URBAN DYNAMICS AND VULNERABILITY TO DISASTERS IN LAGOS STATE, NIGERIA (1982 – 2012)

By

OLUWASINAAYOMI FAITH KASIM

B.Sc (Hons), Geography (Ibadan); M.U.R.P,
Urban and Regional Planning (Ibadan)

A Thesis in the Department of Urban and Regional Planning
Submitted to the Faculty of the Social Sciences,
in Partial Fulfillment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN

December, 2014

CERTIFICATION

I certify that this work was carried out by Mr. KASIM, O. F. in the Department of Urban and Regional Planning, University of Ibadan.

……………………………………………………………..
Supervisor
Prof. C. O. Olatubara,
Ph.D. (Ife),
Professor, Department of Urban and Regional Planning,
University of Ibadan, Nigeria

DEDICATION

This thesis is dedicated to my Late Grand Mother Chief Sarah Adesoro for her care, mentoring, motivating and super motherly roles in my life and to the Almighty God, the giver of wisdom, knowledge and understanding.

ACKNOWLEDGEMENT

I wish to use this medium to unalloyedly express my profound gratitude to my supervisor, friend, financier and tutor, Professor Charles Olufisayo Olatubara who gave all the necessary support and soft-landing towards the completion of the thesis. My unreserved acknowledgement goes to Professor Samuel Babatunde Agbola, my mentor on and off the academic landscape. Sir, the three secrets to success given to me, albeit unmerited but invaluable, are still being kept in my cache and acting as my vision and mission statements.

I wish to acknowledge the effort of Professor Layi Egunjobi and the immediate past Head of Department, Dr. Lekan Sanni for their forthrightness but laced with encouragement towards the accomplishment of this thesis. I also wish to express my sincere gratitude to Dr Bolanle Wahab, Dr Godwin Ode Ikwuyatum and Dr Olutoyin Fashae for reading the post-field work and providing necessary suggestions. To Dr. Dickson Ajayi, thank you for the helping hands in scaling the hurdles of abstract. My special thanks also go to Dr Olusuyi Ipingbemi, Dr Moruf Alabi, Dr Joe Omirin Dr Adams Ajigbogun-Jimoh (Moye) and Dr David Olakunde who assisted and encouraged me in various ways during the writing of this thesis. I cannot forget Late Monday Shari, Saeed Ojolowo, Segun Morolari, Segun Falola and Abiodun Audu for their immeasurable assistance in the final production of this thesis. The administrative staffs of the Department are also appreciated. To all my classmates at the Master and Doctoral levels especially Tunde Kolade, Ayotunde Olagbemi, Dr Tayo Odunola, Toybat, Dr Ifesanya, Sade Odekunle, David Taiwo, Michael Adetunjiand host of others, thank you for your support and encouragement.

My laboratory, the National Emergency Management Agency (NEMA), manned by giants which include but not limited to: Muhammad Sani Sidi (DG), Charles Agbo (Ph.D), Aliyu Sambo, Kayode Fagbemi, Ben Oghenah, James Akujobi, Fatima Kasim, Adamu Usur, Skari Demas, Justin Uwazuruonye, Yinka Afolabi (Oxfam), Tunde Ajiboye, Victor Nwaubani, Tony Ephraim, Abdulrazak Musa, Babuba Sunday, Thickman Tanimu, Garki Imam, Fred Anusim, Hayatu Abdulkadri, Hajia Hauwa Sabir, Funmi Oyinsan, Joke Raji, Julius Dave, Funmi Obolo, Bunmi Akanbi (Moye), Igozi Iyase, Godwin, Williams Uzowulu, Sunday Amama, Jumoke Ogungbe, Ogunbambi Kemi (Auntie), Nabila Ibrahim, Isabella Ekpo and Bulus Wando (the General). Others who had contributed significantly to the completion of this thesis are: Alhassan Nuhu, Akande Iyiola, Pero Oladeinde, Tunde Olowookere, Dapo Akingbade, Michael Adeyanju, Saheed Akiode, Kadiri Sakiru, Tope Ajayi, Kazeem Olarenwaju, Anjolaoluwa Oguntokun, Alhassan Alhassan, Nkoyo Eyo, Nkiru Nwokeabia and Oluchi Gregory. You guys are the bomb.

To my family: Mama and Baba, Nike, Sola, Sunday, Kemi, Ayo, Taiwo, Kehinde, Idowu and everybody on the home fronts especially Michael Adegoke Bakare I am grateful. Tunde Babalola, Hassan Adetunji, Ope Olowoniyi, Kayode Alhassan, Taiwo Olurin and other friends thank you.

Finally, my overarching gratitude goes to my divine, better-half, help meet and wife Dr. (Mrs) Rita Oyin Kasim and my son, Oluwanife Gomez and daughter, Oluwatomife Elluz, thank you for your love, care, provisions and understanding. You are deeply appreciated. Stay blessed and be totally transforme

Kasim, Oluwasinaayomi Faith

ABSTRACT

The terrain, morphology, socio-economic characteristics coupled with lateral urban growth and increasing population concentration expose Lagos state to different types of disaster. Studies on disasters in Lagos have focused on the types and their impact to the neglect of vulnerability factors and disaster patterns. This study, therefore, investigated the relationship between urban dynamics (change in population, morphology and urban spatial expansion) and vulnerability to disasters in Lagos state (1982-2012) where flooding and building collapse are common occurrences.

Forrester's urban dynamics theory provided the analytical framework. Cross-sectional survey design was adopted. A multi-stage sampling technique was used to select 1576 Heads of Household (HH) in direct proportion to existing housing stock in five Mainland Local Government Areas (LGAs) [Lagos Mainland –LM (67), Mushin (153), Oshodi-Isolo (197), Shomolu (214) and Surulere (106] and four Lagos Suburb (LS) LGAs [Alimosho (290), Ajeromi-Ifelodun (232), Ikorodu (234) and Kosofe (83]. A structured questionnaire was used to collect data from HH. Observation checklist containing vulnerability indices and satellite imagery were used to document existing infrastructural facilities and residential neighbourhood densities, adherence to urban and regional planning regulation and standards in addition to recorded data on building collapse in Lagos state. The National Population Commission's trend of population growth in LM and LS and Land Use/Land-cover Change (LULC) imageries obtained from Global Land Cover Facility were used as urban dynamics indices. Geographic Information System was used to analyse LULC (Landsat imageries 1984 and 2010) and to simulate flood-risk scenarios. Data were analysed using descriptive statistics, logistic regression and ANOVA at $p \leq 0.05$.

Eighty-eight per cent of the buildings were built of sandcrete blocks (91.4% in LS and 83.9% in LM); 84.2% (LS) and 38.3% (LM) were not linked to pipe-borne water, while, 72.3 % (LS) and 43.1% (LM) did not have storm water drainage. About 74.0% (LS); 37.2% (LM) did not adhere to planning setback and maximum building-plot ratio. Also, 68.0% (LS) and 27.3% (LM) had encroached into natural flood plains. One hundred and thirty-eight buildings collapsed in the study area with 81.9% occurring in LM. Population of LM increased by 32.3% while that of LS increased by 87.4%. Vegetation cover reduced from 46.5% to 26.6% in LS and from 32.7% to 22.3% in LM while urban land use increased from 17.3% to 51.3% in LS and from 28.8% to 31.5% in LM. Buildings became vulnerable as flood-risk increased by one metre Above Sea Level (ASL) (8.3% in LM; 17.6% in LS). At two metres ASL, (19.1% LM; 31.5% LS) buildings were vulnerable to flood. The effects of urban dynamics on vulnerability to flood (R^2=0.473) and building collapse (R^2=0.524) were significant. Vulnerability to disaster varied by housing density across residential neighbourhoods for building collapse ($F_{(2,86)}$=17.88).

Increasing population growth, flood-plains encroachment and non-adherence to planning regulation are factors influenced vulnerability to disaster in Lagos state. Adherence to land use planning regulation and flood-plain buy-back were recommended as vulnerability reduction strategies.

Keywords: Forester's urban dynamics theory, Vulnerability to disasters, Flood-risk simulation, land use planning

Word count: 481

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The world has been experiencing dramatic environmental and socio-economic changes in recent decades. Phenomenon like the changing urban dynamics in the developing countries is associated with economic development, population growth, rapid urbanisation, unprecedented land use and land cover change, environmental degradation, climate change, and increase in disaster incidences have affected the social and economic development in this region and other parts of the world. The consequence of these changes is that many people have become more vulnerable to the negative effects of different hazards. Hazard in this context means: a property or situation that under particular circumstances could lead to harm. More specific, a hazard is a potentially damaging physical event, phenomenon or human activity which may cause loss of life or injury, property damage, social, cultural, political and economic disruption or environmental degradation. Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterised by its location, intensity and probability (International Strategy for Disaster Reduction, 2004; Makoka and Kaplan, 2005)

The number of reported major catastrophes and their impact on social and economic development has been increasing worldwide. With the growing of an increasingly urbanised world population, the potential for human-induced and natural disaster is growing daily. According to Munich Reinsurance (2004), over the last decade, around 7,000 natural disasters including earthquakes, volcanic eruptions, tropical cyclones, floods and droughts have occurred, killing more than 300,000 people and causing over US$ 800 billion in economic losses. As a result of global climate change and climate variability, the frequency and intensity of climate-related events are likely to increase. While all countries may be confronted with natural hazards, as noted by Herrmann *et al* (2004), the poorer developing countries, in particular, are disproportionately vulnerable to those hazards turning into disasters.

Globally, the worsening plight of the millions of people living in appalling shelter conditions has been recognized as one of the major problems facing humankind. This problem is further compounded by accelerating poverty, while high rate of population growth and burgeoning urbanisation continue to adversely affect the quality of the existing infrastructural facilities and services in the developing world. The last few decades have brought enormous changes to the world's population and human settlement and these have caused increased flurry of activities and concern amongst city analysts, urban managers and policy makers in terms of vulnerability to and or occurrence of disaster (UN-Habitat, 2002a).Vulnerability to disaster usually refers to the ability of an individual or a group to prepare, respond, cope and recover from a disaster (Robertson, 1992 and Blaikie *et al,* 1994).

The world's population in 1995, according to UN-Habitat (1996), United Nations Organisation [UNO] (1996) and International Human Dimensions Programme on Global Environmental Change [IHDP] (2005) was estimated at 5.7 billion and it continues to grow by 83 million people per year. There has been more growth in population in the last fifty years than the previous 2 million years that humans have existed. Currently, the rate of population increase is 1.2 % per year, which means the global human population is on a trajectory to double again in 58 years. Presently, the world population has reached the 7 billion milestone while the global rural-urban balance of populations has tipped irreversibly in favour of cities. Tokyo emerges as the world's largest urban area under this definition, with 36.7 million people, which is more than a quarter of the national population. Tokyo is followed by Delhi, with 22 million; São Paulo, 20 million; Mumbai, 20 million; Mexico City, 19.5 million; New York-Newark, 19.4 million; Shanghai, 16.6 million; Kolkata (Calcutta), 15.5 million, Dhaka, 14.7 million, Karachi, 13 million and Lagos, 9 million. Each of these cities reflects a different pattern or path of planning and governance and a different composition of affluence and poverty (United Nations Population Division, 2003; Population Media Centre, 2009; United Nations Population Fund, 2011).

The rate of urbanisation and its attendant socio-economic and spatial consequences have been of tremendous concern, especially to all professionals in human settlements and to policy makers and analysts. It is pertinent to note that the problem of urbanisation in the developing countries is not necessarily that of the level but that of the rate. For instance, while the level of urbanisation in Nigeria is 36 %, that of South

Korea, Mexico and Colombia is 79, 74, and 71 % respectively (Federal Government of Nigeria [FGN] 1997; Population Reference Bureau 2001; Olatubara 2002). However, the rate of urbanisation in Seoul is 7.8 %, Mexico City 5.5 % and Bogotá 5.4 % while that of Lagos is 15 % per annum. This rapidity in the rate of urban expansion is so overwhelming that it generally far exceeds the speed with which urban managers in Nigeria are able to respond to the dynamics of urbanisation, occasioned by skewed economic growth, population increase and lateral expansion, due to inadequate facilities, resources and capabilities at their disposal (Olatubara, 2002 and 2007).

Thus, the rapid rate of urban agglomeration has been faced with colossal urban environmental challenges such as the growth of urban slums and informal settlements characterised by substandard housing; inadequate or absence of basic infrastructural facilities and services; poor environmental sanitation; air, water and noise pollution; urban sprawl and squalor (Agbola, 2005a). Other observable indices of declining urban quality include unemployment or underemployment; overcrowding; incessant civil unrest; infectious diseases; prostitution, sexually transmitted infections (STI), crime and municipal budget crisis. The result is that all the cities and urban agglomerations have paradoxically become centre of excellence in urban squalor and aggravated poverty, exhibiting human misery, training grounds for various types of gangsterism, diverse category of civil and violent crimes and perhaps more despairingly, an apparent absence of credible, futuristic and sustainable urban management system which could evolve alternative future for the contemporary urban systems (Agbola, 2005a). The combination of all these environmental challenges create instance recipe for human-induced and nature induced disasters (Smith, 2005).

Twigg (1998) contended that there are no such things as natural disasters, but there are natural hazards. A disaster is the result of a hazard's impact on the society. Hence, the effects of a disaster are determined by the extent of a community's vulnerability to the hazard or, conversely, its ability or capacity to cope with it. Thus, vulnerability is not natural but the result of an entire range of constantly changing physical, social, economic, cultural, political and even psychological factors, especially in urban settings, that shape people's lives and create the environments in which they live. For that reason, natural disasters could be seen as nature's judgement on what humans have wrought.

Nigeria is bedevilled with natural and human induced disaster such as, flood, drought, famine, disease, fire, land degradation, ocean surge, erosion, landslide, windstorm, vehicle and aviation crash, boat mishap, oil spillage, and terrorism (Ojo, 2013; Wahab, 2013). However, the natural hazards the country faces, from time to time, are ones that are aggravated by human activities and are almost always preventable. For example, desertification and or desert encroachment in the sahel and sudan savannah of the extreme north western and north eastern parts of the country can be stemmed by embarking on purposeful and functional enlightenment campaigns to prevent communities within these regions from felling trees indiscriminately for fuel wood. In addition, flood disasters can be controlled in most of the urban centres if people adhere to the minimum space standard between drain and building and by not building structures within and or along the natural flood plain of urban rivers. As opined by Nigerian Environmental Study/Action Team [NEST] (1991), the increasing frequency and severity of floods in urban centres in Nigeria do not stem from increased rainfall. On the contrary, rainfall amounts have, overall, been on the decrease, but the increased floods are in response to an increasing rate of urbanisation in the absence of well-articulated and comprehensive physical planning and development control in the cities.

Urban areas are not, by nature, more vulnerable to disasters. Instead, it is the structural and dynamic processes occurring in an urban area which accelerate urbanization and concentrate population in places within the city that increase vulnerability. Consequently, vulnerability needs to be examined in relationship to changes in socio-spatial patterns that occur in urban systems (Makoka and Kaplan 2005). However, in Lagos State today, the urban dynamic processes triggered by the provision of low income housing from early 1970s to early 1980s, increase the probability that a dangerous event (natural or technological) could be disastrous or resulted into a disaster. Among those factors and processes are the size of the city, the characteristics of its settlements, the cultural and economic capacities of its inhabitants, the socio-economic gaps between the different social groups, demographic and physical factors and the nature of urban planning and development control (Olorunfemi 2009). Lagos state is exposed to natural hazards of hydro-meteorological origin (which can cause flooding, land subsidence and diseases epidemic). Added to these natural hazards are dangers derived from human activities, which also facilitates technological accidents.

1.2 Statement of problem

Disaster has never been a new phenomenon in the life of humanity; it dates back to the biblical days of Noah, when he was told to build an ark in order to save humanity from the impending flood disaster (Holy Bible [Genesis, Chapters 6 and 7], 2010). With an increasingly urbanised population, especially in the developing countries, the potentials for human-induced and natural disasters are growing daily. According to McCall (1992), the concept of natural disaster is an ambiguous one, for many catastrophic events within the human environment are human-induced or at least made worse by humans' activities.

