



LAND USE MANAGEMENT & ENVIRONMENTAL SUSTAINABILITY IN NIGERIA

Edited by

**Dr Victor Umoren
&
Dr Jacob Atser**

Preface by

Professor Best Ochigbo

A BOOK OF READINGS

*In Memory of Late Professor Joseph Uyanga
Professor of Environmental Planning, University of Uyo, Nigeria*

LAND USE MANAGEMENT & ENVIRONMENTAL SUSTAINABILITY IN NIGERIA

Edited by:
Dr. Victor Umoren

&

Dr. Jacob Atser

Preface by:
Professor Best Ochigbo

A Publication of the Department of Urban and Regional Planning,
University of Uyo, Nigeria

Copyright © Department of Urban and Regional Planning, University of Uyo, 2020

All rights Reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any way or by any means, electronic, electrical, mechanical, photocopying, optical, recording or otherwise, without the prior permission of the copyright owner. Enquiries should be addressed to the publisher.

First Published, 2020

ISBN: 978-978-57832-0-9

Designed and Published by:
Parvenu Technologies
No 8 Urua Ekpa Road, Uyo
Akwa Ibom State
Tel: 08027228272
Email: parvenuonline@gmail.com

ACKNOWLEDGEMENTS

I greatly appreciate the help and encouragement of many people who have been directly involved in the production of this book on 'Land use Management and Environmental Sustainability in Nigeria': A book written in honour of Professor Joseph Uyanga. He was a dedicated Professor in the Department of Urban and Regional Planning at the University of Uyo, Nigeria, with a passion for research in Environmental Sustainability. He was honoured with numerous awards and recognitions for both his teaching and research. He certainly was in our thoughts for a Festschrift before putting together this special issue. I think that was befitting, given his contribution. As we say: Old Planners don't die, they just reach equilibrium!

Professor Best Ochigbo, the Dean of Faculty of Environmental Studies, University of Uyo, is gratefully acknowledged for his unwavering and all dimensional support in the course of this book project, especially for writing the preface to this book.

Gratitude also goes to Professor Godfrey Udo, the immediate past Deputy Vice Chancellor (Administration) for his encouragement and support in the course of carrying out this assignment. We are grateful to him for writing the forward. I wish to specially thank all the authors that have contributed chapters to this Book of Readings. We are also indeed grateful to Professor Authur Essaghah of Enugu State University of Science and Technology (ESUT) who was present at the presentation of "A Book of Readings" in honour of Professors Akaninyene Mendie and Offiong Bassey Ekop by the Department on 2nd October 2019, who suggested that a similar thing be done to his benefactor. We appreciate the reviewers for their insightful editorial comments, thus raising diverse issues which authors graciously corrected and streamlined to the required standards.

The editorial team did a good job, showcasing academic competence in the rigour of fine-tuning the submissions that made up this book.

Special thanks are due to the printers for their promptness in getting the work done.

Dr. Victor E. Umoren MNITP, RTP, CMILT (LOND)

Head of Department, Urban and Regional Planning

University of Uyo, Nigeria

victorumoren@uniuyo.edu.ng

PREFACE

A catalogue of land use and environmental management crises in Nigeria is quite fascinating as each passing day, public outcry and research reports, remind us of flood that destroys lives and properties; Thousands rendered homeless, threats on agricultural lands, insecurity forcing thousands to flee their home land, and a lot more. Current development efforts in Nigeria have helped to amplify in magnitude and range, the environmental problems, thereby crippling all efforts towards sustainability. Although Nigeria has made determined efforts in the most aggressive manner than ever before to speed up development, such efforts seem to be yielding little or no positive results due to weak economic infrastructure base. The chain reactions of these problems are enormous and thus require research intervention for solution. Therefore, land use management and environmental sustainability in Nigeria is intended for a wider reading audience in order to make them better informed of the consequences of unsustainable actions.

In this laudable project, the topics were carefully selected to cover a wide variety of areas. This is not intended to cover the entire realm of Urban and Regional Planning, but to reflect contemporary land use management and environmental problems in the Nigerian scene. The articles are of high quality and issues raised serve to provide policy guide for intervention towards attaining the goals of sustainable development. The book is broad and diverse in scope covering issues of significance in dynamics of land use, infrastructure, sustainable design and construction, housing, urban development, corporate social responsibility and environmental sustainability, spatial planning and food security, population growth/quality of life and environmental quality; as well as real estate and investments; and environmental ethics. Authors' narratives reflect conceptual and methodological diagnoses and in some cases detailed empirical exposition of the problems in local studies.

As you read this resourceful and exciting compendium, it is hoped that you will not only find time to interact and engage in open discussion of issues with the authors, but will increase in awareness and greater concern about planning sustainable and liveable environment. I therefore commend the staff of the Department of Urban and Regional Planning for this noble idea and its fruitful accomplishment.

Professor Best Ochigbo

*Dean, Faculty of Environmental Studies
University of Uyo*

FOREWORD

The past few decades have witnessed unprecedented interest in the physical environment. The physical environment is an embodiment of multi-faceted phenomena, and it is open to academic and scientific analysis by professionals from various ideological and academic standpoints to make contributions to knowledge and understanding of the total environment. The need for a conscious and prudent management of the physical environment in Nigeria to address the numerous environmental challenges is apt; however, the level of success attainable is tied to the extent to which land use management practices are efficient. Inefficient land use management practices in the face of growing population will impact adversely on the built environment, thereby making it not to be able to sustain itself, undermining its capacity to positively impact on the citizenry. Governments at various levels have been working assiduously towards the realization of sustainable development goals, however, scientific research is required in order to measure the levels of progress made. It is against this background that the special value of this book is placed. I therefore recommend this book to all the stakeholders in the built-environment as well as those in academia with proven interest in environmental research.

