar problem as most slum areas tend to exhibit the same trait, these identified problems are evident in the slum area of Kpakungu, a Neighbourhood in Minna, Niger State. Since the inception of the present political dispensation (1999 till date), the state government has been enforcing all the planning tools to control its development but this has proved abortive. This study aims at appraising the characteristics of slum neighbourhood of Minna, Niger State with reference to Kpakungu between 1999 and 2014. This was achieved by examining the factors responsible for slum proliferation in kpakungu neighbourhood and the impact of town planning activities in kpakungu between 1999 and 2014. Quantitative approach was used in data collection and stratified random sampling was used to select respondents. The neighbourhood was divided into 8 units from which random sampling was used to select the respondents for the study. A total of 95 questionnaires were administered due to the size of the population and the respondents. Geospatial techniques were also used to substantiate data from both sources. The Rasi 700 gas meter was further used to determine the pollution level. The analysis of the spatial development of the neighbourhood indicated that there is a significant increase in the size of the slum between the periods of investigation. The pollution level of the neighbourhood shows higher level than the stipulated value of 10ppm for CO, 0.04-0.06ppm for NO₂ and 0.01ppm for SO₂ by NESREA. There is also increase in crime rate in the neighbourhood by 25%. The study recommends inclusive planning approach in the management and planning of neighbourhood and proper monitoring and implementation of development control measures should be enforced by the relevant agencies in the state.

Keywords: Development Control, Geospatial, Inclusive Planning, Pollution and Slum

Introduction

Over the years, scholars in urban studies are faced with the challenging phenomena of increasing rates of urban growth in the world, especially in developing countries, where less urban planning is being carried out to contain such growth in a viable manner (Egunjobi, Jelili, Adeyeye, 2007). Unplanned urbanization and rapid urban growth are linked to various environmental challenges in developing countries. Olthuis, Jiya, Eichwede and Zevenbergen (2005) opined that unplanned urban and rapid urbanization often result in chaotic development which in turn breed slum settlements in developing countries of the world with Nigeria inclusive. Also, Agbola and Agunbiade (2009) share the same opinion about development and slum formation. Slum settlements are defined as any neighbourhood or city with half or more of its residents lack access to improved potable water supply, sanitation, sufficient living area, durable housing and secure tenure (UN-Habitat, 2009).

Consequently, proliferation of slums areas are seen as major challenge to development in the developing countries. This is because slum areas are often characterized by appalling living and environmental conditions which frequently result to inadequate water supply, squalid conditions of environmental sanitation, breakdown or non-existence of waste disposal managements, overcrowded and dilapidated habitation, hazardous location, insecurity of tenure, and vulnerability to serious health risks (Arimah, 2010). More so, social vices such as drugs addiction, prostitution, smuggling, etc. are attributed to slum proliferation in

developing countries (Fourchard, 2003). All challenges that are associated with Slum areas are seen as an impediment undermining the actualization of goal number 7, target d of the Millennium Development Goals that seeks to improve the lives of at least 100 million dweller by the 2020 (IDB, 2013).

The rate of the proliferation of slum in the world at large is alarming and this calls for stern concern by stakeholders. According to the UN (2008) a total of one billion people worldwide were estimated to be living in slums currently and this figure translates to one-sixth of the world's population. Thus, with the rapid and unplanned urbanization experienced in most cities of the world, especially Africa, there is a likelihood of a significant increase in the number of slum dwellers and environmental problems that will accompany the influxes (IDB, 2013). Challenges posed by rapid urbanization are peculiar to all, but the developing countries are the ones finding it increasingly difficult to respond to these challenges (Siddharth, 2008).