Ojo (2001), noted that the impact of natural and human-induced disasters on people and human settlements in Nigeria, most especially Lagos State, are becoming greater. This development is frequently caused by vulnerabilities created by human actions such as uncontrolled or inadequately planned human settlements, lack of basic infrastructure and the occupation of disaster-prone areas. Poverty and ignorance are also identified to be contributing to some of these problems. Therefore, the induced disasters exerted heavy toll on humans in terms of loss of lives, destruction of socio-economic infrastructure and the negative impact on already fragile ecosystems is equally colossal (Olorunfemi, 2009). Thus, in many parts of the city, natural and human-induced disasters will continue to occur. However, human actions will either increase or reduce the vulnerability of societies to disasters depending on the kind of practices they engaged in. For example, it has been documented in most of the Nigerian's cities that, changing demographic and economic patterns resulting from rural-urban, inter- and intra-urban migration would lead to uncontrolled urbanisation and widespread poverty which would, invariably, push large number of people to live in disaster-prone areas. Similarly, there is a considerable possibility for the reduction of risks through the application of disaster abatement and mitigation efforts based on modern forecasting technology as well as improved human settlement plans and building practices.

Natural and human-induced disasters come in many forms and it is when nature comes into conflict with humans that catastrophe results. For a hazard to be called a public disaster, according to Blong (1992), human life, property, and social infrastructure had to be lost to the event and socio-cultural attributes of people in such environment affected. In this regard, if windstorm causes havoc to thatch and mud structures in a remote hamlet, for example, the event may be dramatic but it is seldom a disaster. A disaster occurs when wind storm strikes a large city, fire outbreak in densely and congested market or residential area, bomb explodes in a densely populated settlement or a high-rise building collapses within a city's Central Business District (CBD) causing multiple collapse of structures within its vicinity. Thus, one cannot talk about disaster and vulnerability without considering where people have chosen to live and how densely they have spatially occupied the existing space (Zebrowski, 1997). For example, Lagos State is likened to densely populated cities such as Mumbai, Dhaka, Rio de Janeiro and Hong Kong and if the present population growth rate, the major factor deduced to be driving urban dynamics process in Lagos State, is not checked, by the year 2025, Lagos will be the most densely populated city in the world (Population Reference Bureau, 2005). According to Lagos State Bureau of Statistic (2005) and Buffett Centre (2010), the rate of population growth in Lagos State is about 600,000 per annum with a population density of about 4,193 persons per square kilometre. However, in the built-up areas of metropolitan Lagos, the average density is over 20,000 persons per square kilometre.

At the city scale, the process of urban dynamics can be understood in three main phases: available land in a city that produces a subset of areas to be occupied by different land use; changing land use pattern and local level interactions that combine to create the distribution of new built-up areas and the effects of the interactions on future land use coupled with the interconnectivity between the demographic, social, economic and political characteristics of the city. From a practical point of view, White, *et al* (1999), noted that the process of urban dynamics can be defined as an iterative probabilistic system in which the probability of a place in a city to be occupied by a land use in a time is a function of the concerned factors measured for that land use: suitability, accessibility, land use zoning status, socio-economic and population characteristics and stochastic perturbation.

The dynamics of urban process in Lagos, and in other developing countries' cities, is usually a complex phenomenon measured in terms of highly accelerated demographic growth; irregular (in)formal settlements; stress on marginal land by poor intra urban and rural migrants, inefficient and oversaturated transport and roadway systems that could barely support the massive daily commute of the city's inhabitants, irregularities in the enforcement of developmental and physical planning norms, construction of structures and indiscriminate dumping of solid waste that impede natural drainage patterns and water flow. Additionally, the lateral burgeoning of Lagos to its flood plains and marginal land further predisposed the city to natural hazards. The possibility of a technological disaster is also emerging due to the concentration of intense industrial and other economic activities. This situation increases the vulnerability to disasters of not only the city's inhabitants but also the systems on which they depend, such as water, electrical supply, housing, transportation networks and access to health care.

According to Blaikie, *et al* (1994) and Martínez-Viveros and López-Caloca (2010), the impact of disasters must be interpreted as a consequence of different structural situations that expose people and systems to danger. The authors believe that natural events, as determining factors of disaster, play a secondary role when compared to the socio-economic, political and physical environment. Consequently, vulnerability becomes the "active agent" in a disaster, not the natural phenomenon, which only serves to ignite preexisting, critical situations. Increased vulnerability increases the probability of disaster for the unit under analysis (people, places, social groups, systems). In order words, physical, political, socio-economic and demographic dynamics within the city's sphere, if not holistically managed, combine in a process that increases vulnerability and leaves people, individually or in groups, exposed to danger as they live or work in precarious areas, construct insecure buildings and infrastructure, or utilize unsound transport system. Vulnerability is acutely connected to people's ways of life, as individuals or in groups, and is related to their assets, access to resources (productive, natural, managerial, organizational) and their capacity to prevent, face, organise and adapt to disastrous events.

Once it is accepted that vulnerability is a social process, not a matter of fate, it becomes possible to generate capacities to diminish it and better anticipate, not only the likely occurrence, but the potential impact of disasters (Ojo, 2013). Planning is a purposeful process that links knowledge to action in order to induce changes geared toward desired future outcomes (Martinez-Viveros and Lopez-Caloca, 2010). However, the spatial changes evident in Lagos have not been the product of planning. Rather, intra-city and rural-urban migration and the quest for employment opportunities and other attraction parameters brought about chaotic growth and the generation of urban sprawl that encroaches on marginal land, leading to adverse land use and land cover change. Therefore, should the natural and human interaction interrupt the drainage network, detonate bomb, shake buildings to the ground, start a civil strike (communal clash, crisis, conflict and social disorder) or ignite a few fire, the impact on many dwellers will be catastrophic bearing in mind the increasing rate of urbanisation and density of development in the absence of well-articulated comprehensive physical planning and development control within the cities. The association between urban dynamics and vulnerability in Lagos State is succinctly captured by the incessant building collapse, fire and disease outbreak, increasing perennial flood that singularly and collectively exposed people, property and infrastructure to disasters.

Diverse studies have been carried out in Nigeria on disasters: its types, severity, frequency causal factors, and vulnerability patterns. However, there is a paucity of investigations on the possible associations between urban dynamics and vulnerability to disasters in Nigerian cities. This is a major research gap this study intends to fill focusing on Lagos, the most dynamic, the most densely populated and the most vulnerable to disaster State in Nigeria.

1.3 Research questions

In analysing the nexus between urban dynamics and vulnerability to disasters, the under-listed research questions were posed:

i. What triggers the urban dynamics process in Lagos State?;
ii. Is there any relationship between urban dynamics and vulnerability to disaster?;
iii. What are the impacts of disasters in the residential neighbourhoods?;
iv. What is the importance of Geographic Information System (GIS) in disaster management?
v. Is there any variation in the occurrence of disaster across residential neighbourhoods in Lagos State?;
vi. How does socio-economic indices, household characteristics and housing facilities and services affect urban dynamics, vulnerability and trend of occurrence of disaster?;
vii. In what ways do the government institutions respond to disasters?; and
viii. What are the legislative and institutional policies and programmes developed to manage disaster and how effective are these policies?

1.4 Aim and objectives

The aim of this research is to examine the nature of urban dynamics process and associated vulnerability to disasters in Lagos State. In order to achieve this aim, the specific objectives are to:

i. Identify the nature and contributing factors to urban dynamics and vulnerability to disasters;
ii. Determine the land use and land cover change from 1984 – 2010 and simulate flood risk using Geographic Information System (GIS);
iii. Examine the relationship between urban dynamics, socio-economic indices and vulnerability to disasters;
iv. Discuss the legislative and institutional policies enacted and programmes implemented to abate disasters by stakeholders in disaster management; and
v. Provide recommendations with facilitators that will drive the processes of its implementations

1.5 Hypothesis

The hypotheses to be tested for this study are stated as follows:

i. Urban dynamics is influenced by the availability of low income housing
ii. Vulnerability to disasters is a function of socio-economic indices, housing characteristics and provision of infrastructural facilities and services
iii. Occurrence of disasters differs significantly between residential neighbourhoods;

1.6 The study area settings

Lagos state is located in the South Western part of Nigeria, on the narrow plain of the Bight of Benin. It is bounded to the North and East by Ogun state, by the Bight of Benin to the South, and by the Republic of Benin to the West. It extends approximately from latitude 6°2' N to 6°4'N, and from longitude 2°45'E to 4°20'E. Lagos state represents 0.4 % of Nigeria's territorial landmass with total land area of 3,577 square kilometers. Lagos State was created on May 27th, 1967 by virtue of the States (Creation and Transitional Provisions) Decree No. 14 of 1967 which restructured Nigeria into a Federation of twelve states. However, Lagos as a trading port has a recorded history dating back to the Portuguese explorers of the 16th century. The State is composed of the old Federal Territory of Lagos which remains the financial hub and was the Federal Capital of Nigeria (up to December 12, 1991), and the old Colony Province of the defunct Western Region of Nigeria comprising Badagry, Ikeja, Ikorodu and Epe Divisions. The state has not been affected by subsequent state creation exercises and, today, it is one of the 36 states making up the Federal Republic of Nigeria as shown in Figure 1.1. Figure 1.2 depicts the study area in Lagos state context.

Lagos State is the smallest state (in land area) in Nigeria, yet it has the highest population. According to the 1991 national census, Lagos State had a population of 5,725,116 out of a national total of 88,992,220 (National Population Commission 2006). However, the results of the 2006 census show that Lagos State and the study area have 9,013,534 and 5,641,717 inhabitants respectively out of a national total of 140,003,542. This is less than what was anticipated. However, based on UN-Habitat and International Development Agencies' estimate, Lagos is said to have about 18.5 million inhabitants in 2008. However, within the official population structure of Lagos State, the study area accounts for over 60 % of the population on an area that is less than 25 % of the land area of Lagos.

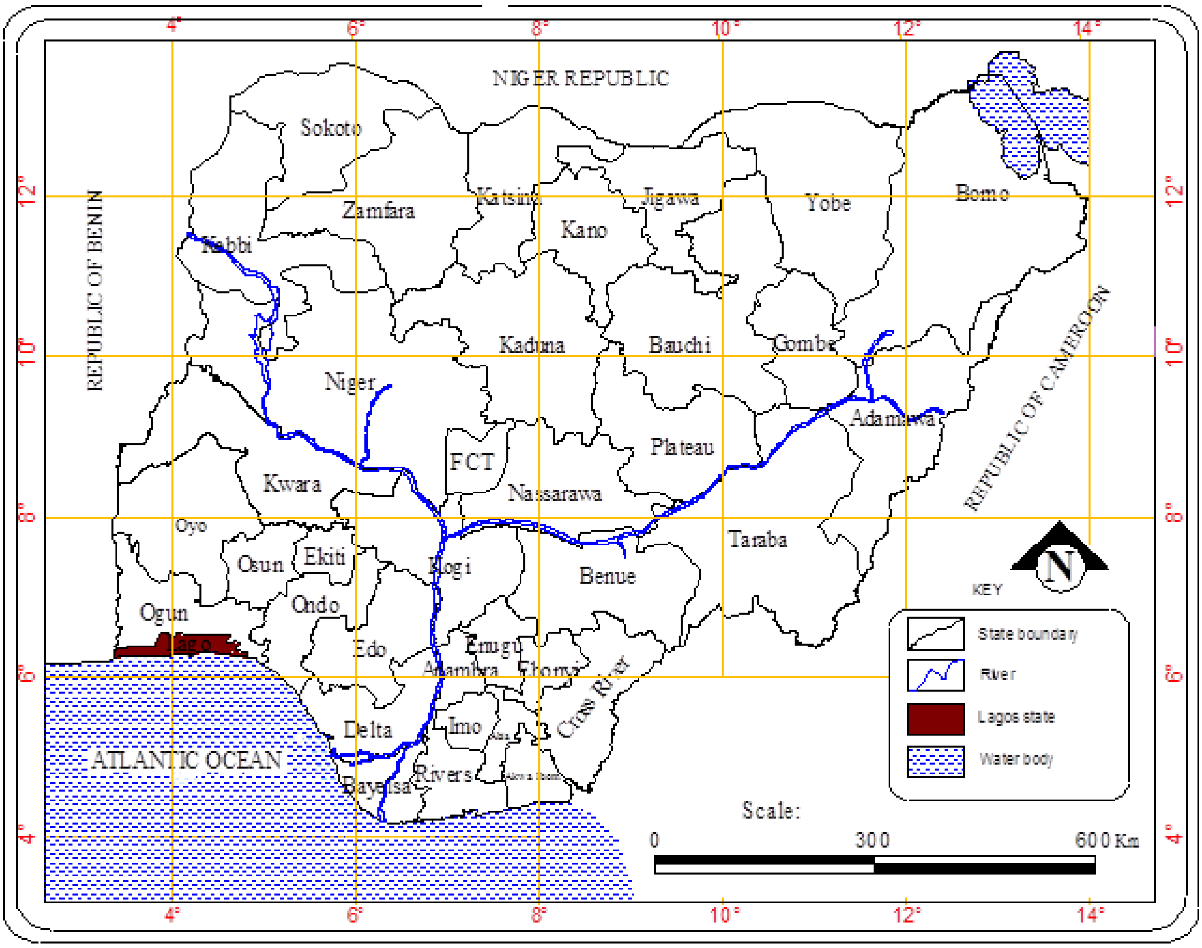

Figure 1.1 Lagos state in Nigeria context

Source: Dada, *et al* (2010)

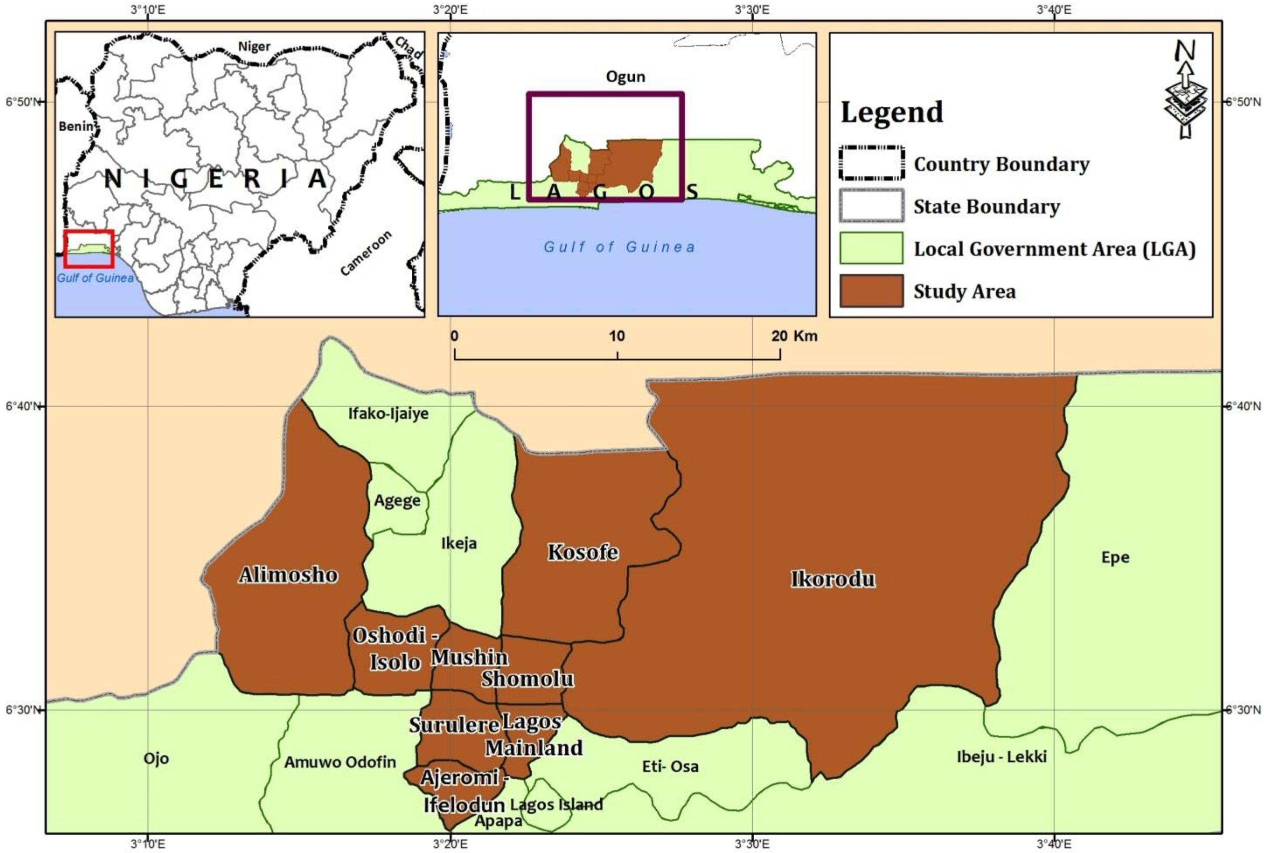

Figure 1.2 Political structure of Lagos state including the study area

Source: Dada, *et al* (2010)

Geographically, Lagos state is a wetland dominated by swamp forest consisting of the fresh water and mangrove swamp forests. The temperature of the state is high all year round and has two climatic seasons: wet (April – October) and dry (November – March). During the rainy season, the mean annual and monthly rainfall as well as the number of rainy days is high due mainly to the effect of south westerly monsoon wind. The high rainfall, especially at the peak of rainy season, coupled with poor waste disposal system and inadequate drainage network, results into perennial flooding. The drainage network within the state is characterised by maze of lagoons and waterways. The major water bodies are the Lagos and Lekki Lagoons, Ogun, Oshun, Yewa and Kweme Rivers. Others are Kuramo waters, Badagry, Five Cowries and Omu creeks. The network of creeks and lagoons covers about 800 square kilometers, which is about 22% of Lagos landmass. Though water bodies reduce land availability, however, housing construction has increased due to land reclamation. For instance the proposed Eko Atlantic City will be built on 10, 000, 000 square meters of reclaimed land from the Atlantic Ocean (Eko Atlantic Project 2010).