Professor Godfrey Udo

DVC (Administration)

University of Uyo

LIST OF AUTHORS

Abraham S. Samuel
Adegboyega Maziseyi Ose
Adelanke Samuel Owoeye
Adesina John A
Aduloju Olalekan Tolulope
Akaninyene Mendie
Akpabio Ufot-Akpabio
Alexander A. Mchi
Ambrose Lyam
Aniekan Eyoh
Aniedi Essien
Anih Paul
Anofi Abdulfatai Olanrewaju
Anthony O. Ujene
Anwana S. B.
Asuquo Ekpenyong Ima
Araoye Olarinkoye Ajiboye
Arthur Efeoghene Essaghah
Azanna O. Nnamdi
Bassey K
Bako A. I
Best Ochigbo
Beulah I. Ofem
Chidi I. Ugwu
Cyril J Effiong
Davidson Alaci
Durosinmi Wasiu Ayobami
Effiong Augustine Edet
Eno Eyak James
Evangeline Nkiruka Anthony
Eyenghe Tari
Faith Ekong
Francis P. Udoudoh
Glory Anwirin Ehikwe
Hauwa'u Yakubu Wokii
Igiri Cornelius Ali
Ikurekong EE
Inemesit Ettang

Iniobong Udoituen
Isibor Comfort Ekannyin
Irene Mngutyo
Ito U. Akpan
Jacob Atser
Jenny Jacky Ntamark
John Ladoke
John Opeyemi Egunjobi
Julius. O. Gbakeji
Kingsley C. Okereke
Koffi Ayadu
Liol Anthony Nkireuka
Micah E. Eyo
Michael C. Oguike
Monday Otali
Ndubisi Onwuanyi
Nissi Chicheta
Nnezi Uduma Olugu
Nsikak Udoibeh
Ojeifo O. Magnus
Okon Ubom
Ola A. B.
Ola Olumide Samson
Olanrewaju Samson Olaitan
Olopade Israel Temitope
Oluwole John Olatoke
Omatsone M Emmanuel
Onyejekwe Harriet Ijeoma
Samuel O. Ebong
Samuel I. Okon
Solomon Alexander Onung
Sunday Adekunle Adeogun
Tashok Yusuf Haruna
Titus Emem
Uduma-Olugu Nnezi
Usen P. Udoh
Uwemobong Bassey Ukpa
Victor Umoren
Wahab Muktar Babatunde

TABLE OF CONTENTS

Acknowledgements		iii
Preface		iv
Foreword		v
List of Authors		vi
Prof. Joseph Uyanga's Profile		vii
Table of Contents		x
Section One: Dynamics of Landuse		
1.	Deficiency of Street Trees in Benin City: A Survey of Residents' Perceptions	1
2.	Sustainable Urban Form and Public Space Utilization in Makurdi, Nigeria	12
3.	Travel Issues of Households in Minna, Nigeria	27
4.	Impact of Landuse/Landcover Change on Land Surface Temperature in Central Akwa Ibom State	39
5.	Effects of Rapid Urban Landuse/Landcover Change on Environmental Resource Sustainability in Warri Metropolitan Region	67
6.	Urban Landuse/Landcover Change and Flood Vulnerability in Lokoja, Nigeria	84
7.	Intra Urban Trip Generation and Distribution Pattern in Makurdi, Nigeria	102
Section Two: Urban Infrastructure		
8.	Public Infrastructure Facilities in Nigeria: The Management Question	124
9.	Determinants of Good Urban Governance and Infrastructure Service Delivery in Akwa Ibom State	137
10.	Appraisal of Vision 20:2020 Infrastructure Development Strategies in Nigeria	153
11.	Energy Infrastructure and Urban Development: A Review	170
Section Three: Sustainable Design & Construction		
12.	A Framework for Defining and Implementing Sustainable Urban Design	202
13.	Integration of Sustainable Design and Construction Principles into Organisational Structure of Firms	220
14.	Mitigating Buildings' Flood Hazards through Environmental Sustainable Road Design and Construction	236
15.	Application of Colours in Urban Design	251
16.	Application of Input-Process-Output Logic Model in Master Plan Design Process: A Case of Institutional Design	257
17.	Spatial Relationship and Integration of Functions in Institutional Buildings: A Case Study of University of Uyo, Nigeria	267
18.	Mitigating Flood Hazards through Landscape Design: Case of Lagos-Ogun Development Pressured Areas	276