Nigeria has also had its own fair share of slum proliferations which are evident in urban centres across the country. Olotuah (2006) opined that 75% of dwelling units in Nigeria urban centres are substandard and these dwelling units are cited in slums. In Minna, the Niger state capital Aliyu (2008) reported that 70% of the population of Minna reside in slums and squatter settlements. This analysis from Aliyu (2008) affirms Olotuah's (2006) assertion that 75% of urban dwellers in Nigeria reside in Slum neighbourhood. The "story" of slum proliferation is not different in the case of Kpakungu a neighbourhood in Minna, Niger state. The study area shows that it is an undulating neighbourhood which has valley towards the southern part. This allow for the indiscriminate sewage and solid waste disposal in and around the neighbourhood. The environment is filthy and shows high level of unplanned and uncontrolled growth. The people of Kpakungu neighbourhood are gregarious in nature and lives in a compact ties, they have similar social and economic characteristics. Due to negligence on the part of the authority and the poor socio-economic status of the people, Kpakungu neighbourhood has shown a near or total collapse of urban infrastructure which has resulted to high crime incident and growing environmental problem such as air pollution, uncollected waste, poor accessibility, poor sanitation, silted drains and erection of buildings without planning permit. These phenomenons have led to the growth of slum in Kpakungu.

Efforts to address these issues by the Niger State Urban Development Board right from the inception of the present political dispensation (1999 till date) have proven abortive. Against this background, the planning activities toward revitalizing Kpakungu were assessed in this study.

Aim and Objectives of the Study

The aim of this study is to appraise the characteristics of slum neighbourhood of Minna, Niger State with reference to Kpakungu between 1999 and 2014. To effectively carry out this appraisal, the factors that are responsible for slum proliferation in Kpakungu were examined, the trend of slum proliferation between 1999 and 2014 was analyzed, the implications of slum proliferation in Kpakungu is looked into and the impact of town planning activities between 1999 and 2014 are also examined.

STUDY AREA

Kpakungu, a suburb of Minna is located on Latitude 9°35' North and Longitude 6°31' East and occupies a land area of 801.402 Hectares and an estimated population of about 22,587 projected from NPC, 2006 population census. Kpakungu is one of the 24 neighbourhoods of Minna city and one of the largest populated neighbourhood in the city. Figure 1 shows the spatial extent of the neighbourhood and its location in relation to Minna. Kpakungu

neighbourhood is bounded by Fadipe, Soje, Barkin Sale and Gbaganu community to the North, East, South and West respectively.