Lagos is the commercial and industrial hub of Nigeria with a GNP that triples any other West African cities. The economy of the state consists of commercial, industrial, financial services undertaking by formal and informal sectors. Energy, water access, sewerage, transportation, solid wastes disposal and housing have all been adversely affected by haphazard development. 90 % of the population of the state has access to electricity but availability is another different ball game. Water supply to Lagos State is inadequate with the low income residential neighbourhoods having the least provision. Water shortage is rife in Lagos state despite the State's natural endowment with water bodies. The public sector has almost completely withdrawn from household waste collection and disposal. In terms of waste management, about 66 percent of the solid wastes in the State are disposed either by government or through private and community efforts. The remaining percentage is left at various illegal dump sites. The waste generated in Lagos State, especially within the high density neighbourhoods, is hardly disposed scientifically; household garbage is dumped in nearly all the vacant plots while untreated industrial waste is channeled into public drains or surface water bodies. However, with the increasing level of public-private-participation (PPP) and the contemporary stand of government towards improved sanitation, there is a ray of hope that waste management will improve significantly in the years ahead.

Traffic congestion is a daily challenge in Lagos metropolis as a result of high passenger trips per daily transport demand. With the introduction of integrated and intermodal transportation system coupled with mass transit Bus Rapid Transit Scheme (BRT) the transport situation is improving gradually. The disasters that the State is most vulnerable to are: road crash, building collapse, fire incidence, communal clashes, land subsidence and general environmental degradation and pollution aggravating climate change induced disaster like: ocean surge, coastal erosion, flood and disease outbreak

One of the greatest challenges facing Lagos State is the provision of housing. There is considerable gap between supply and demand. Overcrowding, slums and substandard housing manifested in the landscape of Lagos State. Despite the efforts of the various housing authorities, over 90 percent of the housing in metropolitan Lagos is still provided by the private sector and individual effort. Residential districts range from low-density areas that have been able to retain their characteristics, through medium-density districts to substandard high density settlements that lack basic amenities. Some of the high to medium density neighbourhoods located along the major highways in the State have been gentrified to accommodate the evolving commercial activities in the State.

CHAPTER TWO

THEORETICAL AND CONCEPTUAL ISSUES IN VULNERABILITY ANALYSIS AND LITERATURE REVIEW

2.0 Introduction

In contemporary times, increasing attention is being paid to the evolvement, modification and application of theories and concepts in most of the learned disciplines, especially in social and environmental sciences. The reason for this phenomenon as noted by Agbola and Kasim (2007) is not unconnected with the ever-increasing urge to either invalidate an existing theory or test its responsiveness, degree of fairness or effectiveness. There is plethora of theories and concepts used in vulnerability analysis and disaster management; however, the following were adopted for this study: Post-Modern Urbanisation Concept; Urban Dynamics Theory; Urban Governance Concept; The Vulnerability Concept; and Traditional - Expanded Disaster Management Cycle Concept.

2.1 Post-modern urbanisation concept

The decade of the 1980s has seen the extensive presentation of a fashionable theory to the effect that people today are living in a knowledge-based post-industrial world with a postmodern culture. With globalization, industrial restructuring, and new breakthroughs in information and communication technologies, post-modern urbanization has entered a new phase. New patterns of urbanization are emerging both in the industrialized countries and the developing world, increasingly characterized by metropolitan regions.

The new urban model which bridges the distinction between the rural and the urban is particularly important for the developing world, where the growth of cities has been the greatest. Casting a relief of sharply increasing inequality, post-modern cities bring about exclusiveness, social fragmentation and spatial segregation of the rich and the poor in terms of vulnerability to disasters. Vulnerability is determined by a variety of social, economic, cultural and political factors, which define individual's or group's status, position and power in society. It also has a distinct spatial dimension, as people with similar characteristics tend to settle in the same or similar areas (Wisner, 2003).

In order to systematize the review of the effects of urbanization on disaster and to show that post-modern urbanisation magnified vulnerability, Charveriat (2001) and Pantelic, *et al* (2005), adopted the following concepts as the main factors that characterize vulnerability to hazards: Exposure of people and assets to hazards; susceptibility of people and assets to disasters; and environmental degradation of hazard-prone areas.

2.1.1 Exposure factor

Throughout history, one of the functions of cities was to provide safety and protection to its inhabitants from disasters, onslaught of invaders or pest and pestilence. The concentration of wealth, knowledge and power in great cities made it also possible for the construction of some of the greatest projects to protect people and property from the vagaries of nature. Drainage and irrigation were the first mitigation projects designed to serve and protect ancient civilizations. To this day, cities have continued to employ their vast resources and greatest technological advances to protect themselves from biological, hydrological, meteorological and geological hazards (Mitchell, 1999).

Post-modern urbanization has not only exacerbated many of the traditional urban development processes that contribute to vulnerability (such as the spread of slums and the decay of old or undesirable neighbourhoods) but it has also changed the way urban space is developed and managed, creating, thereby, new agents of vulnerability. The reality of new economic imperatives has forced city authorities to reconsider their priorities. Prudence and safety concerns have become casualties of the cost-conscious development strategies. Even in highly industrialized nations like Japan, the high cost of urban land in Tokyo encourages overcrowding, restricts open space and pushes new developments onto hazardous coastal areas in the paths of cyclones and tsunamis (Hoyois, *et al* 2007). While all social strata may equally be exposed to the risks of some hazards, in most cases, this exposure is determined by locations, which people choose or in which they are obliged to live (Velasquez, *et al* 1999).

In most urban centres, the competition for land is fierce socially and economically. Therefore, poverty has made people to squat in the deadly shadows of refineries, chemical factories, toxic dumps, burrow pits, abandoned quarries or in the margins of railroads and highways. This development, has ‘constructed’ an urban disaster problem of unprecedented frequency and scope. Referring to the group of the least developed countries, Davis (2004) notes that 78 % of the urban population lives in slums and in some countries reaches well over 90 %. In Mozambique, a country that has reached an enviable annual economic growth rate of 9 %, almost 80 % of its residents live on less than $2 a day and have a life expectancy of 41 years. This scenario is not very far from what is happening in most of the Nigerian cities.

In addition, more than 50 % of Mumbai’s 16 million residents live in slums, and about 100,000 actually live on the streets or drainage canals built to take out excess water during monsoon months (World Bank, 2005). Also, some of the entrepreneurial street residents rent out their makeshift shelters to other homeless people as sleeping quarters during a part of a 24-hour period. Recent migrant to urban centres in Cairo and Phnom Penh squat or rent space on rooftops, thereby, creating slum cities in the air (Davis 2004).

Focusing closer on the situation in individual cities in Nigeria, for example, in Lagos, using the basic Millennium Development Goals [MDGs] indicators such as: access to improved water; access to improved sanitation facilities; secure tenure; structural durability/quality of dwelling unit; and sufficient living area, not overcrowded inherent in Millennium Development Goal 7 Target 11, about 60 % of the inhabitants reside in slum households that has positive correlation with exposure to hazard and vulnerability to disaster (Tibaijuka 2002; UN-Habitat 2003a; 2003b; Agbola 2005b; International Strategy for Disaster Reduction [ISDR]. 2006).

2.1.2 Susceptibility factor

The rapid urbanisation in the developing countries has engendered one of the greatest socio-economic changes ever witnessed in the last five decades leading to the burgeoning of new kinds of slum. For instance, after the day’s work, whether informal or formal, all humans must retire to their houses, however defined and wherever located. Since urbanisation is increasing at a rate greater than the capacity and capability of urban planners and managers, city dwellers, especially migrants, retire to what the city planners called slum but which the resident called home. Thus, as countries urbanised, the number of people living in slums increase (Agbola 2005a).

The susceptibility of people and assets to hazards measures the degree of their preparedness and adaptability to known risks. The concept of susceptibility includes the quality of construction of assets, the awareness of the residents to risks posed by known hazards, the presence or absence of emergency and preparedness plans and facilities, and the ability of the population to prepare and withstand the impact of a disaster. This is where social and economic status and political clout of the population play an important part, since it has been shown a number of times that the poor are disproportionately susceptible to the effects of natural hazards (UN-Habitat and Department for International Development [DFID]. 2002). The World Disaster Report stated that 97 per cent of all disaster-related deaths in 2001 occurred in the developing countries (International Federation of Red Crescent Red Cross Societies [IFRCRCS], 2001). Moreover, as a percentage of GNP, disaster losses are an estimated 20 per cent higher in developing than in developed countries (Anderson, 2000). Only 2 per cent of all the people affected by disasters every year live in highly developed countries. In contrast, about 90 per cent reside in the low- and middle- income countries (IFRCRCS, 2001).

Pantoja (2002) observes that the poor are more risk averse in economic terms because they lack savings or assets, but are more “risk taking” in spatial terms. The situation in the central city slums of Santo Domingo, illustrates the point: The risk of flooding during rains varies from 6 to 45 per cent, respectively, for houses located near the river and those built on higher, consolidated ground. The quality of housing construction reflects the local perception of risk of floods and the residents’ willingness to spend money on shelter. Wooden shacks are thus common in the areas near the river, where they are prone to flooding and the investment is likely to be lost, but houses of durable material, sometimes several stories high, are built on a higher ground. Rents also reflect the safety of location: those on the higher ground pay almost twice the amount paid by those near the river and the canals (UN-Habitat 2003a).

The extent of disaster preparedness of a community speaks not only of their knowledge and awareness of risks, but also of their adaptability to change, and enormous public investments in social and essential infrastructural facilities and services. In most developing countries such investments have been minimized, if they ever existed, under the pressure of fiscal retrenchment that characterised the theme of the new profit-driven and commercialised urbanization. Interestingly, as noted by International

Strategy for Disaster Reduction [ISDR] (2002), the value of such public investments is demonstrated by the example of Cuba, one of the rare countries that still practices command economy, where natural land use planning and management are integrated into risk reduction considerations. In Nigeria, a lot still has to be done to adequately integrate disaster risk reduction into the country's developmental agenda.

2.1.3 Environmental factor

Environmental problems manifest in various forms and dimensions. The effects associated with these problems are felt locally, nationally, continentally and globally. For example, in Nigeria, as noted by Adetunji (2006), every state of the federation across the various ecological zones suffers from one form of environmental ill or the other. The north 'blows' away through wind erosion aggravated by deforestation, drought, over-grazing and desert encroachment. The coastal south 'washes' away into the ocean. Gully erosion opens the middle belt and most southern states especially in the south east. In addition to these, there are other environmental problems such as flood, building collapse, bush burning, oil spillage, gas flaring, pollution, municipal waste disposal and above all the general urban infrastructural decay. Like the kindergarten rhyme that teaches us of little drops of water forming the mighty ocean, scientific and empirical evidences have shown that local environmental problems have regional and indeed global consequences as manifest in ozone layer depletion, global warming and climate change and climate variability challenges.

Environmental degradation and global environmental change, particularly climate change, pose an exceptionally complex challenge to humanity by affecting vulnerability and hazard patterns (Strange, 2006 and The Punch Newspaper, 2007). Thus, environmental degradation and global environmental change increase the intensity of hazards and they are often the factors that transform the hazard into a disaster. For instance, floods are aggravated or even caused by deforestation, which in turn causes erosion and silt-up river channels. Poverty and vulnerability are linked to this situation (Martine and Guzman 1999 and Pantelic *et al*, 2005).

The poor are compelled to exploit environmental resources for survival, therefore, amplifying both susceptibility and exposure to disasters, in particular those triggered by floods, drought and landslide. The degradation of the urban environment is, therefore, the result of not only uncontrolled urbanization that swallows open spaces and agricultural land, interrupts natural drainage, patterns or denudes hillsides in pursuit of new urban land, but also of the breakdown in the ability of local populations and their governments to manage urban growth. This breakdown is the inevitable consequence of fiscal retrenchment and the restructuring of the public sector that, in most cases, leaves the poor sections of the city to fend for themselves as manifested in the study area.

The outcome of the relationship postmodern urbanisation and its explanatory indices of exposure, susceptibility and environmental factors is highlighted in Figure 2.1. The Figure illustrates that the postmodern urban development especially in the developing countries of the world is characterised by social inequality, exclusion, unemployment, increasing urban poverty and inability of urban managers to provide the most basic of basic infrastructures such as water, electricity and roads. When disaster occurs in this kind of situation, the urban poor are further thrown into deprivation.

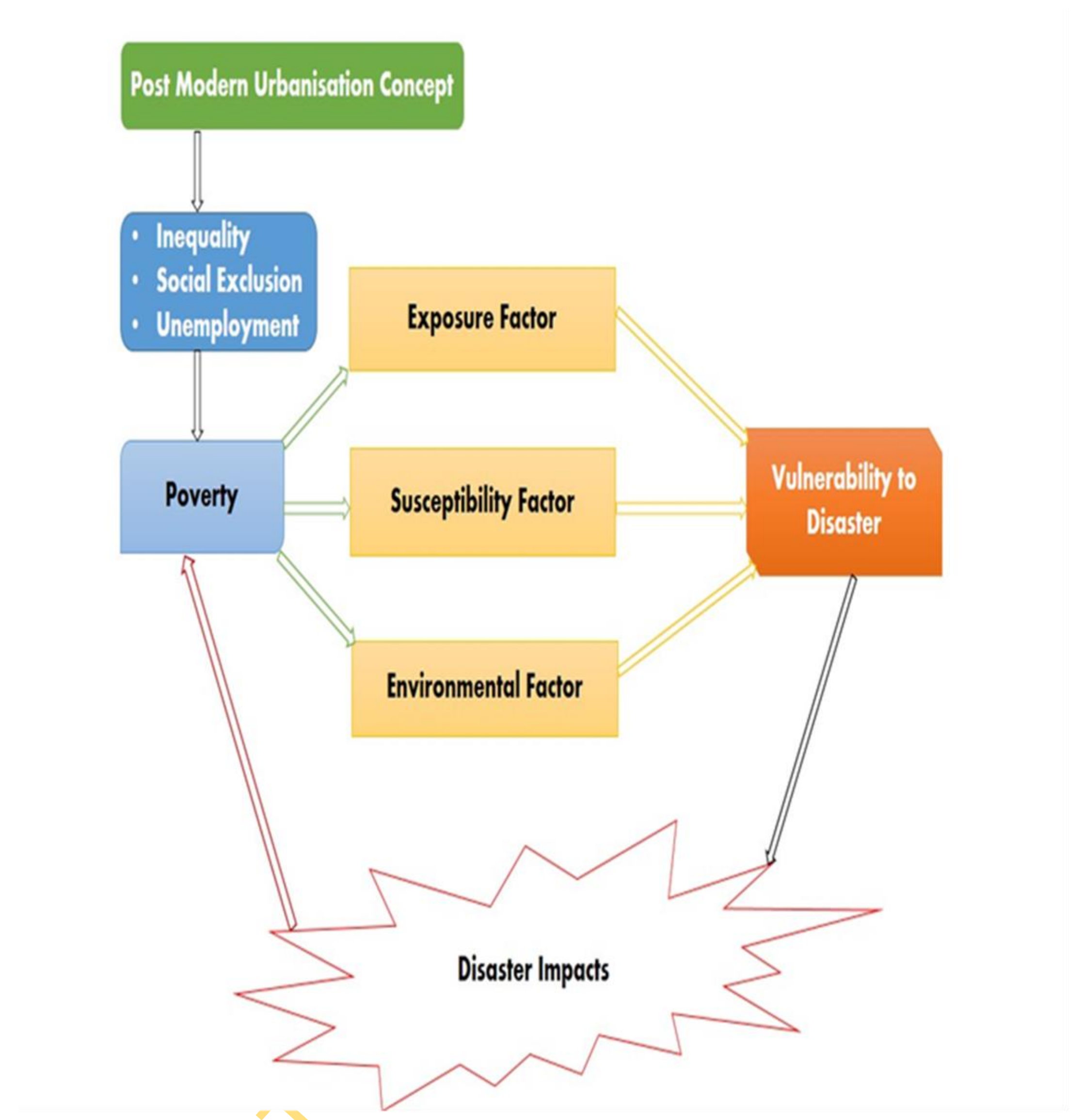

Figure 2.1 Post-modern urbanisation, poverty and vulnerability to disaster schema

Source: Derived as a summary of post-modern urbanisation discussions (2013)

2.2 Urban dynamics theory

Urban dynamics was developed as a tool for urban policy analysis. Forrester (1969), made a unique contribution to the analysis of social systems by introducing computer simulation modeling to the study of urban interaction. Urban Dynamics refuted the conventional wisdom that urban problems are caused by such factors as rural-urban migration, dwindling fiscal resources, and sub urbanization, which are beyond the control of central cities. Using a computer simulation model, the analysis showed that most urban problems arise, instead, from the interaction of processes that occur within the cities. It also identified policies that enable cities to exercise some control over their own futures.