Section Four: Housing		
19	Housing and Environmental Quality in Rural Akwa Ibom State	296
20	Conceptual and Methodical approach to Evaluation of Housing Adequacy	305
21	Population Dynamics and Housing Deficit in Nigeria	219
22	Landscaping and Housing Performance in Uyo Metropolis, Nigeria	331
23	Institutional Barriers to Sustainable Urban Housing Development in Lagos	349
24	A Review of Building Envelopes: Emerging Lessons from Nigerian Context	357
25	Administrative Performance of Enugu State Housing Development Corporation (ESHDC) in Public Housing Provision in Enugu Urban (1995-2020)	365
Section Five: Urban Development		
26	Economic Instruments for Sustainable Urban Waste and Environmental Improvement in Nigeria	382
27	Sustainable Cities and Economy	395
28	New Urban Agenda and its Domestication for Urban Development in Nigeria	407
29	Propellers of Urban Slum and Implications on Residential Environment in Mpape, Abuja	417
30	Domestic Water Demand Management Strategies in Urban Cross River State	429
31	Perceived Quality of Life in Informal Settlements in Yenagoa, Nigeria	439
Section Six: Environmental Ethics		
32	Environmental Justice and Land Acquisition in Lagos: A Review	453
Section Seven: Spatial Planning & Food Security		
33	Effects of Human Activities on Food Security in Ika South, Delta State	465
34	Morphological Transformation of Urban Agriculture: A Panacea to the Inevitable Trinity of Poverty, Hunger and Food Insecurity	495
Section Eight: Planning, Security & Environment		
35	An Overview of Crime Prevention through Environmental Design	514
36	Emerging Issues in Security, Drug Abuse and Technology towards National Development	529
Section Nine: Corporate Social Responsibility & Environmental Sustainability		
37	Corporate Social Responsibility and Community Development in Uyo	538
38	Corporate Social Responsibility and Environmental Sustainability	560
39	Corporate Social Responsibility and Sustainable Development	572
Section Ten: Population Growth, Quality of Life & Environmental Quality		
40	Evaluation of Community Participation in Rural Water Supply in Oron LGA, Akwa Ibom State	583

41	A Review of Conceptual and Character of Informal Settlements in Developing Countries	
42	Impact of Informal Development on the Quality of Residential Environment in GRA, Benin City, Nig.	594
43	Conceptual and Methodological Perspectives on Rural Water Supply	613
44	Solid Waste Management Problems in Ikot Abasi LGA, Nigeria	626
	Section Eleven: Real Estate & Investments	658
45	Disproportionate Returns on Residential Property Investment in Ilorin	
46	Real Estate Investment and Urban Growth	672
47	Online Marketing and Real Estate Business in Uyo, Akwa Ibom State	684
	Section Twelve: Environmental Education & Management	695
48	Communicating Climate Change in Africa through the Theatre for Development Process	
	Authors' Profile	706
		715
	Index	
		734

CHAPTER THREE

TRAVEL ISSUES OF HOUSEHOLDS IN MINNA, NIGERIA

Araoye Olarinkoye Ajiboye, Adelanke Samuel Owoeye, & Hauwa Yakubu-Wokili

Introduction

The urban centres of today are multidimensional, cover the enormous expanse of land and accommodate diverse activities (Hoyle & Knowles, 1998; Aderamo, 2004; Owoeye, 2018; Osoba, 2011; Raji, 2013). The consequence of this leads to the generation and attraction of an immense number of individual daily trips by urban centres. The spatial segregation of cities and land use types creates a spatial disparity that necessitates spatial interface for purposeful interrelationship. Many studies have been carried out such as Ayeni, (1974), Adeniyi, (1981), Ojo, (1990), Ogunsanya, (2002), Solanke, (2005), Badejo, (2011) Osoba, (2011) and Raji, (2013). The studies revealed that in general, people tend to travel in order to gain access to varieties of other people's services and facilities that are not available at the origins of their respective trips. The need for people to travel from one place to another arises as a result of the spatial spread of events within the spatial environment (Fadare & Salami, 2004). The movement has brought about the emergence of an increase in the usage of automobiles resulting in the extended trip length and high dependence on car usage (Handy, Weston & Mokhtarian, 2005). The extended trip length and high dependence on car usage invariably pose many travel issues to urban residents. Human activities take place in an environment that attracts mobility to land use within the city centre or the hinterland. Activities like working, shopping, religious, recreation and others influenced the movement of households within the city. The significance of transportation in this regard cannot be over-emphasised (Ojekunle *et al.*, 2018). Transportation majorly affects the relationship between physical space and society, and changes in transportation affect the organisation of human activities in urban and regional space. It structures the built environment, spurs urban growth, as well as orders relationships among cities in a national urban system (Yago, 1983). The search for explanation to the travel issues facing urban residents in developing countries, particularly Nigeria is not a conclusive one. More researches have been done to establish various issues of urban trip generations. Against this backdrop, this study attempts to analyse the various travel issues confronting households in Minna Metropolis, Nigeria. Accordingly, Clifton and Handy (2001) asserted that the more we understand about urban travel behaviour, the less we know, because as one question is answered, new questions emerge, and our gratitude of the complexity of urban travel behaviour challenges grows. This study, therefore, emphasised examining the problems facing households travel in Minna.

Literature Review

The study of travel behaviour over the last half-century has yielded critical insights into the choices that individuals and households make about their daily travel (Clifton & Handy, 2001). This information has added to the growth of more studies in America, Europe, Asia and Africa with increasingly sophisticated methods by researchers and transport experts to understand and predict travel behaviour. The findings of many of these studies have influenced to a great extent different transport planning decisions and policy issues in many countries of the world (Fadare, 1989; Mokhtarian, 2002; Srinivasan, 2005). Several factors affect the travel demand of households in different neighbourhoods, these include; socio-economic attributes of households, level of transport infrastructure development, religion, culture, government policy on reproduction, city structure, location of household within the town, accessibility to public transport, ownership of means of transport, among others. Scholars (Fadare 1987, 1989; Owoeye *et al.*, 2018; Ogunjumo, 1986; Pucher and Renne, 2003; & Fujiwara *et al.*, 2005) have identified household size, car ownership, income, age, gender, number of employed people in the family and occupation among others as primary socio-economic attributes of households that influence their travel behaviour in both developed and developing countries. Some studies in some nations in North America and Europe have established that residential density or location positively affects individuals and household travel behaviour (Hanson and Hanson, 1981) while comparative studies in Third world countries are limited in the literature. The study of Maunder *et al* (1981), Fadare (1987), and Fadare & Hay (1990) are some of the little studies that have been carried out in this area. One of the critical issues of travel behaviour is a travel mode choice decision. Mode choice plays a vital role in transportation planning and policy-making in any city. Past research has clearly shown that individual and household socio-economic characteristics have a strong influence on mode choice decision. They identified that income, gender, vehicle ownership, employment status are the most influencing variables in mode choice decision (Miller *et al.*, 2005; Bhat & Sardesai, 2006). Residential location and built environment attribute also play an important role in travel mode choice decisions (Pinjari *et al.*, 2007; Frank *et al.*, 2008). Wang (2015) used two neighbourhoods in Perth and Shanghai as a case study in explaining the extent that personal travel behaviour is affected by external factors such as land use system and the transport system. The findings confirmed the expected importance of socio-economic characteristics on motorisation and traveller's decision on travel mode choice.