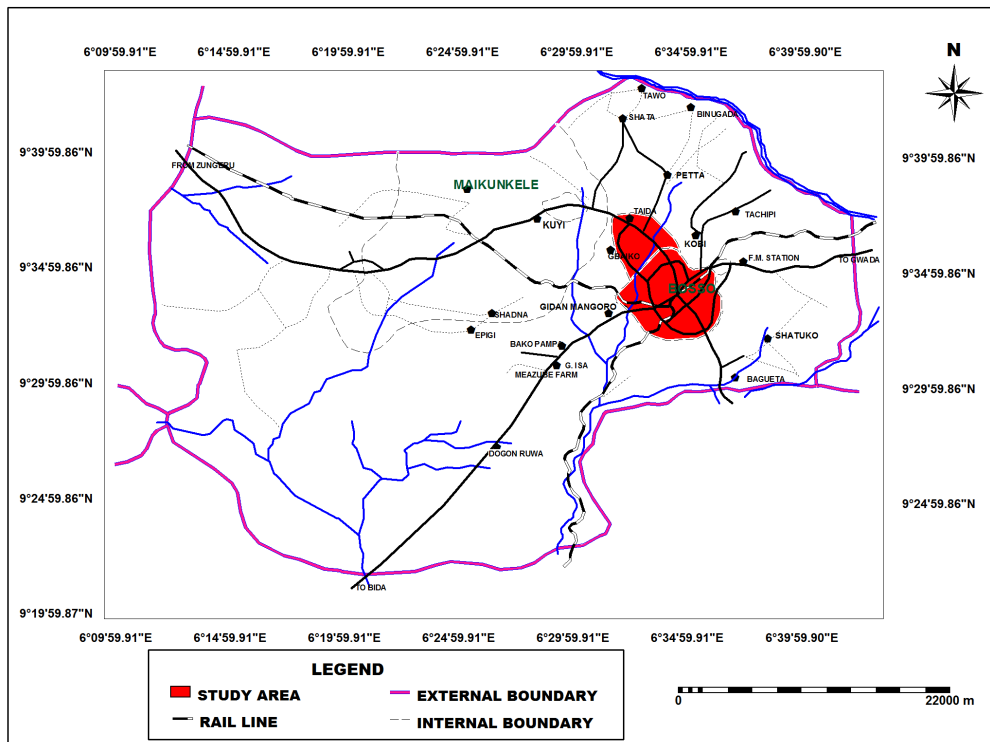


Figure 1: Street Guide Map of Minna Highlighted in Bosso L.G.A.
Source: Department of Urban and Regional Planning, FUTMINNA

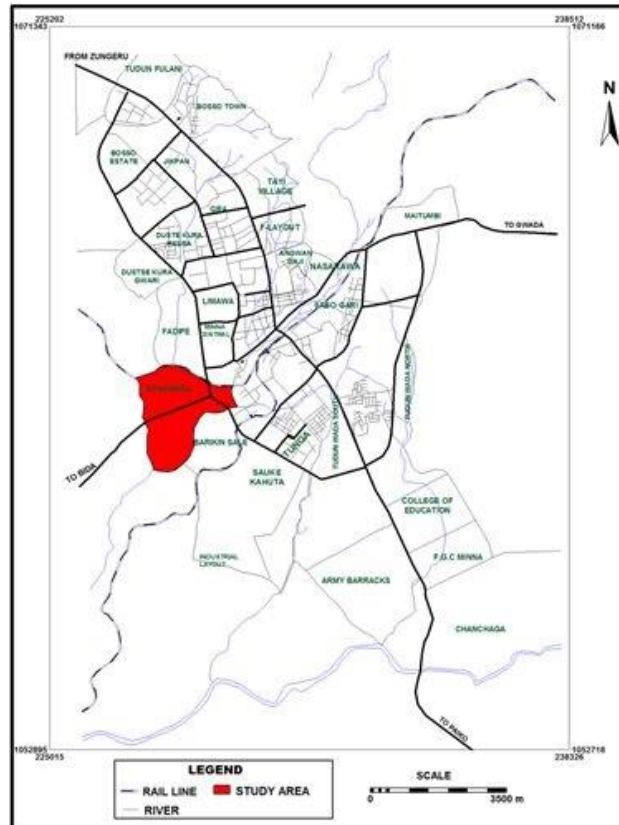


Figure 2: Kpakungu Neighbourhood highlighted in the Street Map Guide of Minna
Source: Department of Urban and Regional Planning, FUTMINNA

MATERIAL AND METHOD

Sources of Data

Data for this study were collected through Primary and Secondary sources. A total of 95 questionnaires were administered using Stratified random sampling, and each unit has certain number of questionnaire based on the population of the unit. Kpakungu neighbourhood was divided into eight units for easy administration. At each unit a random sampling was employed to give each household an equal chance to be selected. At unit one, nine questionnaires were administered; at unit two, eleven questionnaires, were administered; at unit three, fifteen questionnaires were administered; at unit four, sixteen questionnaires were administered; at unit five, thirteen questionnaires were administered; at unit six, twelve questionnaires were administered; at unit seven, ten questionnaires were administered and at unit eight, nine questionnaires were also administered. The perception of the households on the issues of slum and town planning activities in Kpakungu neighbourhood was ascertained. Pollution levels in Kpakungu were recorded for seven days at three different intervals (morning, afternoon, and evening). This was done with the use of the Rasi 700 gas metre and the mean of the gases were computed. The coordinates of the location where these gases were taken was also recorded. Data on the development control in Kpakungu were sourced from Development Control Department of the Niger State Urban Development Board, Minna through an oral interview. Data on crime was obtained from the Nigeria Police Force Kpakungu Division, the crime report was later corroborated by the findings from the literatures on crime in Minna.