Urban dynamics theory postulates three primary forces that underlie urban growth and decline guided by perceptions of relative attractiveness. These are: aging of housing and business structures, and the feedback connections among population, housing and jobs. As noted by Forrester (1971), often policies that have been adopted for correcting a difficulty are actually intensifying it rather than producing a solution. In order words, actions believed to alleviate the difficulties of a city can actually make matters worse. For example, as noted by Moody (1970), urban dynamics theory explained four common programmes aimed at improving the depressed nature of central cities. First programme was jobs creation. Second was a skill training programme to increase skills of the lowest-income group. Third was financial aid to depressed cities. Fourth was low-cost housing construction for low income earners. The four programmes range from ineffective to harmful judged either by their effect on the economic health of a city or by their long-range effect on the low income population. The results both confirm and explain much of what has been happening over the last several decades in cities (proliferation of informal settlements, environmental degradation and vulnerability to disasters).

Forrester (1969) observed that naturally, obvious solutions to social problems are apt to fall into one of several traps set by the character of complex systems. In other words an attempt to relieve one set of symptoms may only create a new mode of system behavior that also has unpleasant consequences. Also, attempt to produce short-term improvement often sets the stage for a long-term degradation. The local goals of a part of a system often conflict with the objectives of the larger system. People are often, intuitively, intervene at points in a system where little leverage exists and where effort and money have but slight effect. The question to ask, according to Forrester (1969) and Alfeld (1995), is why do the best of intentions for improving a city lead, instead, to greater social pressures, more commuting delays, increased drug addiction, higher crime rates, greater welfare loads and vulnerability to disasters in most cities?

In most cities, administrative authority is distributed vertically according to specialized tasks and responsibilities. In several respects, urban dynamics has shown that vertical forms of municipal government may be relatively ineffective because urban functions administered by separate agencies are in fact highly interconnected. As noted by Kadanoff (1971), the attractiveness principle in urban dynamics implies that all cities tend toward attractiveness equilibrium with their external environments. Because people migrate to areas that they perceive as being relatively attractive, efforts by local government to improve a single component of urban attractiveness (such as housing availability) always lead to rising urban population and the degradation of other components of attractiveness (such as job availability).

The quality of urban life in most cities around the world has not improved since the 1960s. By any objective measure, the individual problem-solving approach seems to have failed. Reports and statistics on urban crime, pollution, slums, traffic, welfare and vulnerability to disaster attest to this fact. Most observes (Sanderson, 2000; Aguirre, 2002; UN-Habitat and Department for International Development (DFID) 2002; UN-Habitat, 2010) of the urban scene would agree that, relative to our expectations, cities are getting worse, not better. Therefore, urban dynamics theory views city as a complex social and economic system formed by the interactions of individual efforts to achieve personal goals. Unfortunately, in modern life, such a system does not operate to further individual goals – or even, in some cases, human goals generally. Many individuals can take actions that appear to satisfy their own objectives; the aggregation of these efforts constitutes a complex social system. The characteristics of that system may cause it to behave in some very different ways from the expectations and the desires of its creators (Forrester, 1975).

Urban dynamics provides a theory that embraces a conceptual understanding of the city as a whole. It facilitates the analysis of city's various activities as interrelated functions. Only when city operates within such a conceptual framework can it be certain that new urban programmes will actually solve urban problems. Without embracing the postulation of urban dynamics, the solution to urban problems will be elusive and vague. Therefore, cities, especially in the developing countries, should begin to exhibit the courage to plan in terms of a maximum population, a maximum number of housing units, a maximum permissible building density, and a maximum number of jobs (Alfeld and Graham 1976). A city must also choose the type of city it wants to be. To become and remain a city that is all things to all people, as epitomized by Nigerian cities, is virtually impossible. There can be many uniquely different kinds of cities, each with its special mix of advantages and disadvantages. However, the policies that create one type of city may destroy another type. A choice of city type must be made, and corresponding policies must be chosen to create the combination of advantages and disadvantages that are characteristic of that type. There are severe limits on how many types of cities that can be created simultaneously in one place. When the choices have been made, and when effort is no longer dissipated in growth, there will be an opportunity to come to grips with social and economic decay.

Urban dynamics is a theory of the forces that shape human settlements which, in turn, shape human history. The theory is rich with subtle nuances which deserve a vigorous reinterpretation, a reinterpretation suited for no less a purpose than the political management of the people and resources of every nation on Earth. Urban dynamics shows the folly of traditional thinking, both for cities and for the world. Human systems, from all indications are too complicated for intuitive solutions. Traditional solutions to urban problems hardly work. Feedback, nonlinearities and hidden delays defeat most conventional policies (Alfeld, 1995). Eventually, urban managers and analysts must shift the paradigm away from traditional analytical methods to the urban dynamics viewpoint-conserve the existing development by reinforcing the preferred counterbalances. It is the mentality of the great cities of Europe and it is the mentality of the well-preserved American suburb. It works there and it can work worldwide especially in the developing countries. The major force that could drive the preferred urban dynamics in the developing countries is hinged on the inclusive city as postulated by the UN-Habitat's urban governance concept

2.3 Urban governance concept

In recent times, vulnerability to disaster has generated a lot of debates, thus many management techniques have evolved through various discussions on vulnerability pattern. All the management techniques developed are understood and confined to the intellectual community and hence lack mass participation. Awareness of disaster and grass-root inclusion is the only effectual way in which one can bring about mass participation in disaster management (Quarantelli, 2005). Also, disaster management is successful only when the general public has some awareness about the causes and effect of the disaster. Therefore, the importance of the concept of participatory disaster management is more fully appreciated if one considers recent developments in conceptual debates about achieving integrated and sustainable development, particularly in this milieu of global disaster risk reduction campaign (Partnership in Environmental Management for the Seas of East Asia (PEMSEA) 2003).

However, today there is growing convergence of ideas that one should not think about social problem in oppositional or one-dimensional ways. Consequently, a fundamental prerequisite for effective engagement with new and old intractable development challenges is indeed a strong and determined integration involving the local, state, an autonomous and democratic civil society and a robust private sector committed to sustainable and equitable growth (Simone, 2002). The failure of state-only and market-only approaches to urban management (disaster inclusive) acts as catalyst to ganger paradigm shift towards participatory management that will create ownership over decision-making and daily management practices. Participation is necessary to seek multiple perspectives of the various stakeholders, encourage involvement and action and resolve conflicts for the common and future good. Consequently, change cannot be effected without the full involvement of all stakeholders and adequate representation of their views and perspectives (Mulwanda, 1992; UN-Habitat 2002a).

It is from this viewpoint that the global campaign on urban governance was launched in 1999 by UN-Habitat to support the implementation of the Agenda of sustainable human settlement development in an urbanizing world. As noted by UN-Habitat (2001a and 2002b), the campaign comprises the mechanism, processes, and institutions (whether formal or informal) through which citizens and groups articulate their interests, exercise their rights, meet their obligations, and mediate their differences. In operational terms, the campaign is a capacity building programme in self-governance. Thus the campaign envisions the inclusive city as a place where everyone, including the urban poor, and among them, women, can contribute productively, enjoy the benefits of urban life (UN-Habitat, 2002b) and cohabit in a harmonious manner. According to Tibaijuka (2006), the campaign on good urban governance is that inclusiveness is not only socially just, but is good for growth and central to sustainable development.

The Global Campaign signals a new and strategic approach for achieving the goals of the Istanbul Declaration and the Habitat agenda. Thus, the campaign is designed to promote accountability and transparent urban governance, which responds to and benefits all sectors of society, particularly the urban minority and strives to eradicate all form of exclusion. Its goal is to improve the quality of life in cities, especially for the marginalized, through improved local governance. The strategy for achieving this is to advocate the norms of good urban governance and promote inclusive decision-making process especially in disaster situations (Taylor, 2000; Davis, 2004).

In view of this, Habitat understanding of good governance is based on operational experience and the Habitat Agenda. The operational experience, therefore, suggests the emergence of a new approach to urban governance based on the shift from direct provision of goods and services by government to an enabling approach. Habitat II embraces this approach as the best available strategy for achieving sustainable human settlements through the efficient management of disasters. It is characterized by three strategies, namely, decentralizing responsibilities and resources to local authorities; encouraging the participation of civil society; and using partnership to achieve common objectives (Taylor, 2000).

Bad governance could be seen as an additional burden borne by the minority in the society. Increasingly, therefore, the impact of governance is acknowledge as critical for unleashing national energies to reduce vulnerability to disaster. Therefore, unlike bad governance, good urban governance is expected to emphasize government involvement in disaster management, thus transparency, accountability, full participation and proactive responsiveness in vulnerability analysis are given laudable attention. The central argument is that unbridled competitions for power, and the failure of government to deliver democratic dividends, have resulted in compounding the vulnerability profile of the urban centres in Nigeria. Good governance, especially accountability, transparency and equity, would restore governmental legitimacy, harmony and promote national development (Kistner, 2007).

The concept of governance is complex and controversial, thus, different people and organizations define "good governance" according to their experience and interests. The theme of the Campaign for Good Urban Governance is the "inclusive city" since inclusive decision-making is at the heart of good urban governance. Exclusion as a result of physical, social or economic conditions, or because some individuals are not politically recognised or due to break-down of trust in government and politics prevents certain groups of people from participating in city life and activities. The failure of cities to integrate excluded groups into their decision-making process is, most often than not, a function of inertia, and bureaucratic and unresponsive forms of government (Nwaka 2005; Pieterse 2000).

Based on major international legal instruments, on commitments made by Governments at major United Nations conferences, and on Habitat's and its partner's experience in urban development work, a set of norms of good urban governance has been proposed by the campaign. The normative goals according to Rakodi (1999), Pieterse (2000) and UN-Habitat (2002b), include the followings: sustainability in all dimensions of urban development; subsidiarity of authority and resources at the lowest appropriate level; equity of access to decision-making processes and the basic necessities of urban life; efficiency in the delivery of public services and in promoting local economic development; transparency and accountability of decision-makers and all stakeholders; civic engagement and citizenship to promote active contribution of urban citizens to the common goods; and security of individuals and their living environment. The campaign encourages central and local governments to strive for policy and institutional change to support inclusive sustainable development.

According to Pieterse (2000) and UN-Habitat (2002), the underpinning strength of good urban governance is about promoting innovation in urban management to ensure that appropriate and sustainable policy options are developed collectively by local actors. In particular, it promotes the role of municipal governments in finding solutions to the ever-growing problems that converge in the third world cities as the world gradually and predominantly becomes urban. Therefore, urban governance to address disaster vulnerability should be hinged on integrated development approach that brings together sustainability, equitable economic development, responsiveness transparency, political voice, social justice and cultural freedom (Pieterse, 2000). However, lack of guarantee for the stated indices predisposed the urban centres to increasing risk and vulnerability to disaster.

2.4 Vulnerability concept

To individuals committed to environmental issues, the evolving evidence of environmental degradation is real. Environment and development are two inseparable features of any country. They both interact and are intertwined. Unfortunately, the fast development and progress that accompanied the industrial/technical evolution of the modern era have changed all these (Ayoade, 1997; Osuntokun, 1997; Awake, 2005; Adetunji, 2006; Ceylan *et al*, 2007; The Punch Newspaper, 2007). The changes were further compounded by the human vulnerability and exposure to disasters.

Vulnerability is the degree to which a system or unit is likely to experience harm due to exposure to hazard or stress (Pelling, 2003 and Wisner 2001a). The concept of vulnerability originated in research communities to examine risks and hazards, climate impacts and resilience. The concept emerged from the recognition by research communities that focus on hazard alone (environmental, socio-economic, technological) was insufficient for understanding the responses of, and impacts on, systems (social groups, ecosystems, places) exposed to such hazard (Mitchell, 1999 and Pine 2003).With vulnerability concept, it became clear that the ability of a system to attenuate stress or cope with the consequences through various strategies or mechanisms constituted a key determinant of system response and, ultimately, of system impact. A clearer understanding of coping strategies or mechanisms can, thus, throw light on who and what are at risk from what, and how specific stresses and perturbations evolve into risks and impacts (Turner, *et al* 2003; Wisner 2001b; Pine 2003).

Also, since the 1970s, but with increasing emphasis in the 1980s and 1990s, researchers from the social sciences and humanities have argued that the impact of a natural hazard depends not only on the physical resistance of a structure, but on the capacity of people to absorb the impact and recover from loss or damage. The focus of attention moved to social and economic vulnerability, with mounting evidence that natural hazards had widely varying impacts on different social groups and on different countries. The causal factors of disaster thus shifted from the natural event towards developmental processes that generate different levels of vulnerability (Ojo, 2013).

Vulnerability reduction began to be advanced as a key strategy for reducing disaster impact in the 1990s. Though this proved elusive to implement, however, by the end of the 1990s, it was clear that development processes were not only generating different patterns of vulnerability, but were also altering and magnifying patterns of hazard - an argument that has gained increasing currency as evidence mounts coupled with the impact of global climate change. Vulnerability assessment through risk management and reduction has been advanced as an integral disaster management paradigm that builds on and incorporates all the previous strategies from the perspective that all development activities have the potential to increase or reduce risks (UNDP, 2004).

There are a number of factors that contribute to the configuration of vulnerability in cities. First, is history; where cities have been founded in or expanded into hazardous locations. Second, the urbanisation process and weak urban planning and development control framework that lead to the concentration of populations in hazard-prone cities, and hazard-prone locations within cities. For instance, when populations expand faster than the capacity of urban authorities or the private sector to supply basic infrastructure, vulnerability in informal settlements can accumulate quickly. Third, in cities with transient or migrant populations, social and economic networks tend to be loose. Many people, especially minority or groups of low social status, can become socially excluded and politically marginalised, leading to lack of access to resources and increased vulnerability. The urban poor are often forced to make difficult decisions about risk. Hence, living in hazardous locations is sometimes desirable, provided it offers access to work in the city centre (UNDP, 2004). Urbanisation as noted by UNDP (2004) can also modify hazard patterns. Through process of urban expansion, cities transform their surrounding environment and generate new hazards. The urbanisation of watersheds can modify hydraulic regimes leading to increasing flood and biophysical hazards.

As noted by Zebrowski (1997), one object does not influence a second unless the second also influences the first. Disasters occur when societies or communities are exposed to potentially hazardous events, such as extremes of rainfall (rainfall too much or too little), temperature or wind speed or tectonic movements, and when people are unable to absorb the impact or recover from the hazardous impact. While it is commonplace to talk about natural disasters, both vulnerability and hazard are conditioned by human activities (Twigg, 1998). In relating the analogy above to this research work, it can be seen, for example, in a swollen and over-stressed urban river that floods and devastates a growing city within its channels: humans will perceive the flood as the cause of the devastation. People are not inclined to question whether the presence of the devastated city may have influenced the river to overflow its bank through local deforestation, silting-up of the river channel by refuse and other materials or the building of structures on the flood plain of the river preventing it from dispersing into a natural flood plain (Ojo, 2001).

Socially significant disasters do not put a major break on development. Rather, as noted by Lavell (1999), they are the logical response to underdevelopment. Underdevelopment, environmental unsustainability, and poverty are the major contributing factors to disasters vulnerability. Disasters do not in general throw the poor into a state of underdevelopment. They are already there prior to the disaster. Due to inherent vulnerability, disaster can project the poor from a state of poverty into a state of absolute destitution. This is not a problem of the disaster as such; it is a problem of where they were prior to the disaster. For instance, when a community is on the edge, at the limit, with water nearly inundating it, then any perturbing agent will throw the community over and submerge it.

2.5 Traditional – expanded disaster management concept

The period 1990 -1999, which the UN general Assembly declared as the International Decade for Natural Disaster Reduction (IDNDR), led to a greater awareness of the social and economic consequences of natural disasters. Since the world conference in Yokohama in May 1994, there has been a conscious paradigm shift towards preparedness rather than focusing only on rescue and relief (International Strategy for Disaster Reduction (ISDR), 2002).