Study Area and Methodology

Minna is a rapid budding urban centre and the administrative Capital of Niger State in North-Central Nigeria. It has an estimated population of 176754 persons. The study area is situated between Longitude 3°30' and 7°20' E and Latitudes 8°20' and 11°30' N; and lies entirely in the middle belt region of Nigeria. Kaduna State and Federal Capital Territory border the State to both North-East and South-West respectively. Minna occupied a total land area of 74,344 km², and it approximately covered about 8% of the total landmass of Nigeria. Three identical residential densities of low, medium and high were identified in Minna. Social, economic and physical patterns categorise these residential areas.

A cross-sectional survey method was used to examine the socio-economic characteristics and trip attributes of respondents. For this study, a multistage sampling technique was applied. The study area was divided into four major zones using the traffic corridors as boundaries. In each zone, three neighbourhoods of low, medium and high densities were identified. In determining the appropriate sample size, the current population of the city was obtained from the National Population Commission (NPC). From the record of NPC, Minna has a current estimated population of 176753 persons. However, since the household is the target population and according to the Nigerian Bureau of Statistics (NBS, 2010), six persons averagely live in a household. The total population in Minna was divided by six, which gave rise to 29,459 households. This population size is considered too large; however, Dillman (2007) formula for determining the appropriate sample size was used. Based on this, the total number of 1303 persons as sample size was gotten. Questionnaires were administered on this population using Open Data Kit (ODK) at 12 residential locations in the city. The locations were chosen based on the densities and characteristics of residential land uses. Figures 1- 3 show the Study Area and the four cluster areas of the city. The locations shown in green colour (Fig 3) are the selected residential areas for data collection. Systematic random sampling method was adopted for questionnaire distribution on household heads based on the population of the neighbourhoods in each neighbourhood. In cluster A; Bosso Estate, Jikpanand Dutsen Kura neighbourhoods were selected, while in Cluster B; Angwan Daji, Bosso Town, and F-Layout neighbourhoods were selected. In cluster C; Maitumbi, Chanchaga and Tudun Wada North were the selected neighbourhood while, BarkinSaleh, SakaKahuta and Tunga were selected in cluster D. A total of 1303 questionnaires were administered, out of which only 888 questionnaires were returned valid and suitable for analysis (Table 1).

Table 1: Proportional Samples per Neighbourhoods

S/N	Neighbourhoods	2006 Census Results	Projected Population 2016	Number of Households	Households Sample size	Households Questionnaires
A	Bosso Town	43,856	60,091	10,015	5	5
A	Dutsen Kura	6,604	9,049	1,508	67	48
A	Jikpan	6,604	9,049	1,508	67	50
B	Bosso Town	43,856	60,091	10,015	443	278
B	F-Layout	6,604	9,049	1,508	67	52
B	AgwanDaji	612	839	140	6	6
C	Maitumbi	17,775	24,355	4,059	180	125
C	Tudun-Wada North	6,494	8,898	1,483	66	50
C	Chanchaga	23,236	31,838	5,306	235	148
D	Barkin sale	5,862	8,032	1,339	58	44
D	Tunga	6,494	8,898	1,483	66	46
D	SaukaKahuta	4,274	5,856	976	43	36
	Total	128,998	176,753	29,459	1,303	888

Source: NPC, 2006 and Authors Projection and compilation (2016)

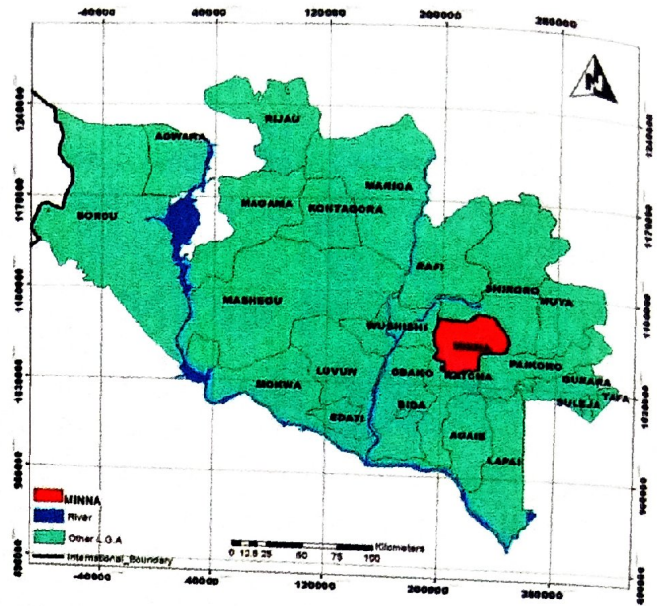
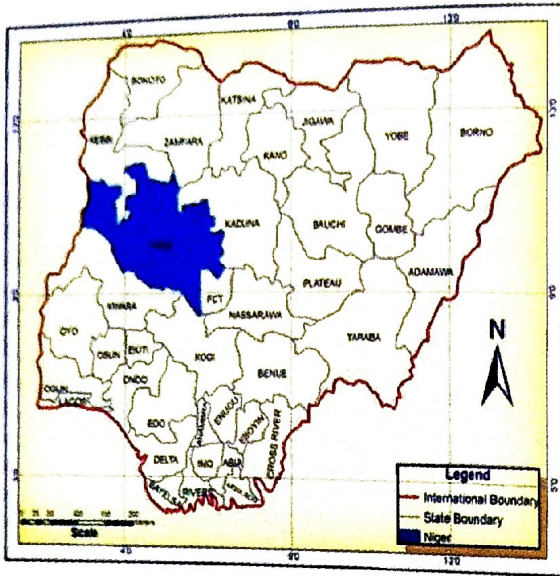