Post Processing

Spatial analysis of the growth of the neighbourhood over the planned period was obtained from three sets of images, which are the Enhance Thematic Mapper of 1999, 2006 and 2014 (Table 1). The area of interest (Kpakungu) was "clipped" out of the three images using Arcgis 10.2 software. Band combination of 4,3,2 were used to form the "False Colour" composite for the images via the use of the "New Map list" operation tool on ILWIS 3.3 Academic. On band 4,3,2 "False Color" composite, Vegetation appears in shades of red while Urban areas and Densely populated urban area come out in cyan blue and light blue respectively. Sample Set for urban areas and vegetation were created on all the images in question (1999, 2006 and 2014) after which the images were subjected to maximum likelihood classification on ILWIS 3.3 academic.

On each of the classified images of Kpakungu neighbourhood the urban area were digitized and then overlaid. This task was performed in order to determine the direction and spatial extent of Slum in Kpakungu neighbourhood. Finished were composed into maps by adding graticules, scales, legend and cardinal point.

Data Processing Techniques

Data processing techniques used for this study include: Data evaluation, Image Sub-setting, Image Classification, Overlay Analysis and Map Composition.

Table 1: Image Properties

S/No	Image Year	Path and Row	Sensor	Captured Date
1	Kpakungu 1999	P189 R053	ETM ⁺	03 /04/1999
2	Kpakungu 2006	P189 R053	ETM ⁺	11/07/2006
3	Kpakungu 2014	P189 R053	ETM ⁺	04/04/2006

RESULT AND DISCUSSION

Factors Responsible for Slum Growth in Kpakungu, Minna

Several factors were advanced by the perception of respondents as reasons for its spatial growth. Factors responsible for slum proliferation in Kpakungu reveals that 3.2% of the

respondents were of the view that transportation nodes in Kpakungu must have influenced slum proliferation in Kpakungu, 15.8% of the respondents opined that economic activities in Kpakungu is responsible for Slum proliferation. Low land value was attributed for slum growth by 26.3% of the respondents in Kpakungu. Majority of the respondents (42.1%) are of the view that low rent must have influenced the growth of slum in Kpakungu while 12.6% of the respondent believed that the development of micro housing has swayed the growth of slum in Kpakungu (Table 2).

Table 2: Factors Responsible for Spatial Growth of Kpakungu

Factors	No of Respondents	Percentage
Transportation Node	3	3.2
Economic Activities	15	15.8
Low Land Value	25	26.3
Low Rent	40	42.1
Development of Micro Housing	12	12.6
Total	95	100.0

The result of the study indicated that all these factors contributed in different proportion to development of slum spatially in the neighbourhood. Though perception is subjective, it corroborated the findings of other researcher that low cost of illegal land, unplanned and unserviced land as well as low rental value is the factors that encourages slum development (UN-Habitat, 2003; Tibaijuka, 2005; UNDP, 2003; and World Bank and UNCHS, 2002).

Spatial development of Kpakungu, Minna between 1999 and 2014

Table 3: Land Area of Slum between 1999 and 2015

Year	Area (Hectares)	Percentage of Increase
1999	119.610	
2006	272.970	128
2014	482.940	77

Table 3 reveals a progressive growth spatially in the size of Kpakungu neighbourhood between 1999 and 2014. The spatial extent of Slum area in Kpakungu in 1999 (base year) was 199.610 Ha. In 2006, the Slum area rose to 272.970 Ha (128 percentage of increase). The relocation of Federal University of Technology, Minna and National Examination Council in 2005 to Gidan-kwano and Gidan Mangoro respectively, influenced the proliferation of slum in Kpakungu neighbourhood in 2006. These settlements (Gidan-Kwano and Gidan Mangoro) are all adjoining settlement to Kpakungu Neighbourhood. In 2005, construction of buildings were done to meet the housing need of staff of National Examination Council and Staff and students of Federal University of Technology with little or no regard for development control. Slum proliferation in Kpakungu increased by 77% in 2014 compared to 2006 size. As at the end of 2014, Kpakungu neighbourhood has spread territorially to about 482.940 Ha. The proliferation of Slum at this period can be attributed to increase in Commercial activities in Kpakungu. Figure 3 and Figure 4 shows the spatial extent of Kpakungu in 1999, 2006 and 2014 respectively.