Disaster Management today has assumed more holistic dimensions. ISDR uses the following formula to determine the impact of disaster: risk is given as the product of hazards and the vulnerability of the community over the capacity of the community to cope with the disaster (Risk (R) equals to Hazard (H) multiply by Vulnerability (V) divided by Capacity (C) ($R = H \times V \div C$). In simple terms, this means that the risk of a disaster happening depends on: what the hazard is; how vulnerable the community is; and how well the community can limit the damage by being prepared and forewarned. The risk of a disaster occurring is based on physical, economic and environmental factors which need to be monitored and evaluated continuously. Hence, disaster risk reduction involves four phases of activities, these are: Risk Assessment and Analysis; developing an Awareness of risk; Developing Early Warning Systems; and Disaster Management (ISDR, 2004)

Thus, issues related to disasters should be properly ingrained into development and planning process as sustainable and long-term strategy. The disaster management cycle concept aims to reduce, or avoid the potential losses from hazards, assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery. The cycle illustrates the on-going process by which governments, businesses, and civil society plan for and reduce the impact of disasters, react during and immediately following a disaster, and take steps to recover after a disaster has occurred. Appropriate actions at all points in the cycle lead to prevention of disasters, reduced vulnerability, better warnings and greater preparedness. The complete disaster management cycle includes the shaping of public policies and plans that either modify the causes of disasters or mitigate their effects on people, property, and infrastructure (Warfield, 2005).

The Disaster Management Cycle (DMC) highlights the range of initiatives which normally occur before disaster and during both the Emergency Response and Recovery Stages of a disaster. Some of the procedure of DMC cut across stages (such things as Coordination, Collaboration and the Provision of Ongoing Assistance), whilst other activities are unique to each stage, for example, Evacuation during Emergency Response; Reconstruction and Economic and Social Recovery as part of Recovery. The DMC also highlights the role of the media, and there should be a strong relationship between DMC and funding opportunities. Not unnaturally, the relationship between media and funding opportunities is highest during Emergency Response Stage, and tends to tail off during the later Recovery period. The challenge for all stakeholders today is how media and, to a larger extent, funding opportunities can take a greater interest in the earlier Disaster Risk Reduction Stage (Piper, 2006).

The disaster management cycle is in phases, thus, the prevention, mitigation and preparedness phases occur as disaster management improvements are made in anticipation of a disaster event. Developmental considerations play a key role in contributing to prevention, mitigation and preparedness of a community to effectively confront a disaster. As disaster occurs, disaster management actors, in particular humanitarian organisations become involved in the immediate response and by extension long-term recovery phases. The disaster management cycle is conventionally written as: Prevention > Mitigation > Preparedness > Response > Recovery > Prevention (abbreviated PMPRR), and ideally it is cumulative. That is, each phase teaches lessons, reveals weaknesses, and provides an opportunity for improving and strengthening the DMC (Twigg, 1998; Wisner, 2001b).

Some practitioners, over time developed the expanded version of DMC. To this school of thought, disaster management should be seen as ongoing process where phases in the cycle should be done simultaneously. In other words, one phase of the cycle does not necessarily have to be completed in order for the next to take place. Often several phases are taking place concurrently. Timely decision making during each phase results in greater preparedness, better warnings, reduced vulnerability and/or the prevention of future disasters. This model is not static and activation of a phase should not be dependent on disaster occurrence. The school posited that when disaster occurs what is expected from a DMC is an expansion and concentration of activities within the relevant phase to adequate manages the disaster. The expansion model has moved away from using a diagrammatic representation of the Disaster Management Cycle (DMC), and particularly the earlier model which was more of a circle.

Over time, most countries' economies show steady improvements, as measured, for example, by the Human Development Index (HDI), such countries are said to be in a disaster free state. During this period, ideally, a range of risk reduction mainstreaming initiatives should be introduced, which, when combined with other key mainstreaming parameters, particularly community participation, poverty reduction, good governance, and environmental sustainability, will result in safer communities. However, occasional severe hazards may still affect communities, which can turn into potential disasters when they overwhelm the resources of the affected population. In this period, a so called disaster may occur, which will normally trigger a range of emergency response initiatives. With time, the community will begin to recover, and move from an emergency response stage to that of Recovery (Australian Development Gateway, 2007).

2.6 Literature review

Various studies have been undertaken on human vulnerability to natural and man-induced disasters, ranging from the study on a specific type of disaster to vulnerability study of a given region. However, this study focuses on the nexus between urban dynamics and vulnerability to disaster. In this regards the following components of vulnerability to disaster and urban interactions were reviewed: nature, type and characteristics of disaster; urban dynamics and vulnerability to disasters; causes and effects of disasters; remedial measure to manage disasters; development attributes of disasters; methodological issues in disaster management; application of urban dynamics model to urban management and flood risk assessment and mapping

2.6.1 Nature, type and characteristics of disasters

Our psychological profiles as human draw us to disaster; some as volunteers, relief workers, others as public servants or engineers whose vision is to prevent future catastrophes, and many as intellectually curious onlookers. Millions of people watch news telecasts of the latest natural and man-induced disaster with an uneasy combination of awe and the personal sense of relief that they are not being counted among the affected persons. Disasters can be categorized into natural and man-induced or technological disaster. The natural disasters include floods, hurricanes, tornadoes, winter storms, landslides, earthquakes/tremors, volcanic eruptions, drought, desertification, wind and thunder storms, among others, while man-induced or technological disasters include plane crash, train wreck, road accident, ship mishap, fire and disease outbreaks, building collapse, industrial accident, hazardous material spills, land subsidence, civil disturbance which may include terrorism, riot, shooting, bombing and war (Kasim, 2004; National Emergency Management Agency 2011a).

According to Twigg (2001), there is no natural disaster, but there are natural hazards, such as earthquakes and cyclones. The difference between a hazard and a disaster is an important one. A disaster takes place when a community is affected by a hazard that is usually defined as an event that overwhelms a community’s capacity to cope without calling for external help. Thus, the impact of disaster is determined by the extent of a community’s vulnerability to the hazard (McEntire, 2005). Therefore, a disaster is more or less rapid, often unexpected destructive event that occurs in a particular natural and human context and in a definable territory causing death and injuries as well as extensive damage to property and distracting the social structures of the affected persons. Consequently, the upheavals in the life of the masses is so great that the social structure loses its functioning capacity and there is urgent need for special organization and mobilization of the social services as manifested in the World Trade Centre (WTC) terrorist attack of September 11, 2001, Ikeja (Lagos) Cantonment bomb explosion of January 27, 2002, India Ocean Tsunamis in 2004, hurricane Katrina in 2005, earthquake in Haiti in 2010 and 2011 Tsunami in Japan (New York State Office of Mental Health, 2001; Agekameh, 2002; Dolfman, *et al* 2007; Oxfam International 2010; Nanto, *et al* 2011)

Between 1971 and 1995, disasters caused each year, on average, more than 128,000 deaths and affected the lives of 136 million people (Canadian Red Cross, 2006). Every country is affected by natural hazards to some extent. However, most disasters occur in the poorer countries of the Third World: some 97 % of deaths and 99 % of people affected between 1971 and 1995 were in developing countries. The economic consequences of disasters in developing countries can be massive. From 1995 to 2004, 5,989 reported disasters killed 901,177 people and affected over 2.5 billion people, causing at least US$ 738 billion in estimated damage. This compares to 643,418 reported killed and 1.74 billion reported affected by disasters from 1985 to 1994. In December 2004, 250,000 were reported killed by disasters – mostly from the Indian Ocean Tsunami. Disasters affected 146 million people (mainly due to floods in Bangladesh, Malaysia, Indonesia, India and China) and inflicted estimated damage of US$ 100-145 billion (Twigg, 1998; Canadian Red Cross, 2006).

Year 2006 was observed by Hoyois *et al* (2007), to be a return to a kind of 'normality' after the major events of the last few years. Even though the disasters in 2006 have not captured as much attention as those of the recent past, it is important to remember that they have had devastating impacts. In 2006, there were 427 reported natural disasters that killed more than 23,000 people, affected almost 143 million others, and cost up to US $ 34.5 billion in economic damages. The 2006 data shows that Asia remains the continent most hit by disasters with over 44 % of all reported disasters occurring in the region. In addition, the 2006 numbers was an indication that it is not only developing countries that are severely affected by disasters. Four European countries - France, the Netherlands, Belgium and the Ukraine - rank among the top 10 countries affected by deadly disasters (Hoyois *et al* 2007; Ojo 2013).

Prior to the 1970's, Hewitt (1983) noted that disasters were viewed purely as natural phenomenon. A departure from this postulation came to light in the late 1970's. The new postulation was an attempt to take the notion of naturalness out of natural disaster. As opined by McCall (1992), the line between natural and man-induced disaster is finely drawn and may be blurred. Therefore, disaster cannot be explained only in terms of its naturalness; some other variables like human interaction with their physical environment are also important. The contemporary assumed paradigm shift from the notion of disaster naturalness to comprehensive outlook of the relationship between natural and man-induced disaster has not fully taken its root.

A disaster is a natural or man-induced / technological event of severity and magnitude that normally results in death, injury and property damage that cannot be managed through the routine procedures and resources of individual, community and Local Government. It requires immediate coordinated and effective response by multiple governments and private sector organisations to meet the medical, logistical and emotional needs and to speed recovery of the affected population. As noted by the New York State Office of Mental Health (2001), disasters differ from routine emergencies and cause unique problem for private-public organisation as well as the Local, State and Federal Government affected. Routine emergencies and critical incidents are events to which response demands can be met with local resources. Disasters, compared to routine emergencies and critical incidents, possess unique characteristics. The followings are characteristics of disaster as developed by the United States of America's Federal Emergency Management Agency (FEMA).

i. Create demands that exceed the normal capacities of any one organisation and/or government.
ii. Cross jurisdictional boundaries
iii. Change the number and structures of responding organisation, which may result in the creation of new organisations.
iv. Create new tasks and engage participants who are not ordinarily disaster responders.
v. Disable the routine equipment and facilities needed for emergency response.
vi. Compound the difficulty of understanding who does what in disaster response due to the complexity of government.

vii. Impacted by lack of standardisation in disaster planning and response and complicated coordination.

The emerging characteristics of disasters indicate that there is ample justification for the promotion of interventions that involve the participation of the general populace in the difficult task of determining causes of disasters and in solving the various problems posed by its occurrence (Thompson, 1995). The relationship between human actions, environmental stewardship, climate change and disaster risks are becoming ever more crucial. Disasters not only affect the poor and characteristically more vulnerable countries but also countries thought to be well protected. In recent years, Canada, Czech Republic, France, Japan, Poland, Germany, United Kingdom, United States of America Australia and New Zealand experienced record-setting floods of such magnitude that previous accepted procedure for protection and the utility of structural barriers have had to be re-evaluated (ISDR, 2002; Awake, 2005; 2007; Chanson, 2011).

2.6.2 Urban dynamics and vulnerability to disasters

Vulnerability is a multi-dimensional concept that comprises physical, social, economic, environmental, political, cultural and institutional factors. The perception of hazards, disaster, urbanisation and vulnerability is increasing both in the developing and developed countries of the world. However, as noted by Olatubara (2007), the challenge of urbanisation is more of its rate than the level in the developing countries. Thus, rapid rate of urbanisation, particularly the growth of large cities, and the problems of unemployment, poverty, inadequate health care facilities, poor sanitation and water provision, burgeoning slum and squalor and environmental degradation pose formidable challenge and render the living environment precarious and vulnerable to disasters in many developing countries.

The additional billion people added to world population in every 12 to 13 years are mortally taxing the earth and its resources. Each individual person has a unique impact on the planet's environment and no living individual is without an ecological footprint (Population Media Centre 2009). Available statistics show that more than half of the world's 7 billion people live in urban area, crowded into 3 % of the earth's land area. The proportion of the world's population living in urban areas which was less than 5 % in 1800 increased to 47 % in 2000 and it is expected to reach 65 % in 2030 (United

Nations, 1990; Population Reference Bureau, 2005; UNFPA 2011). From this global view, however, more than 90 % of the future population growth will be concentrated in developing countries' cities and a large percentage of this population will be poor living in marginal land vulnerable to disasters (Drakakis-Smith, 2000; UN-Habitat 2007).

As a result of unprecedented word population growth, the earth is attempting to impose its own natural checks on human population. These checks are witnessed in the form of widespread disasters and the emergence of new disease strains, food and water shortages, poor harvests, , violent and destructive weather caused by climate change and climate variability (Population Media Centre, 2009). Urban growth does not explain human vulnerability to disasters per se rather it is particular processes and factors of urban change that characterise rapidly urbanising countries that increase human vulnerability to disasters. These processes and factors will vary considerably from context to context (Quarantelli, 2005).

For instance, as noted by Ravallion (2001), the rapid growth of urban areas in the developing world in the next few decades poses a huge challenge to the fight against poverty. The problem of cities are of staggering proportions a significant increase in urban poverty, disproportionately affecting women and children, ethnic and racial conflicts, crime, homelessness and environment degradation with far-reaching political as well as socio-economic implications (Makoka and Kaplan, 2005). To achieve successful sustainable development, urban poor must be the business of everyone. Cities with growing economic have the possibility, as least, of improving the condition of poor inhabitants. However, among the world's megacities with the highest rates of population growth are precariously poor cities with sluggish economies, such as Cairo, Calcutta, Dhaka, Kinshasa, Kano, Ibadan and Lagos. For these cities the risk of further deterioration is obvious and continuous (Sharma *et al*, 2000).

2.6.3 Causes and effects of disasters

Globally, disasters are two-edged. On one edge is the natural and man-induced mishap or the trigger mechanism which could be flooding, erosion, earthquake, tremor, thunder/windstorm, landslide, land subsidence, technological disasters, among others while on the other edge, the receiving end, are the damages done to the built environment, the injuries and losses of human life and property. It is apt to note that in most disaster vulnerable environments; most victims are the destitute segment of the population. They tend to live in disaster prone areas, which are the least expensive, and thus the only residential sites affordable to them. Therefore, vulnerability strongly correlates with the extent of a society's development. In extreme cases, this correlation proves one of the vicious circle of perpetual under-development that renders a society more vulnerable to hazards and once hit by a disaster; the society suffers severe setbacks to degenerate further into under-development, (Norimichi *et al*, 1991; Hanley, 2006*)*

Although all countries may be confronted with anthropogenic and natural hazards, the poorer developing countries, in particular, are disproportionately vulnerable to those hazards turning into disasters (Herrmann *et al*, 2004). In a nutshell, as noted by Martine and Guzman (1999), poverty is a central component of vulnerability. For instance, the relation between socio-economic conditions and the impact of anthropogenic and natural disasters can be expressed using economic constraints. In other words, the poor are forced to live in precarious homes; made of flimsy, non-durable materials and on the least-valued plots of land. Shacks are built on steep hillsides, on floodplains in fragile ecosystems and watersheds, on contaminated land, right of ways, squat on the deadly shadows of refineries, chemical factories toxic dumps and other inappropriate areas (Davis, 2004). The inappropriateness of these locations, evidently, invites serious social and environmental problems while, deforestation, as well as inadequate management of rainwater and waste, coupled with climate change further aggravate the conditions (van Western and Hosfstee, 2000; Agbola, 2011).

Disasters seek out the poor and ensure they stay poor (Cherpitel, 2002). They are often the most exposed to disasters and with the lowest capacity to cope. Inversely, where the rich may be exposed to disaster through locational choices: flood plains, hill tops, ocean fronts; they have adequate capacity to cope with associated disaster impacts (International Federation of Red Cross and Red Crescent Societies [IFRCRCS], 2002). In general, the drama of disaster and the urgent international activity to provide emergency relief commands the attention of the international media for only a few days (NEMA, 2012a). However, the consequences of disasters last much longer and are more poignantly measured in isolation. These losses impede human development and often erode previously hard-won individual and national accomplishment. Disaster also compromise current and future resources upon which societies and future generations depend (Jabeen *et al*, 2011).

Disasters continue to target the world's poorest and least developed; of those killed in 2002; just 6 % lived in countries of High Human Development (HHD) while countries of Low Human Development (LHD) reported the fewest disasters, and their death toll is by far the highest (Centre for Research on the Epidemiology of Disaster [CRED], 2003). When related to the numbers of reported disasters, an average of 555 people died per disaster in LHD nations compared to 133 in countries of Medium Human Development (MHD) and 18 people in HHD nations (CRED, 2003). While deaths remain low from disaster in highly developed countries; financial costs are very high. Among the globally reported disaster damage in 2001, (27 billion dollar) more than two thirds occurred in HHD countries and LHD countries reported just 0.15 % of total damages. Over the course of the decade, the average costs of damage from each natural disaster were 477, 149 and 61 million dollar in HHD, MHD and LHD respectively. The high financial value attached to infrastructure in developed countries (HHD) is the main reason for these differences. The enormous financial losses related to infrastructure in developing countries (LHD) will be better revealed by a comparison based on losses to gross domestic product (GDP) rather than losses expressed in dollar (CRED, 2003).