Figure 1: Map of Nigeria Showing Niger State. Figure 2: Map of Niger State showing Minna
 Source: Niger State Ministry of Land and Housing

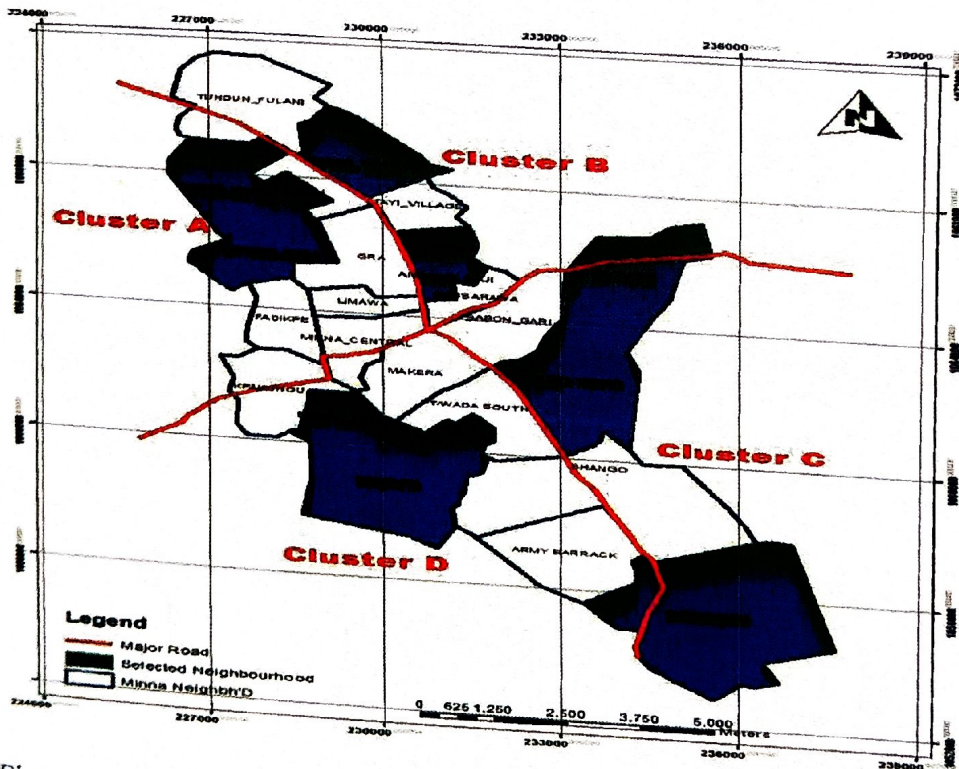


Figure 3: Selected 12 Neighbourhoods in Minna; Source: Author's Field Work (2017)

Results and Discussion

Specific socio-economic attributes analysed in Table 2 shows that the preponderance of male respondents with 63.9% over a female with 36.1%. Respondents below 30 years were 43%; 31-40 years were 24%, while respondents higher than 60 years have 5%. Analysis of educational status reveals that 84.4% of respondents have formal education, while 15.6% were without formal education. Table 2 reveals that 83.7% of respondents were employed

into formal (49.8%) and informal (33.9%) activities. Within the context of current income level in Minna Metropolis, three income groups were identified (Low, Medium and High income). Results show that 31.2% were low-income earners, 49.1% medium, and 19.7% of respondents were high-income earners, respectively. Respondents with household size between 5 and 8 are 54.5% while one car-owning household accounted for 53.9% of the respondents sampled.

Table 2: Socio-economic Characteristics of Respondents

Variable		Frequency	Percentage
Gender	Male	567	63.9
	Female	321	36.1
	Total	888	100
Age	<30yrs	382	43
	31-40yrs	213	24
	41-50yrs	151	17
	51-60yrs	98	11
	>60yrs	44	5
	Total	888	100
Education Status	No formal education	138	15.5
	Primary school	25	2.8
	Secondary school	182	20.5
	Tertiary	543	61.1
	Total	888	100
Occupation Status	Informal	302	34
	Formal	444	50
	Students	44	5
	Unemployed	36	4
	Retired	62	7
	Total	888	100
Income status	Low (<#30,000)	277	31.2
	Medium (#30,000-#70,000)	436	49.1
	High (>#70,000)	175	19.7
	Total	888	100
Household size	Btw 1-4	215	24.2
	Btw 5-8	484	54.5
	>8	189	21.3
	Total	888	100
Number of Cars in the household	0	60	6.8
	1	479	53.9
	2	282	31.8
	3	48	5.4
	>3	19	2.1
	Total	888	100