The overlay of the spatial development of the Kpakungu slum over the study period is indicated in Figure 5. This was depicted by different colours, the red colour indicated the area extent of the neighbourhood in 1999, the green indicated the area extent in 2006 and blue colour implies the development in 2014. The overlay shows that between 1999 and 2014 (period of 16 years), the slum has expanded more than two folds.

The development of the slum is toward the western and southern part of Kpakungu neighbourhood. At the western axis Federal University of Technology and National

Examination council are seen as growth pole while Shiroro Hotel is seen as the growth pole at the southern axis of the neighbourhood.

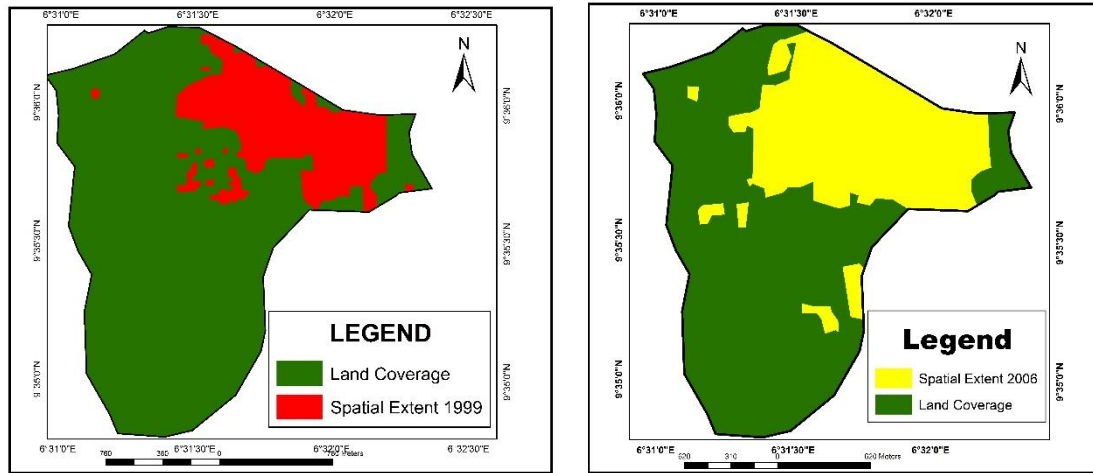


Figure 3: Spatial Extent of Slum in 1999 and 2006

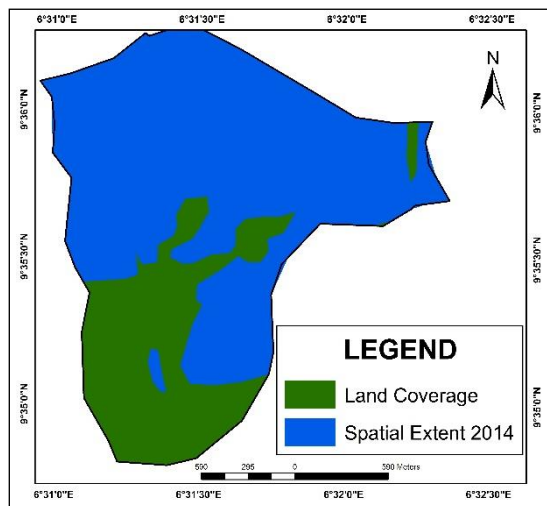


Figure 4: Spatial Extent of Slum in 2014

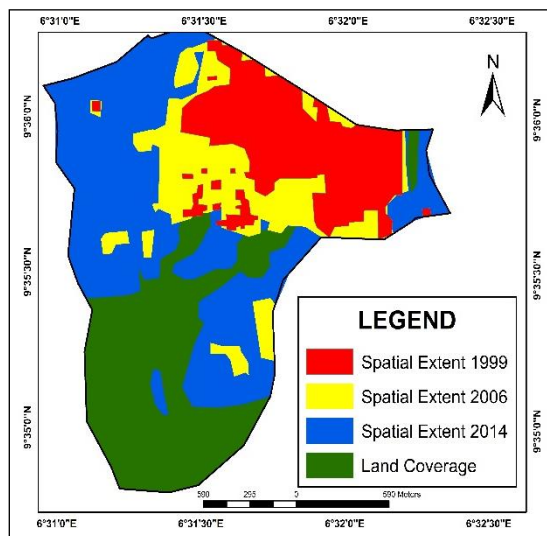


Figure 5: Overlay of Spatial Extent

Implications of Slum Proliferation

There are many implications of the slum development in Kpakungu, these ranges from all forms of social vices to local acts. The prominent types of insecurity faced by the inhabitant of Kpakungu neighbourhood are Armed Robbery, Burglary, Stealing and increase in Juvenile delinquency. A significant number (46.3%) of the respondents believed that stealing was more pronounced in Kpakungu, 25.2 % of the respondents were of the view that burglary was rampant in Kpakungu, 25.3% of the respondents were of the opinion increased in juvenile delinquencies was raging Kpakungu while Armed Robbery which constitute 3.2% of the respondents was believed to be threatening.