The Munich Reinsurance Company, as quoted by IFRCRCS (2002), gave the top three casualty disasters since 1970 to 2000 as follows:1970: Storm and floods in Bangladesh: 300,000 victims; 1976: Earthquake in China: 250,000 victims; 1991: Tropical cyclone in Bangladesh:138,000 victims. While the three most costly disasters in terms of insured losses since 1970 to 2000 were: 1992: Hurricane Andres in the USA: 20 billion dollar; 1994: Northridge earthquake in the USA: 17 billion dollar; 1991: Typhoon Mireille in Japan: 7.5 billion dollar.A cursory look at Table 2.1 shows that in 2006, Asia remains the most affected region with China having more than 8.8 million reported victims, the Philippines had 8.6 million victims and India accounted for 7.3 million. However, in terms of the proportion of the total population, the most affected continent was Africa. The most affected country was the Malawi with 38.8 % of the total population affected mainly with drought followed by Djibouti, 30.8 % and Burundi with 26.8 % (Hoyois *et al*, 2007).

Table 2.1 Top 10 countries by persons affected by disaster in 2006

Countries	No of victims	Countries	% of the total population
China P. Republic	8,873,953	Malawi	38.8
Philippines	8,615,801	Djibouti	30.8
India	7,385,999	Burundi	26.8
Malawi	5,160,508	Niger	24.3
Kenya	4,283,526	Kenya	11.9
Indonesia	3,952,616	Philippines	9.6
Viet Nam	3,349,989	Mali	8.8
Thailand	3,257,588	Afghanistan	7.2
Niger	3,046,476	Mozambique	7.0
Afghanistan	2,234,292	China P. Republic	6.8

Source: Hoyois *et al,* (2007) p 34

Table 2.2 Top 10 countries affected by natural disasters and number of deaths in 2012

Events	Country	Number of death
Tropical Cyclone (Bopha) December	Philippines	1901
Flood, August – October	Pakistan	480
Flood, July – October	Nigeria	363
Earthquake, August	Iran Islam Republic	306
Cold Wave, June	Peru	252
Cold Wave, December	India	249
Flood, July	Russia	172
Cold Wave, December	Russia	170
Flood, July	China	151
Avalanche, April	Pakistan	135
Total		4179

Source: Guha-Sapir *et al,* (2013).

Table 2.3 Top 10 countries affected by natural disasters and impacts on persons in 2012

Events	Country	Persons affected (million)
Flood, June	China	17.4
Flood, April	China	13.1
Flood, July – October	Nigeria	7.0
Tropical Cyclone (Bopha) December	Philippines	6.2
Tropical Cyclone (Haikui) August	China	6.0
Flood, June	Bangladesh	5.1
Flood, August – October	Pakistan	5.0
Flood, August	Philippines	4.5
Tropical Cyclone (Damrey) August	China	3.8
Drought	Kenya	3.8
Total		72.000

Source: Guha-Sapir *et al* (2013).

According to Guha-Sapir *et al* (2013), the Americas suffered the most damages in 2012 (65.7% of worldwide natural disaster damages), followed by Asia (17.8%) and Europe (15.4%). A share of 0.6% of global disaster damages was reported for Africa and of 0.5% for Oceania. This distribution of disaster damages between continents is different from the one observed over the last decade, where Asia had the most damages, followed by the Americas and Europe. Damages in the Americas increased from an annual average of US$ 56.5 billion from 2002-2011 to US$ 103.4 billion in 2012, mostly due to two disasters which occurred in the U.S.A: hurricane Sandy and the drought in the South-Western and Mid-West regions. However, damages in Europe also increased from an annual average of US$ 13.5 billion during 2002-2011 to US$ 24.2 billion in 2011. On the other side, in 2012 compared to the annual average for 2002-2011, damages decreased by 83% in Oceania, by 58% in Asia and by 21% in Africa.

The distribution of disaster frequency in Africa in 2012 presented a similar profile to the one seen over the last decade. Hydrological disasters represented 52.6% of occurrence, followed by climatological (28.1%) and meteorological disasters (19.3%). No geophysical disasters were recorded in 2012. However, the number of victims increased in 2012 by 43.4% compared to the annual average number of disaster victims in Africa during 2002-2011, due to the impact of climatological and hydrological disasters. The number of reported climatological disaster victims in 2012 (28 million) surpassed their 2002-2011 annual average (23.9 million) and the number of reported hydrological disaster victims (9.3 million) was far above their 2002-2011annual average (2.1million). Droughts and food crises made one million victims or more in Angola, Burkina Faso, Chad, Ethiopia, Kenya, Malawi, Mali, Niger, Sudan, Tanzania and Zimbabwe caused 25.3 million victims, with one flood in Nigeria causing 7 million alone. These twelve disasters represent 85% of the total of victims in Africa in 2012 (Guha-Sapir *et al*, 2013).

The estimation of natural disaster damages in Africa remains extremely challenging as data are often poorly reported or lacking altogether. In 2012, like in previous years, no damages for climatological disasters in Africa were reported. Reported damages from hydrological disasters (US$ 0.83 billion) increased in 2012compared to their annual average reported damages during2002to 2011(US$ 0.3 billion) and reported damages from meteorological disasters (US$ 0.1 billion) surpassed also their 2002-2012 average (0.07 billion) (Guha-Sapir *et al*, 2013).

Table 2.4 Top 10 countries affected by natural disasters and economic damages in 2012

Events	Country	Damages (US$ bn.)
Tropical Cyclone (Sandy), October	United States	50.0
Drought, June	United States	20.0
Earthquakes, May	Italy	15.8
Flood, July	China	8.0
Tornado, March	United States	5.0
Severe Storm, April	United States	4.5
Severe Storm, June	United States	4.0
Thunderstorm, May	United States	3.4
Flood, April	China	2.5
Flood, August	Pakistan	2.5
Total		115.7

Source: Guha-Sapir *et al* (2013),

In August 2005, hurricane Katrina hit New Orleans, the hurricane destroyed lives and floodwalls in the river area, causing 80 % of the predominantly black community to be flooded (Dyson, 2006). Some parts were more than six metres under water. More than 80 % of the residents were evacuated, and housed in Louisiana super dome. The official death toll was set on 1577 while economic and political damage lasted well into 2006 (Enzlar, 2006; Hoyois *et al*, 2007). Therefore, potentially negative consequences for social development do not stop with direct impact. In the aftermath of a disaster or during the escalation of a slow-onset disaster such as drought, flood or complex political emergency, aid budgets can be skewed towards the recovery of one group or sector as opposed to another. The result is a reduction in social equality. Consequently, studies have shown that lower income people are more vulnerable to disaster threats than those with greater economic resources. Thus, effects of disasters are non-random because vulnerability of harm and damage is patterned by inequality.

2.6.4 Remedial measures to mitigate disasters.

Disaster Management is the coordination and integration of all activities necessary to build, sustain and improve the capability to prepare for, protect against, respond to and recover from threatening or actual natural or human-induced disasters. It is a multi-jurisdictional, multi-sectoral, multi-disciplinary and multi-resource initiative. Disaster management is also the coordination and integration of all activities necessary to build, sustain and improve the capability for disaster prevention, mitigation, preparedness, response and recovery. (National Emergency Management Agency [NEMA], 2012b). More effective prevention strategies would save not only tens of billions of dollars, but save tens of thousands of lives. Funds currently spent on intervention and relief could be devoted to enhancing equitable and sustainable development instead, which would further reduce the risk for war and disaster. Building a culture of prevention is not easy. While the costs of prevention have to be paid in the present, its benefits lie in a distant future. Moreover, the benefits are not tangible; they are the disasters that did not happen (Annan, 1999).

A major goal of emergency management is to minimize the adverse impact of a disaster on a business, community or large geographic area. The efforts of many organizations to build a more sustainable community, business or country are consistent with emergency management goals of hazard mitigation (McGuire, 2000). In 1987, the United Nations World Commission on Environment and Development coined the term sustainable development. It defined sustainable development as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs". This means that harvesting natural resources and developing land, must be done in a manner that will allow other generations to have at least the same opportunities that currently exist (Aguirre, 2002; Pine, 2003).

The significance of institutional framework in projecting into the future in disaster abatement is crucial. The Federal Government of Nigeria has established several ministries, agencies and parastatals for this purpose in addition to the existing disaster networks like non-governmental organisations, private concern and international bodies. In recent times, Nigeria, especially Lagos State, has been exposed to a wide range of human and natural hazard induced disasters. Some of these disasters include ethno-religious crisis, political turmoil and electoral violence, floods and drought, population movements (Internally Displaced Persons - IDPs - and refugees) and others (Ojo, 2013). In addition, some parts of the country face food insecurity and malnutrition while health epidemics such as Polio, Meningitis, Cholera and Lassa fever, are recurrent diseases that continue to affect the lives and livelihood of the populace. The multiple humanitarian challenges posed by these disasters could have far reaching impact on the entire country (NEMA, 2012a).

Over the years, response to disaster in Lagos State and by extension, Nigeria has been unanticipated, unplanned and often poorly coordinated so much so that response could be as bad as the disaster and often compound the impact of disaster on persons affected (Ojo, 2013). Also, those impacted and affected by disaster are often treated as object of charity rather than subject and claimants of rights to whom it is accountable. They are treated as people who have committed crimes and who deserve to be punished and not assisted. Consequently and in order for the country to operate in an organized manner by coordinating the activities of all these networks for effective disaster management, there is an overarching need to have centralized disaster management agencies at the national and regional scales (NEMA, 2003)

Disaster management being a multi-jurisdictional, multi-stake holding, multi-disciplinary, multi-sectoral, multi- resource endeavour, requires elaborate policy, procedures, systems and guidelines to ensure seamless coordination and collaboration.

Disaster management is an enormous task. A disaster is not confined to any particular location; neither do they disappear as quickly as they appear (Annan, 1999). Therefore, it is imperative that there is proper management to optimize efficiency of planning and response. Due to limited resources, collaborative efforts at the governmental, private and community levels are necessary (ISDR, 2004)). This level of collaboration requires a coordinated and organized effort to prevent, mitigate, prepare for, respond to, and recover from emergencies and their effects in the shortest possible time (Kasim, 2004; Warfield, 2005).

NEMA, by its mandate, is to coordinate and integrate the activities and efforts of disaster management stakeholders and structures, and to complement their resources to avoid haphazardness, duplication and waste. In performing the mandate, NEMA is faced with several constraints by taking on the responsibilities of other first responder agencies who fail to lead in some critical disaster situations for lack of capacity to do so. Lessons learnt have highlighted the limited human and material resources available for disaster response among responder agencies and stakeholders. Consequently, the bulk of the tasks still fall back upon NEMA (NEMA, 2012a; b). However, in the process of doing this, as noted by Wahab (2013) and Abin and Wahab (2013), NEMA comes in conflict with SEMAs, due largely to turf protection, as highlighted in the frequent friction between NEMA and Lagos State Emergency Management Agency (LASEMA).

For effective coordination of the activities of all agencies associated with disaster management in Nigeria, according to the National Emergency Management Agency (2003), the National Disaster Response Plan (NDRP) assigns a number of primary and secondary responsibilities to networks involve in disaster management as shown in Table 2.5. From the Table, in accordance with the provision of the Agency's establishment Act No. 12, 1999, the National Disaster Response Plan [NDRP] provides a focus for inter-agency and inter-governmental emergency preparedness, planning, training, exercising, coordination and information exchange by organizing the forms of federal response assistance that a community is most likely to require under the 13 Support Service Areas [SSAs] (NEMA, 2003).

The 13 Support Service Areas (SSAs) are as follows: 1 Transportation; 2 Communication; 3 Public Works and Engineering; 4 Fire Fighting; 5 Information and

Planning; 6 Mass care; 7 Resource Support; 8 Health and Medical Services; 9 Search and Rescue; 10 Hazardous materials; 11 Food and water; 12 Energy; and 13 Military support. For effective implementation, every agency and organisation relevant to emergency management has been systematically divided to fit into a SSA where their expertise would be maximally utilized to allow for coordination, efficiency and speed. Due to inherent shortcomings of the NDRP document, NEMA in 2012 launched the National Emergency Management Framework to incorporate the critical stakeholders such as Town Planning Authority, the Community Development Organisation and the Private Sector left out in the NDRP 13 Support Service Areas.

Table 2.5 Assignment of disaster related responsibilities in Nigeria

Organisation	Primary responsibilities	Secondary responsibilities
NEMA	6,7.8.11	9,10
Ministry of Transport	1	4,5,7,10,13
Nigerian Immigration Service		1,13
Nigerian Army	1,9,13	2,3,4,6,7,8,11
Nigerian Air Force	1,9,13	2,3,4,7,8
Nigerian Navy	1,9,13	2,3,4,7,8
Nigeria Police	1,9,13	3,4,6,7,8
Nigerian Ports Authority		1
NSCDC (Civil Defense)		5,6,7,9,13
Nigerian Maritime Authority	1	
Federal Road Safety Corps	9	1,4,8,13
Nigerian Railway Corporation	10	1
Ministry of Works and Housing	3	1,4,6
Ministry of Health	6,8,11	1,3,4,5,9,10,13
Federal Ministry of Environment	10	1,3,5,8
Ministry of Agriculture	11	1,3,5,6,7,8,10
Ministry of Communication	2	
Federal Radio Corporation of Nigeria		2
Nigerian Telecommunications (NITEL)		2,3
Nigerian Television Authority (NTA)		2
Ministry of Aviation		2
Federal Fire Service	4,9	3
Nigerian Red Cross Society	6	3,4,5,8,10,11,13
NEPA	12	3
NAMA	4	9
Ministry of Water Resources	11	3,4,6,10,11,12
Ministry of Information	5	
Ministry of Education		5
Ministry of Labour and Productivity		7
NAFDAC		8,11
FAAN		9
NNPC, Oil Companies	10,12	1,4,8,9,12
DPR	10	
Ministry of Power and Steel	12	
Construction Companies		1,3,4,9
NGOs		8,11
Nigeria Customs Service		13

Source: NEMA (2003), National Disaster Response Plan

For any management method to be successful, it requires mass participation, which not only gives strength but also legitimacy and ownership to the project. Thus, when awareness and education about disasters are provided to people, disaster management becomes a simpler task. One of the causal factors of vulnerability of a population is lack of awareness and education about disasters. It is also the only factor, which can be tackled very easily and immediately. For example, according to Wisner (2001b), while poverty cannot be eliminated in a developing country like India, ungoverned population growth has been controlled to some extent through public education and awareness. Rapid urbanization and migration cannot be stopped at present which would take long years; transition in the cultural practices cannot be stopped that easily, which again is a slow process and to a greater extent depends on the people's mind-set. However, vulnerability to disaster can be addressed through functional public awareness and education.

In view of the above, Thompson (1995), opined that in a given country, what is important in the efforts to reduce disaster is to prescribe an appropriate feasible package of measures that are not limited to conventional counter-disaster activities. Such a package, for instance, most likely includes a rural and urban development programme, with particular emphasis on watershed rehabilitation and literacy campaign measures not regarded usually as counter-disaster measure. There is, however, no universally applicable package of right action. Most often, the structure of disaster vulnerability is unique to each country and such a comprehensive package cannot be prescribed without thoroughly scrutinizing how and why the country in question is vulnerable. For example, following the extensive flooding that covered almost three-quarters of Bangladesh in 1987, the Bangladeshi officials launched a three year Flood Action Plan to study more than 25 different dimensions of flood prevention (World Bank, 2005). The resulting recommendation overwhelmingly suggested the need for much greater investment in "flood-proofing" the society by learning to live with the inevitable floods in a way that would minimize harm and loss, rather than trying to prevent the powerful forces of nature. Findings were ultimately guided by the fact that almost the entire country of Bangladesh is a highly fertile flood plain. It would neither exist, nor be as productive as it is without the annual floods continually renewing and extending its landscape (ISDR, 2002).