Source: Authors' Data Analysis

Table 3: Travel Difficulties Experienced by Respondents in Minna

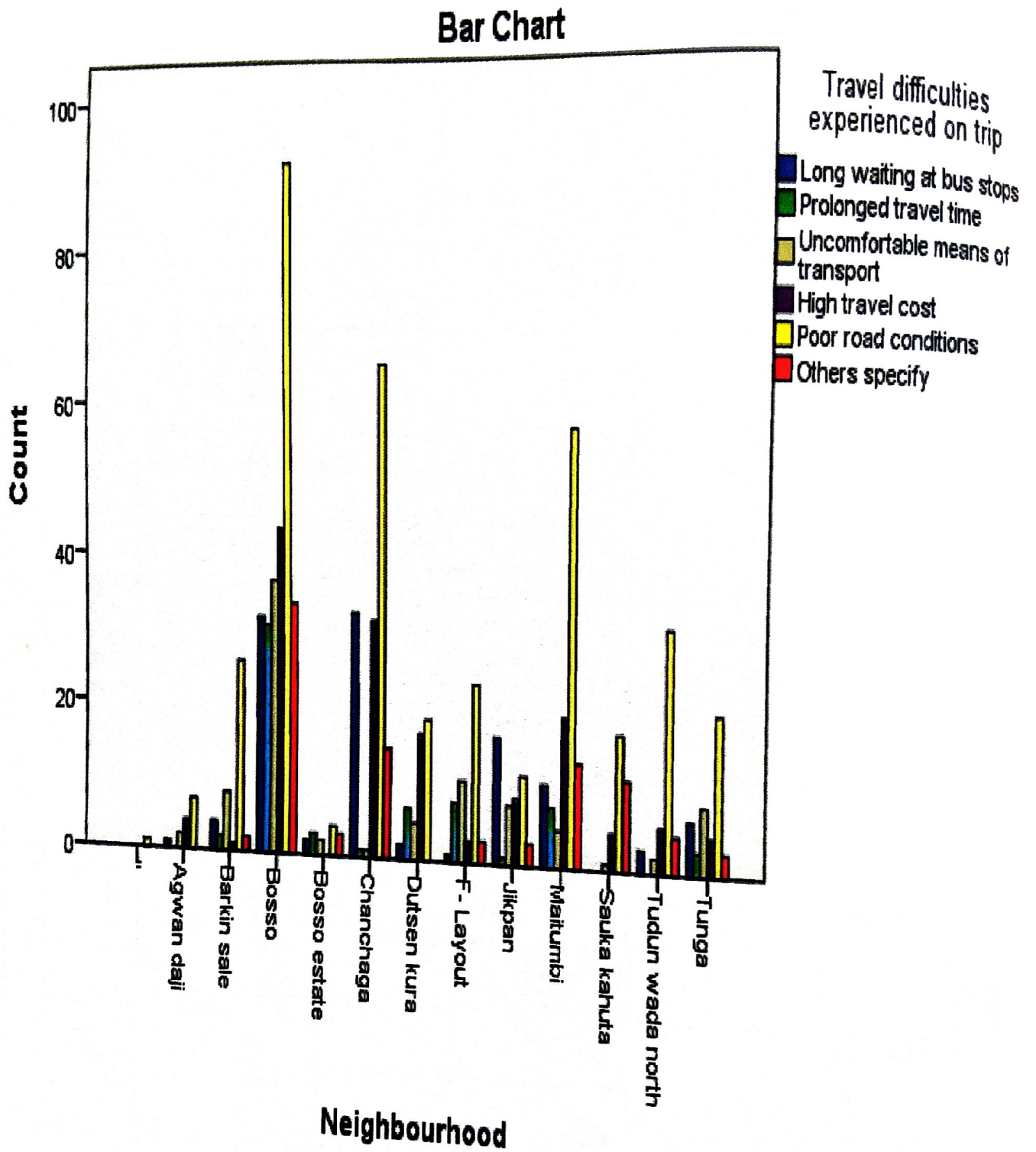


Figure 4: Travel Difficulties Experienced in Minna; Source: Authors' Data Analysis

		Long waiting at bus stops	Prolonged travel time	Uncomfortable means of transport	High travel cost	Poor road conditions	Others specify	Total
	Count % within Neighbourhood	0 0.0	0 0.0	0 0.0	0 0.0	1 100.0	0 0.0	1 100.0
Agwandaji	Count % within Neighbourhood	1 7.1	0 0.0	2 14.3	4 28.6	7 50.0	0 0.0	14 100.0
Barkin sale	Count % within Neighbourhood	4 9.3	2 4.7	8 18.6	1 2.3	26 60.5	2 4.7	43 100.0
Bosso	Count % within Neighbourhood	32 11.9	31 11.5	37 13.7	44 16.3	92 34.1	34 12.6	270 100.0
Bosso estate	Count % within Neighbourhood	2 14.3	3 21.4	2 14.3	0 0.0	4 28.6	3 21.4	14 100.0
Chanchaga	Count % within Neighbourhood	33 22.3	1 .7	1 .7	32 21.6	66 44.6	15 10.1	148 100.0
DutsenKura	Count % within Neighbourhood	2 4.0	7 14.0	5 10.0	17 34.0	19 38.0	0 0.0	50 100.0
F- Layout	Count % within Neighbourhood	1 2.0	8 16.0	11 22.0	3 6.0	24 48.0	3 6.0	50 100.0
Jikpan	Count % within Neighbourhood	17 34.0	1 2.0	8 16.0	9 18.0	12 24.0	3 6.0	50 100.0
Maitumbi	Count % within Neighbourhood	11 9.5	8 6.9	5 4.3	20 17.2	58 50.0	14 12.1	116 100.0
SaukaKahuta	Count % within Neighbourhood	0 0.0	0 0.0	1 2.8	5 13.9	18 50.0	12 33.3	36 100.0
TudunWada North	Count % within Neighbourhood	3 6.3	0 0.0	2 4.2	6 12.5	32 66.7	5 10.4	48 100.0
Tunga	Count % within Neighbourhood	7 14.6	3 6.3	9 18.8	5 10.4	21 43.8	3 6.3	48 100.0
Total	Count % within Neighbourhood	113 12.7	64 7.2	91 10.2	146 16.4	380 42.8	94 10.6	888 100.0