According to the Nigerian Police force, Divisional Headquarters Kpakungu, a total of 86 cases of crime was reported between 1999 and 2014 in Kpakungu. The police force opined that out of the other neighbourhoods in Minna, the number of cases of crime in Kpakungu was more. As a result of this Kpakungu neighbourhood was termed as a hot spot area. Jinadu, Morenikeji, Sanusi, Dukiya and Owoyele (2013) in their study on "Digital Mapping of Crime Statistics in Minna" also termed Kpakungu neighbourhood as a hot spot zone when it comes to crime. Between 2000 and 2011, Kpakungu recorded the highest incidence of crime in Minna, Niger State and this was attributed to slum proliferation (Jinadu, et al., 2013). It was observed that the inhabitants of Kpakungu were faced with the problem of flooding, Land Degradation and Erosion at the western part of the neighbourhood these problems can as well be attributed to the slum expansion.

The problem of poor sanitation in Kpakungu was also seen in the manner of waste disposal as 33.7% (highest number of respondents) of the respondents disposed their waste in the drainage channels. The methods of burning and incineration were adopted by 6.3% of the respondents and 24.2% of the respondents respectively. The services of the Niger State Environmental protection agencies were employed by 23.2% of the respondents.

Problem of insecure tenure were also pronounced in the Kpakungu as 72.6% of the respondents do not have a secure tenure. Only 15.8% of the respondent could boast of a secure tenure. The low number of secure tenure in Kpakungu can be attributed to the organic nature of the neighbourhood.

Level of Pollution in Kpakungu Neighbourhood of Minna

One of the environmental consequences of slum development in Kpakungu is pollution as a result of poor sanitation and unclean environment. The national air quality standard according to National Environmental Standard and Regulation Enforcement Agency (NESREA) indicated that the amount of various components of the air ranges between 10ppm for CO; 0.04 -0.06ppm for NO₂ and 0.01ppm for SO₂.