Preparedness and response to disaster as opined by Ijewere (2003), are not solely the work of expert and emergency responders from government disaster organisations. Local volunteers, citizens, organisations and businesses have an active and important role to play before, during and after major emergencies and disasters. Therefore, Community Based Disaster Preparedness (CBDP) that seeks to develop and implement a locally owned strategy for disaster risk reduction and preparedness is of paramount importance. The local population in disaster stricken areas is the first to respond to a disaster in terms of search and rescue as well as providing emergency treatment and relief for families, friends and neighbours (Wisner, 2001c). The management of disaster is primarily the prerogative and duty of governments. However, a multi-sectoral and multi-disciplinary cooperation between government agencies, community based organisations, corporate bodies, non-governmental organisations and other networks in disaster abatement and management is a critical one (Wisner, 2001c; Frances and Hanlon, 2001).

2.6.5 Developmental attributes of disaster

Disasters constitute a development issue because they can make development risky and unsustainable while development processes can cause or reduce disaster risks. Losses from disasters negate some development gains and exacerbate poverty, partly because natural hazard vulnerability causes, exacerbates or is linked with other vulnerabilities and risks. Due to the inter-relationships between disaster risk and developmental attributes, effective disaster risk reduction strategies most strive to mainstream and ensure sustainable development (ISDR, 2006).

It is noted by UNDP (2004), that development patterns that do not balance wealth creation, equity or environmental soundness are unsustainable and cause disaster risks, mainly through worsening underlying factors of vulnerability to hazards or contributing to conditions that cause or exacerbate environmental degradation. In contrast, sustainable development strengthens the security of populations, hence, disaster reduction interventions can effectively help to alleviate or avoid disaster risks to the community's livelihoods, the supporting physical, economic and social base. This mutually beneficial relationship between reducing disaster risks and ensuring sustainable development occurs when disaster losses are addressed in a development context and development processes and patterns adequately address threats from disasters and other livelihood risks (ISDR, 2006).

Although a number of studies had been published previously on the theme of disasters and social change but the first systematized and comprehensive series of ideas on the ways disasters may interrupt development processes, whilst, at the same time, offering opportunities for future development was developed by Fred Cuny in 1983. As noted in the work, the recovery process could serve as opportunity to build disaster risk reduction mechanisms into post-disaster development planning. Disaster-development relationships should be reconsidered as development priorities are thought through. Importantly, it is not just local actors, but national and international actors who should be involved in these reflections. Disruptions caused by disasters create avenue to open up political space for alternative forms of social networking that enhance egalitarian forms of organization to develop. Support for such organisations could be a way in which new development priorities are carried forward beyond the immediate response and recovery periods (Cuny, 1983).

Integrating the results of society's responses and reconstruction activities into post disaster interventions clearly indicate that disasters are problems for development. However the results of numerous studies carried out in regions affected by disaster show that in many cases there are marked development gains in the medium and long terms (Smith, 2004). This should not be surprising taking into account the argument that disasters can be opportunities for development. New investment, improved quality of housing, infrastructure and production, and overall gains in risk reduction can be expected to occur where the reconstruction process is adequately conceived. Moreover, it has also been documented in various areas affected by disaster that new investment has greatly exceeded calculated disaster losses and reconstruction needs as stipulated in post disaster assessments (Lavell, 1999).

Disasters are popular events and responses may be driven by social, economic, political or ethical reasons. The response could lead to significant positive changes in the local or regional economy and society. In an unintentionally cynical way of looking at the disaster – development spectrum is that disasters could be seen as abrupt writings off of redundant, depreciated capital. However, the argument that disasters may lead to greater development, at least in the affected regions, is not an argument for letting them happen. It is just a statement on the nature of the process. Crisis provides opportunity. Disasters reveal distinct aspects of underdevelopment, expressed through the presence of vulnerability. Given this it is not surprising that what happens after disaster may, many times, be better than what existed before. The contradiction is, of course, that many regions and population groups have to await a disaster in order to have any opportunity to gain a minimal access to development resources (Lavell, 1999).

2.6.6 Methodological issues in disaster management

The purpose of research is to discover, amend or change laws and theories. Research is used to define a cause-effect relationship between independent and dependent variables. Until recently, reports of disaster responses have been primarily anecdotal and descriptive with little or no structure (Wisner *et al*, 2003). Experimental studies are either impossible to conduct in a setting of disaster or are considered unethical (ISDR, 2002; Quarantelli, 2005). However, during the last two decades, methodologies used in the social studies have contributed greatly to the understanding of disaster and the effects of specific interventions on the affected populations or populations at risk from an event. By seeking to understand and to anticipate future hazards by studying the past and monitoring the present situations, a community or public authority can minimise the risk of a disaster (ISDR, 2002)

Researchers in contemporary disaster management have been using quasi-experimental survey design. These approaches such as before – and – after studies (longitudinal) studies have some application in the study of disaster. Before – and – after studies form the bases for assessing the damage caused by an event because assessment of disaster is not possible without the knowledge of the pre-event status of the affected community (Stephenson, 1994). Australian Development Gateway used this method to determine the trends and features associated with each phase of Disaster Risk Management Cycle (DRMC). The longitudinal survey is done, most often than not, in expectation of a disaster that is about to happen. This is so because the goal of disaster preparedness and response is to return the affected society to its pre-event status (Australian Development Gateway, 2007).

Disaster risk is part of everyday life. Awareness of risk is a necessary condition to engage in disaster risk reduction. In determining this, Vulnerability and Capacity Analysis (VCA) is an indispensable profiling method with specific focus on the relationship between hazard and recipient subject. Different approaches to conducting VCA have been used in various countries. Methods adopted may be described either as ‘top-down’ or ‘bottom up’, using quantitative, qualitative or a combination in a triangulated methodology. For example, in Palestine, the Palestine Red Crescent Society (2000), adopted a participatory approach to disaster management which was predominantly qualitative in nature. In Nigeria, the pilot programmes conducted by the National Emergency Management Agency (NEMA) for VCA in Kaduna, Benue, Adamawa, Akwa Ibom, Imo, Lagos States and Abuja were done using quantitative and qualitative approaches to determine how these States could limit the damage occasioned by disaster through their inherent capacity and vulnerability components (NEMA, 2011).

Vulnerability is not a simple or readily measured parameter but it is, rather, a combination of various measures related to the socio-economic, political, physical, cultural and environmental situation of a specific location. Thus, VCA identifies the strength and weakness of the recipient community in relation to the identified hazard, based on readily available information. As noted by Turner *et al* (2003), different levels of decision-making require assessment of vulnerability at different geographic scale on which the VCA is based. Hence, the aim of VCA is to provide decision-makers with information as to where and when interventions should be made and in what form. Vulnerability can be assessed using VCA at various levels such as individual, household, village, ecosystem, regional and national. For different levels different sets of information will be required. It is recommended by UN-Habitat (2001a), that the following procedures should be taken into consideration at any level of assessment:

i. Decision on a target geographical area or assessment unit, taking into consideration scale effects;
ii. Scope study to establish for whom the assessment results can be used and for what decision;
iii. Preparation of a causal schematic illustration; and
iv. Preparation of profile (assessment statement) for the:
    a. Activity sectors for development (the population);
    b. Environmental setting (mediating factors); and
    c. Hazard.

Disaster can be studied through spatial planning and Geographical Information System (GIS) using hazard mapping procedures. Several initiatives on hazard mapping were developed during the 1990s as part of the International Decade for Natural Disaster Reduction strategy. However, as noted by ISDR (2002), hazard mapping is challenged by several constraining factors. Among the most challenging are: inadequate technological infrastructure, training for human resources and insufficient communication and collaboration among relevant bodies adversely affect hazard mapping process.

In recent time, as noted by Eslinger (2001), methodologies which include ground surveys, remote sensing and GIS mapping have been employed in hazard mapping. An integrated hazard assessment methodology that used a GIS-driven constraint analysis to evaluate multiple hazards had been used in sustainable development planning for eight Puerto Rico municipalities. The method employs a vulnerability index that relates the intensity of past damages to the reoccurrence interval for each hazard, and then compares different hazards to create a composite hazard map.

While hazard mapping has been improved by the wider use of GIS technique, the inclusion of socio-economic and environmental variables into GIS models remains a major methodological challenge. In other words, the need to assign quantifiable values to the variables analysed in the spatial models used by GIS is not always possible for social and economic dimensions of vulnerability. Also, the diverse scales at which different dimensions of socio-economic vulnerability operate make the spatial representation through these techniques very difficult. In addition, the quality and detail of the data required by GIS analysis is in many cases non-existent, especially in the developing countries (de Jong, 2002).

2.6.7 Application of urban dynamic model to city management.

This study of urban dynamics was undertaken principally because of discoveries made in modeling the growth process of corporations. It has become clear that complex systems are counterintuitive. The ideal city would be one with readily available housing at low cost, a surplus of jobs at high wages, excellent schools, no smoke or pollution, housing located near one's place of work, no crime, beautiful parks, cultural opportunities, and list continues. Suppose such a city existed. What would happen? It would be perceived as the ideal place to live. People from everywhere would move into the ideal city until the advantages had been so swamped by rising population that the city would offer no net attractiveness compared with other locations (Alfeld, 1995).

There are many components of urban attractiveness, and if one of these is decreased, others can be improved. One cannot create the ideal city. But one can create certain ideal features if one is willing to compensate for them by intentionally allowing other features to worsen.

The publication of *Urban Dynamics* in 1969 generated intense controversy. To help assess the model's value, the then-new United States Department of Housing and Urban Development (HUD) provided a 210,000 dollars research grant to support a two-year effort to validate the model. An advisory committee of urban experts drawn from academia and city government was to provide guidance and judge the results of the research. The principle of urban dynamics was adopted in managing the growth of 5 United States of America cities namely: Lowell 1971, Boston 1974, Concord 1975 and Marlborough 1976, all in Massachusetts. The Atlantic beach of Palm Coast, Florida was the fifth city where the theory was implemented in 1980 (Alfeld, 1995). All five applications differed from one another. In the first city, Lowell, the intervention demonstrated the importance of a limited land resource in shaping urban policy. Boston, underscored how urban aging widens the gap between the city's high-priced job base and its low-priced housing stock. Work in Concord employed simple models to capture the powerful feedback forces that drive migration and growth. Marlborough bypassed formal modelling, using the underlying theory to shape a verbal logic that supported political actions aimed at preserving the older inner neighbourhoods in a dynamic equilibrium. Finally, a substantially revised model was constructed to guide the projected 80-year growth of Palm Coast, from a tiny community of 3000 to a new town of 224,000 (Alfeld, 1995).

To encourage that urban renewal according to Kadanoff (1971), two central rules ought to guide any future application of urban dynamics: emphasize answers, not models, and emphasize interface, not data. The first rule cautions model-builders to present their work in terms of answers that urban decision-makers need rather than models of urban problems. These answers must be responsive in three areas of decision support: how to maximize the leverage of existing programs by highlighting some aspects while downplaying others; how to quantify the trade-offs among competing programmes in terms of budget, performance and time; and how to use the model logic to create a consensus to support needed change. In addition to this, any future urban dynamics work must help urban decision-makers grasp four interconnected principles that control urban behaviour: resource constraints; urban aging; relative attractiveness and equilibrium growth. These four principles are still the fundamental forces driving city evolution today and an understanding of how they combine to determine the impact of urban programmes is essential to effective decision-making.

2.6.8 Flood risk assessment and mapping

Flooding is the most common of all environmental hazards and it regularly claims over 20,000 lives per year and adversely affects around 75 million people world-wide (Smith, 1996). The reason lies in the widespread geographical distribution of river floodplains and low-lying coasts, together with their long standing attractions for human settlement. Death and destruction due to flooding continue to be all too common phenomena throughout the world today, affecting millions of people annually.

Mitigation of flood disaster can be successful only when detailed knowledge is obtained about the expected frequency, character, and magnitude of hazardous events in an area as well as the vulnerability of the people, buildings, infrastructures and economic activities in a potential dangerous area (Van Western and Hosfstee, 2000). Unfortunately, as noted by Ifatimehin *et al*, (2009), this detailed knowledge is always lacking in most urban centres of the developing world especially Nigeria. However, one of the functional strategies to mitigate the effects of flooding is to ensure that areas vulnerable are identified and precautionary measures are taken to ensure adequate prevention, mitigation, preparedness, effective response and quick recovery (UN-Habitat, 2001b). Before these could be done, information is required on important indices of flood risk identification which are elevation, slope orientation, proximity of built-up areas to drainages, network of drains, presence of buffers, extent of inundation, cultural practices as well as attitudes and perceptions (Ishaya *et al*, 2009).

Flood risk assessment according to Kates and Kasperson (1983), comprises three distinct steps: identification of hazards likely to result in disasters, for example, what hazards events may recur?; an estimation of the risks of such event - what is the possibility of such event?; and an evaluation of the social consequences of the derived risk - what is the loss created by each event? Also, as opined by Ologunorisa and Abawua (2005), flood risk assessment comprises all the steps outlined above in addition to the identification of high risk areas with the use of meteorological parameters, combination of hydro-meteorological and socio-economic factors, hydrological parameters and Geographical Information System (GIS).

Ologunorisa (2004), undertook an assessment of flood risk in the Niger Delta, Nigeria using a combination of hydrological techniques based on some measurable physical characteristics of flooding, and social-economic techniques based on vulnerability factors. Also, the Nigerian Institute for Oceanography and Marine Research, Lagos State Ministry of Environment and Physical Planning (Department of Drainage), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Coastal Regions and Small Islands (CSI) conducted flood risk assessment for Lagos State in 2000. Some of the physical characteristics of flooding selected include depth of flooding (metres), duration of flood (hours/weeks), perceived frequency of flood occurrence, and relief or elevation (m) while the vulnerability factors selected include proximity to hazard source, land use or dominant economic activity and adequacy of flood alleviation schemes and perceived extent of flood damage. He derived rating scale for the nine parameters selected, and 18 settlements randomly selected across the three ecological zones in the region were rated on the basis of the parameters. Three flood risk zones emerged from the analysis. These are the severe flood risk zones, moderate flood risk zones and low flood risk zones. Some strategies for mitigating the hazard of flooding in the region were also identified.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the research methodology and the procedures adopted in data collection, analysis and interpretation in order to realize the objectives of the study. In view of this, the chapter discusses: research design, sources of data, population of the study, sampling technique, instrument and method of data collection, Geographic Information Systems (GIS) analysis and data analysis. Methodology is paramount to and is seen as the hallmark of researches, thus, findings of research depend on the methodology adopted. This study drew its data from primary and secondary sources of data collection.

3.1 Research design

There are two types of research design: cross-sectional survey and longitudinal survey. This study adopted the cross-sectional survey research design for the household questionnaire distribution and longitudinal survey for the Geographic Information System (GIS) Analysis. Cross-sectional research is a research method often used in social science and education. It is described as snapshots of the population about which it gathers data. Thus, the cross-sectional surveys asked a group of respondents a set of questions at one point in time. This type of study utilises different groups of people who differ in the variable of interests but share other characteristics such as socioeconomic status, educational background, occupation, household and housing characteristics.

3.2 Primary sources of data

This source of data adopted the following methods: Direct Observation, Interview Guide, Administration of Questionnaires, Google Earth and GIS Mapping. The direct observation method was used to investigate the environmental and vulnerability conditions inherent in the study area. The interview guide focused on disaster management agencies and organizations in Nigeria such as the National Emergency

Management Agency (NEMA), the Lagos State Emergency Management Agency (LASEMA), Nigerian Red Cross Society, Fire Service, the Nigerian Security and Civil Defense Corps (NSCDC), Federal and State Ministries, Construction Companies to elicit relevant information on various aspects of their operation with regard to disaster management. To elicit the needed information, Semi-Structured Interviews through face-to-face interviews with the Federal and State Government actors, Local Government Authorities, Nigerian Red Cross Society, Community-Based Organizations (CBOs) and other partners working on disaster reduction and recovery were conducted.

In addition to these, On-Site Field Visits for capacity assessments were carried out. In conducting the exercise, particular attention was given to issues related to capacities for preventing and mitigating natural disaster risks in Nigeria at the national, state, and local government levels. During the field visits, sector-wide consultations and interviews on a wide variety of stakeholders' activities from different sectors and organizations were examined.

The interview guide for NEMA and SEMA was structured into five sections as follows: general and statutory obligations of the agencies, disaster management and mitigation procedure, relationship between the agencies, other disaster networks and communities, vulnerability study analysis, and the challenges of the agencies. The interview guide for the other disaster networks was sectionalized into four: general information, disaster management and mitigation, relationship between the network and the disaster management agencies and communities and their knowledge on environment and disaster related policies and programmes.

The household questionnaire was tailored towards the inhabitants (household heads) of the study area and has eight sections. These sections include: general information, socio-economic information, environmental conditions, types and nature of disasters, disaster management knowledge and approach, vulnerability information, policies and disaster management agencies, urbanization trend and its impact on the environment. For verification and authentication of data, Google Earth was used to count the number of buildings within each unit of study.