Source: Authors' Data Analysis

Figure 4 and Table 3 show that at AgwanDaji Neighbourhood, 7.1% of commuters experienced long waiting time at bus stops, 14.3% witnessed uncomfortable means of transport while, 28.6% encountered high travel cost when travelling in the study area. At Barkin sale, 9.3%, 4.7% and 18.6% of respondents experienced long waiting time, prolonged travel time and uncomfortable means of transport. While 2.3%, 60.5% and 4.7% passed through high travel cost, poor road conditions and other forms of difficulties while making a trip.

At Bosso Neighbourhood, 11.9%, 11.5% and 13.7% of commuters experienced long waiting time at bus stops, prolonged travel time and uncomfortable means of transport. Huge travel cost, poor road conditions and other difficulties make up 16.3%, 34.1% and 12.6% of travel difficulties experienced in the study area. Poor road conditions, prolonged travel time and other travel difficulties make up 28.6% and 21.4% of difficulties experienced by commuters while long waiting time and uncomfortable means of transport take 14.3% of travel difficulties at Bosso estate. At Chanchaga Neighbourhood, 44.6% of commuters agreed to poor road conditions as travel difficulties experienced, 22.3% and 21.6% of trip makers experienced long waiting time at bus stops and high travel cost. 0.7% encountered prolonged travel time and uncomfortable means of transport even as, 10.1% of respondents are challenged with other travel difficulties. At Dutsen Kura Neighbourhood, poor road conditions take up 38.0% of travel difficulties experienced, followed by high travel cost with 34%, while, prolonged travel time, uncomfortable means of transport and long waiting time at bus stop takes 14.0%, 10.0% and 4.0% as travel challenges experienced respectively. At F-layout Neighbourhood, the leading travel difficulties faced by respondents are poor road conditions (48.0%), uncomfortable means of transport (22.0%), prolonged travel time (16.0%), high travel cost and other travel difficulties (6.0%) while, the least is long waiting time at bus stops with 2.0%. At Jikpan Neighbourhood, 34% and 24.0% of travel difficulties faced are long waiting time and poor road conditions, while uncomfortable means of transport and high travel cost is 16.0% and 18.0% respectively with 6.0% and 2.0% making up other travel difficulties and prolonged travel time. At Maitumbi Neighbourhood, the most travel difficulties experienced is poor road conditions taking up 50% followed by high travel cost 17.0% while the least travel challenges faced by respondents are uncomfortable means of transport which is 4.3%. At SaukaKahuta Neighbourhood, high travel cost is the main difficulties experienced by respondents while uncomfortable means of transport is the least with 2.8%. At Tudun Wada North, 66.7% of travel difficulties experienced by respondents are poor road conditions with uncomfortable means of transport being the least with 4.2%. At Tunga Neighbourhood, 43.8% of travel difficulties experienced are poor road conditions followed by 18.8% uncomfortable means of transport while the least is prolonged travel time and other travel difficulties with 6.3%.

Conclusion and Recommendations

The study shows the preponderance of male respondents, with 63.9% over a female with 36.1%. It also shows that 83.7% of respondents are employed, while 19.7% were of the cadre of high-income earners. Household size of between 5 and 8 was found to be dominant in Minna with 53.9% being single car-owning households. Moreover, the study revealed

that the poor condition of the road is a significant travel difficulty experienced by households across the city. From the findings, specific recommendations relating to policy issues are made for the city managers and planners. The first policy implication noticed is that there is an improvement in socio-economic activities among residents. Invariably it has an implication on the level of spatial interaction among various land uses in the city, which in turn influence the transport demand and supply in the city as trip generation increases. Therefore, city transportation planners and managers need to ensure that the quality of road networks across the city are improved upon to enhance the smooth flow of traffic and ease travel difficulties experienced by residents across the urban space. It is high time the Municipal Government introduced an effective and efficient mechanism in ensuring smooth road network across the city. Maintenance monitoring team should be mobilised to routinely inform and make recommendations for road repairs as at when due. It is therefore essential to focus attention on those routes that link the major trip generating and attracting zones by providing adequate traffic management and control measures in order to ensure the free flow of traffic.