Table 3: Level of Gas Emission in Kpakungu in 2011 and 2014

Coordinate	Gases	Standard	2011	2014
		Unit (PPM)	Unit (PPM)	Unit (PPM)
229272 1061852	CO	10	10.00	15
	H ₂ S	10	0.00237	5
	NO ₂	0.04 -0.06	0.00312	14
	SO ₂	0.01	0.00295	0.02

Table 3 reveals the level of gas emission in Kpakungu in 2011, after the average emission of the were recorded CO constitutes 10.00ppm, H₂s constitutes ppm while NO₂ and So₂ reads 0.00312ppm and 0.00295ppm respectively (ATPS, 2013). The level of gas emission increased in 2014, 15ppm was recorded for CO, 5ppm was recorded for H₂S, 0.02ppm was recorded for SO₂ and 14ppm was recorded for NO₂. The value recorded in 2014 were higher

than the stipulated value by the NESREA which state 10ppm for CO, 0.04 -0.06ppm for NO₂ and 0.01ppm for SO₂ (FEPA, 1999). The High pollution values can be attributed to slum proliferation and large concentration of Motor cycles in Kpakungu.

Impact of Town Planning Activities in Kpakungu between 1999 and 2014

Since the inception of the present political dispensation (1999) the Niger State Urban Development Board has been saddled with the responsibility of curbing the problems posed by slum proliferation in Kpakungu. Development control mechanisms were employed by the Agency on a smaller unit and building plans were properly scrutinized before approval. More so, site inspections were often carried out by the agency to checkmate the activities of contraveners in Kpakungu. The Niger State Urban Development Board opined that development control cannot be done on a larger scale in Kpakungu because the neighbourhood was just an organic settlement with no initial plan.

As a result of the ineffectiveness of the "smaller unit of development control" the Niger state urban Development Board proposed a Slum Upgrade for Kpakungu in 2008 before the entire Neighbourhood degenerate. The proposal of the Slum Upgrade for Kpakungu was defended that same year (2013) at the Federal Ministry of Lands, Housing and Urban Development.

The Slum upgrade proposal was accepted by the Federal Government and this was published in the memo of the National Council of Lands, Housing and Urban Development in 2013. Niger State Urban development Board believed that lack of political will by the government has hindered the implementation of the proposal. The Niger State Urban Development Board were of the opinion that the inability of the board to have her proposal approved has further made planning deteriorate in Kpakungu and this in turn has made development control ineffective in kpakungu.

RECOMMENDATION

Based on the major findings in the study, the following recommendations are made to ameliorate the problems of Slum proliferation in Kpakungu Neighbourhood.

There is need for slum upgrading in Kpakungu through rehabilitation, creation of accessibility as well as provision of urban basic services. This approach will go a long way to revitalize Kpakungu. More so inclusive planning approach should be adopted in the slum upgrade plan intended for Kpakungu, this will make the plan more viable.

The reconnaissance survey of the study area shows that there is no designated solid waste disposal area. The only waste collection point in the study area is far from the houses of the residents of the neighbourhood. The agency responsible for waste collection concentrated on only the designated dump site, and this has led to problem of indiscriminate waste disposal in drainage channels, open spaces uncompleted buildings. Niger State Environmental Protection Agency therefore need to address the problem of waste management in Kpakungu to forestall environmental and health hazard. Also public enlightenment campaign should be carried out on the dangers of insanitation by the Niger state Environmental Protection agency. This will help the inhabitant of Kpakungu keep a more hygienic environment.

All the Activities of the Niger State Urban Development Board should be well supported by the Niger State government through effective development control mechanism. In addition, Inhabitants of Kpakungu should be made to revalidate their tenure because this will assist in controlling slum development in Kpakungu and Minna at large.

CONCLUSION

From the analysis presented above, it can be seen that the relocation of the Federal University of Technology, Minna and NECO has contributed to the development of slum in Kpakungu neighbourhood of Minna. It was also observed that within the space of 16 years, the Slum grows more than 2 folds (192.61 Ha in 1999 and 484.7 Ha in 2014). This implies that the slum is growing astronomically. The implication of this growth has been the increase in crime activities, poor sanitation and increase in air pollution beyond the national standard. The tools of town planning (development control) have not been able to stem the tide of unplanned development in the neighbourhood.

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