References

- Adeniyi, S.A. (1981). *Public transportation and urban development strategy in Nigeria*. Unpublished PhD. Thesis, University of Wales.
- Aderamo, A. J. (2004). *Planning for urban transportation in Nigeria* : In Vandu-Chikolo, J., A.A. Ogunsanya and A.G. Sumaila (Eds), *Perspectives on urban transportation in Nigeria*. NITT Zaria, Pp. 312-231.
- Ayeni, M.A. O. (1974). *Predictive modelling of urban spatial structure: The example of Jos, Benue-Plateau State, Nigeria*. Unpublished PhD Thesis, University of Ibadan.
- Badejo, B. A. (2011). *Transportation, removing the clog to Nigeria's development*. Anchorage Press and Publishers, Lagos, Nigeria.
- Bhat, C. R., & Sardesai, R. (2006). The impact of stop-making and travel time reliability on commuter mode choice. *Transportation Research Part B*, 40(9): 709-730.
- Clifton, K. J., & Handy, C.L.(2001). *Qualitative methods in travel behaviour research*. A paper presented at the International Conference on Transport Survey Quality and Innovation, Kruger National Park, South Africa.
- Dillman, D.A.(2007). Mail and Internet Survey- the tailored design method, 2nded. New York. <https://www.researchgate.net>.
- Fadare, S. O., & Hay, A. M. (1990). Housing densities, lifestyle and travel behaviour in Third World City: The example of Ibadan. *The Nigerian Journal of Economic and Social Studies*, 32(2):177-191.
- Fadare, S. O. (1989). *Analysis of factors affecting Household trip generation in the Residential Area of Ibadan*. *Ife Research Publications in Geography*, 3.
- Fadare, S. O. (1987). *Intra-urban travel characteristics: A study of Socio-economic attributes in Ibadan*, PhD Thesis submitted to University of Sheffield, England.
- Fadare, S. O., & Salami, B.T. (2004). Telephone uses and the travel behaviour of residents in Osogbo, Nigeria; An empirical analysis. *Journal of Transport Geography*, 12, 159-164.
- Frank, L., Bradley, M., Kavage, S., Chapman, J., & Lawton, K. (2008). Urban form, travel time, and cost relationships with tour complexity and mode choice. *Transportation*, 35(1), 37-54.
- Fujiwara, A., Soehodho, S., Hyodo, T., & Montalbo, C. (2005). Urban travel behaviour characteristics of 13 cities based on household interview survey data. *Journal of East Asia Society for Transport Studies*, 6:23-38

- Handy, S., Weston, L., & Mokhtarian, P. L. (2005). *Driving by choice or necessity?* Transportation Research Part A: Policy and Practice Positive Utility of Travel, 39(2-3): 183-203.
- Hanson, S. & Hanson, P. (1981). The travel activity pattern of urban residents: dimensions and relationships to socio-demographic characteristics. *Economic Geography*, 332-347.
- Hoyle, B.S. & Knowles, R. D. (1998). *Transport geography: An introduction*, in Hoyles, B.S. and Knowles, R. D. (ed.), *Modern transport geography*, John Wiley and Sons, Pp. 1-12.
- Maunder, D.A.C., Fouracre, P.R., Pathak, M. G., & Rao, C.H. (1981). Characteristics of public transport demand in India Cities.
- Miller, E.J., Roorda, M.J., & Carrasco, J.A. (2005). A tour-based model of travel mode choice. *Transportation*, 32, 399-422.
- Mokhtarian, P. I., & Meenakshisundaram, R. (2002). The patterns of telecommunicating and engagement and frequency: A cluster analysis of telecenter users. *Prometheus*, 20(1): 21-37
- Ogunjumo, A. (1986). The pattern of trip generation at Ile- Ife. *Journal of the Nigerian Institute of Town Planner*, (6&7): 99-114.
- The pattern of trip generation at Ile-Ife. J. Nigerian Institute of Town Planners (1986), pp. 99-114.
- Ogunsanya, A.A. (2002). *Maker and Breaker of Cities*. 59th Inaugural Lecture, University of Ilorin, Ilorin.
- Ojekunle, J.A. & Owwoeye, A.S. (2018). Spatial pattern of household travel in Minna. *International Journal of Research-Granthaalayah*, 6(5):276-288.
- Ojo, O.E. (1990), *Urban travel-activity pattern: A case study of Ibadan, Nigeria*. Unpublished PhD Thesis, Geography Department, University of Ibadan, Ibadan.
- Osoba, S.B., (2011). Variation in the ownership of a global system for mobile communication GSM among the socio-economic group in Lagos, Nigeria. *Journal of Logistics and Transport*, 3(1):79-94.
- Owoeye, A. S. (2018). *Travel behaviour of households in Minna, Niger State*. Unpublished M.Tech. Dissertation, Department of Transport Management Technology, Federal University of Technology, Akure.

- Owoeye, A. S., Fadare, S.O &Ojekunle, J.A., (2018), Households' socio-economic characteristics and urban travel behaviours in Minna metropolis, Nigeria. *International Journal of Research Publications*.9(1) 2018.
- Raji, B.A.(2013). Spatial analysis of pedestrian traffic in Ikeja, Lagos State, Nigeria. Unpublished PhD Thesis, Department of Geography, University of Ibadan.
- Pinjari, A.R.,Pendyala, R. M., Bhat, C. R., & Waddell, P. A. (2007).Modelling residential sorting effects to understand the impact of the built environment on commute mode choice. *Transportation*, 34(5): 557-583.
- Pucher.J.,&Renne J. (2003).The Socioeconomics of urban travel: evidence from the 2001 national household travel survey. *Transportation Quarterly*,57(3): 49-77.
- Solanke, M. O. (2014).Socio-economic determinants of intra-urban trips generation in Ogun State, Nigeria. *Current Research Journal of Social Sciences*, 6(1): 15-20.
- Srinivasan, S. (2005).*Influence of residential location in the travel behaviour of women in Chennai*, India. Deas-Division of Engineering and Applied Sciences, Harvard University.
- Wang, S. (2015).*The function of individual factors on travel behaviour: comparative studies on Perth and Shanghai*, in Burton, P. and Shearer, H. (ed), Proceedings of the State of Australian Cities Conference, Gold Coast, Queensland: Australian Cities Research Network.
- Yago, G. (1983). The sociology of transportation. *Annual Review of Sociology*. 9:171-190. <https://doi.org/10.1146/annurev.so>