3.3 Secondary sources of data

To buttress and complement data that were collected from the study area, existing data were sourced from the Lagos State Ministries of Physical Planning and Urban Development, Housing, Environment, Health, NEMA Headquarters Abuja and the Lagos Zonal Office, LASEMA and the Lagos State Public Works Corporation in determining the Federal and State involvement in disaster management. The Disaster Risk Reduction Capacity Assessment (DRR/CA) methodology which is based on a review of primary data and relevant documentation related to disaster and environmental management in Lagos was employed to review the data sourced from secondary sources. The evaluation was based on a methodology developed by the UNDP Capacity Development Group (CDG) and adapted for the Disaster Risk Reduction in Nigeria in 2013. This methodology outlines the capacity assessment questions and these include data collection methodologies, data sources, and key respondents. The data collected were primarily qualitative, consisting of background documentation, document review and analysis, reports and assessments.

Other secondary sources of information include population census document that shows urban dynamics process over time and also delineates and classifies the selected Local Government Areas (LGAs) according to localities. These were obtained from the National Population Commission (NPC) and the Independent National Electoral Commission (INEC). The documents were used to classify localities into the wards of interest. In addition to this, previous environmental and disaster related policies and laws of the Federal and State Governments were reviewed. These include: the 1946 Planning Ordinance, 1992 Urban and Regional Planning Law, NEMA and LASEMA Acts, the National Urban Development Policy, among other Acts.

The map of Lagos State in the context of Nigeria and the maps of LGAs in Lagos state were used to describe the study area and in analyzing the spatial dimension of vulnerability to disasters from data obtained from the field. Finally, the works, researches and studies done in the area of urbanization, population growth and vulnerability to disasters contained in journals, books, proceedings of conferences, workshops and internet materials especially from websites like www.unisdr.org, www.proVenture.comwww.cred.bc, www.redcross.org, www.globalissue.org and other website related to disaster management and urbanization were used to anchor the theories, concepts and literature review sections.

3.4 Sample frame, size and sampling procedure

Lagos state, at present, has 20 LGAs listed in the Constitution of Federal republic of Nigeria. However, for the purpose of this research, the study area was disaggregated into Lagos Mainland (LM) and Lagos Suburb (LS) as contained in Table 3.1. A total of nine LGAs: five from LM and four from LS LGAs, accounted for about 25% of land cover in Lagos State, were chosen based on current population figures and contagiousness of location. In Lagos State, increasing population places undue pressure on existing infrastructural facilities and services and invariably led to population expansion to marginal land and the burgeoning of informal settlements associated with sub-standard buildings, encroachment on natural flood plains and acute disregard to planning ordinance and regulation. Thus, the LGAs with the highest population figures and most vulnerable to disasters in the regional classification were selected for the study as shown in Table 3.2. A multi-stage sampling strategy was adopted for households' questionnaire administration. According to the NPC, in 1991 and 2006, the populations of Lagos State were given as 5,725,116 and 9,013,534 respectively. The United Nations (1996), posited that Lagos is likely to become the third largest city in the world after Tokyo and Mumbai (formerly Bombay) by 2015. Consequently, the UN-Habitat (2005), has estimated the population of Lagos to be 16.8 million in 2005.

Table 3.1 2010 population projections for Lagos state LGAs

Regional Classification	LGAs	Number of wards	2006 population	Projected 2010 population
Lagos Mainland	Lagos Mainland	11	317,720	355,243
	Surulere	12	503,975	563,494
	Lagos Island	19	209,437	234,172
	Eti Osa	10	287,785	321,772
	Shomolu	12	402,673	450,229
	Apapa	10	217,362	243,032
	Ikeja	10	313,196	350,184
	Mushin	14	633,009	707,767
	Ojo	11	598,071	668,703
	Oshodi/ Isolo	11	621,509	694,909
Lagos Suburb	Ajeromi-Ifelodun	11	684,105	764,898
	Kosofe	10	665,393	743,976
	Ifako/Ijaiye	11	427,878	478,410
	Agege	11	459,939	514,258
	Ibeju-Lekki	11	117,481	131,356
	Badagry	11	241093	269566
	Alimosho	11	1,277,714	1,428,612
	Amuwo/Odofin	10	318,166	355,741
	Epe	11	181409	202,833
	Ikorodu	11	535619	598,876
Total		**228**	**9,013,534**	**10,078,031**

Source: Federal Republic of Nigeria Official Gazette (2007).

Table 3.2 LGAs of interest in Lagos Mainland and Suburb

Regional Classification	LGAs	2006 population	2010 projected population
Lagos Mainland	Mushin	633,009	707,767
	Oshodi-Isolo	621,509	694,909
	Surulere	503,975	563,494
	Lagos Mainland	317,720	355,243
	Shomolu	402,673	450,229
Lagos Suburb	Kosofe	665,393	743,976
	Ikorodu	535,619	598,876
	Alimosho	1,277,714	1,428,612
	Ajeromi-Ifelodun	684,105	764,898
Total	**9**	**5,641,717**	**6,308,004**

Source: Federal Republic of Nigeria Official Gazette (2007)

Lagos manifests the characteristics of high proportion of slum settlements, lack of basic infrastructure and amenities, urban decay and obvious cyclical poverty – the defining features of the developing nations' urban settlement – that further aggravates vulnerability to disasters. Given the history of population censuses in Nigeria, including the 2006 census figures of 9,013,534 million for Lagos, the UN-Habitat's and the United Nations' projected figures are probably closer to reality than the NPC figures.

The research structured the study area into income classifications as follows: Low Income/High Density (LI/HD), Medium Income/ Medium Density (MI/MD) and High Income/Low Density (HI/LD). A number of studies (Centre for Democracy and Governance, 2000; Smith, 2008) have shown and concluded that the classification of LGAs into income groups will not be effective at the LGAs level because LGAs in Lagos state are large, heterogeneous and have mixed income groups neighbourhoods. To minimize the effects of this evident challenge, the classification was done using the Lagos State Independent National Electoral Commission (LSINEC) wards classification for the 9 LGAs.

A ward is a smaller administrative and or political unit which has homogeneous characteristics germane to the study. The challenge encountered by using the ward as the unit of study was that the available NPC population figures were not classified according to ward but the classification was done based on LGAs and their localities. However, the population figure for each ward was obtained by identifying the localities and classifying them according to their corresponding wards. Therefore, the population figure for localities within each ward was summed up to obtain the population for the ward. A total number of 54 wards, 6 from each LGA, were selected for the study. To determine the wards of interest, 6 wards with the highest population figures from each LGA were selected after the population figures for the wards in the LGA had been arranged in decreasing order, where possible, along density/income classifications as shown in Tables 3.3 and 3.4.

Table 3.3 Lagos mainland LGAs, Wards and neighbourhood classifications

LGAs	Name of ward	Neighbourhood classifications
Lagos Mainland	Otto/Iddo	High Density
	Makoko/EbuteMetta	High Density
	Olaleye Village	High Density
	Oyediran Estate/Abule-Oja	Medium Density
	Yaba/Iponri/Sabe	Medium Density
	Iwaya	Medium Density
Mushin	Mushin/Atewolara	High Density
	Ilasamaja	High Density
	Itire	High Density
	Idi-Oro/Odi-Olowo	High Density
	Ilupeju	Low Density
	Kayode/Fadeyi	Medium Density
Oshodi/Isolo	Orile-Oshodi	High Density
	Mafoluku	High Density
	Oke-Afa/Ejigbo	High Density
	Ajao Estate	Low Density
	Isolo	Medium Density
	Sogunle	Medium Density
Surulere	Orile	High Density
	Ijesha-Tedo	High Density
	Itire	High Density
	Ikate	High Density
	Adeniran Ogunsanya	Low Density
	Aguda	Low Density
Shomolu	Bajulaiye	High Density
	Bariga	High Density
	Abule Okuta/Ilaje/Bariga	High Density
	Palmgrove	Low Density
	Ilaje/Akoka	Medium Density
	Gbagada Phase I/Obanikoro	Medium Density

Source: Lagos State Independent National Electoral Commission (LSINEC), 2005.

Table 3.4 Lagos suburb LGAs, wards and neighbourhood classifications

LGAs	Name of ward	Neighbourhood classifications
Ajeromi-Ifelodun	Tolu	High Density
	Alaba-Oro	High Density
	Olodi	High Density
	Ojo Road	High Density
	Awodi-Ora	High Density
	Temidire	High Density
Kosofe	Ketu/Ikosi	High Density
	Ajegunle	High Density
	Anthony/Mende	Low Density
	Isheri/Olowora	Low Density
	Ojota/Ogudu	Medium Density
	Oworonsoki	Medium Density
Alimosho	Abule-Egba/Alagbado	High Density
	Egbe/Agodo	High Density
	Shasha/Akowonjo	High Density
	Egbeda/Alimosho	High Density
	Ipaja North	Medium Density
	Oke-Odo/Pleasure	Medium Density
Ikorodu	Ipakodo	High Density
	Imota	High Density
	Baiyeku/Ireta	High Density
	Odogunyan	High Density
	Igbogbo	Medium Density
	Ijede	Medium Density

Source: Lagos State Independent National Electoral Commission (LSINEC), 2005.

The next stage in the sampling procedure was the identification of houses to be sampled. To identify the sampled houses in each ward, data on the number of building in Lagos State, disaggregated according to streets, roads and LGAs, was collected from the Lagos State Bureau of Statistics. All the streets in the study area were delineated according to wards with the aid of Google Map, Google Earth Imagery and Lagos State Street Map. To determine the sample size to be adopted for the study, 0.5 % of the 315,305 selected houses in the LGAs was taken as the sampling ratio. Thus, the sample size arrived at was 1576. The break-up of the respondents for the LGAs is contained in Table 3.5

The houses within the wards of interest were listed and numbered with the aid of Google Earth while physical counting and numbering was done to authenticate the Google Earth results. The listing and numbering are important because one cannot develop an efficient sampling procedure without taking them into consideration. For example, if there are 80 houses in a given ward, the houses were numbered 1 – 80 and table of random numbers was used to select houses from which to elicit information using the households' questionnaire.

After determining the houses in which questionnaires would be administered, all the households in the selected building were listed and samples were randomly selected using random number.

Table 3.5 Number of wards and sample size adopted for the study.

Regional Classification	LGA	Number of buildings	Sample size (0.5%)	No. of sampled wards in LGAs
Lagos Mainland	Lagos Mainland	13321	67	6
	Mushin	30676	153	6
	Oshodi-Isolo	39359	197	6
	Shomolu	42876	214	6
	Surulere	21171	106	6
Lagos Suburb	Kosofe	16655	83	6
	Ikorodu	46732	234	6
	Ajeromi-Ifelodun	46443	232	6
	Alimosho	58072	290	6
Total		**315305**	**1576**	**54**

Source: Lagos State Bureau of Statistic 2010

3.5 GIS: flood risk assessment procedure

The systematic study of global urban expansion requires good data which, until recently, have not been available. At the minimum, it requires high quality, internationally comparable data of the urban land cover in a global sample of cities for two time periods. As a result of the absence of comparative data, important debates on urban policies continue to take place with little or no data to support one position or another. Introducing the debate on the merits of compact city policies for developing countries, for example, Burgess (2000), acknowledges that lack of empirical data on existing urban expansion, density and trends and a lack of clarity on what are the most appropriate indicators to measure them, pose a problem for the assessment of urban expansion policies for cities in developing countries.

Computer-assisted processing of satellite remote sensing data was judged as the most cost-effective means to extract this information and the *Landsat* Thematic Mapper (TM) and Enhanced Thematic Mapper+ (ETM) were deemed the optimal sensors for this purpose. The data available for this study encompassed: Topographic map; 1984 and 2010 Landsat ETM+ images; and Elevation Map. Lagos State topographic map from Global Land Cover Facility (2011) was scanned and imported into ArcGIS. This was digitized and used to define the boundary of urban expansion overtime. The elevation map of the study area obtained from Global Land Cover Facility (2011) was also imported into ArcGIS (Figure 3.1).

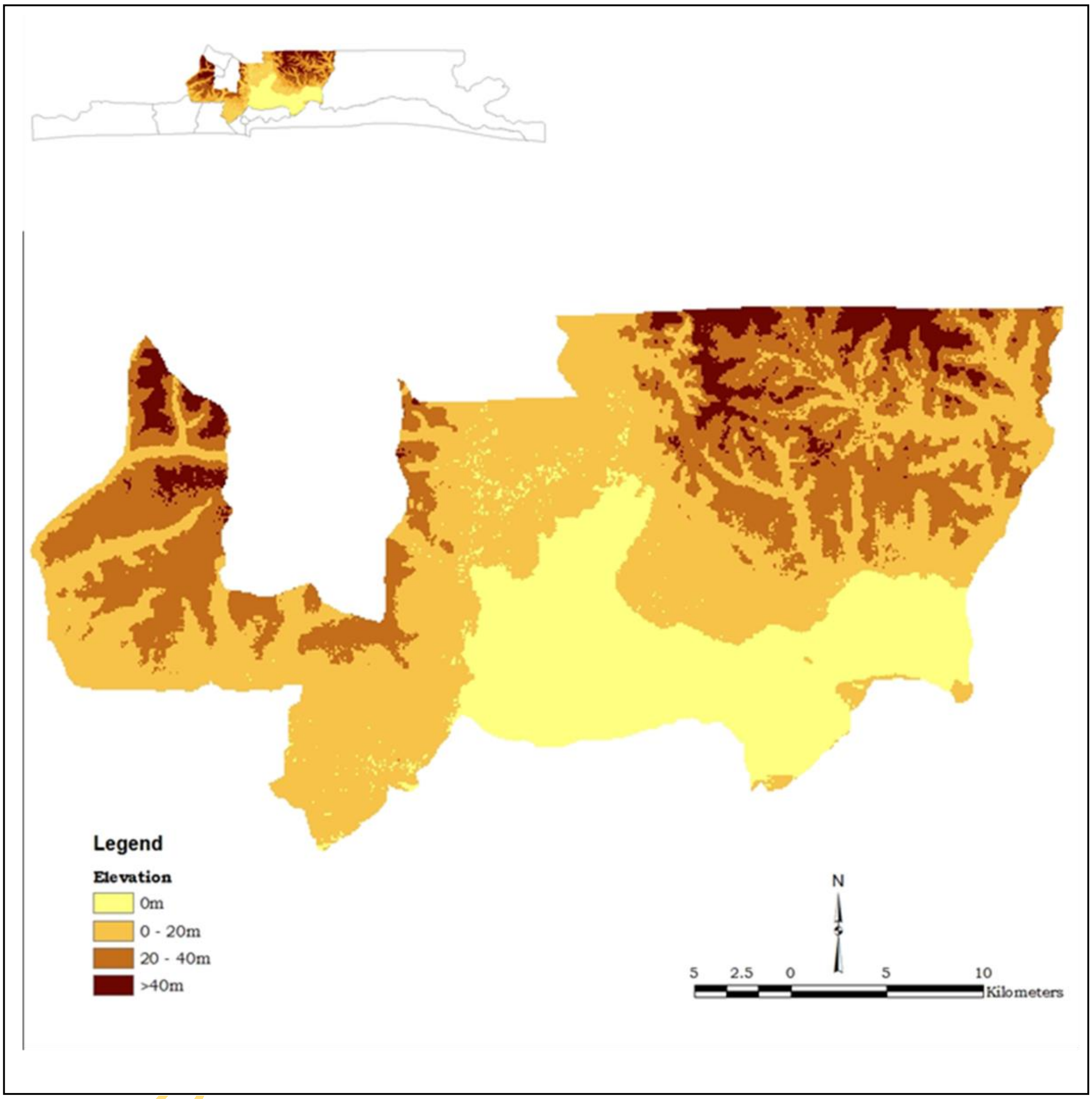

Figure 3.1 Elevation of the study area

Source: Global Land Cover Facility 2011

Elevation is highest in the north eastern and north western parts of the study area but very low at the southern part. The Landsat images and elevation map were clipped with the digitized image of the topographic map. “False” composite images from spectral bands 3 (Red), 4 (near-infrared) and 5 (mid-infrared) of Landsat ETM+ images of the study area in 1984 and 2010 were classified to extract the different land uses of the study area using CLUSTER unsupervised classification algorithm provided by IDRISI Taiga. The Landsat data were orthographically corrected to remove geometric distortions and displacements. Each scene was geo-referenced to the Universal Transverse Mercator (UTM) projection, while the image pixels were re-sampled to 28.5 metres.

3.6 Method of data analysis

For the purpose of this research, the data collected were analysed using the Statistical Packages for Social Sciences (SPSS) and ArcView for Geographic Information Systems (GIS) Analysis. Descriptive and inferential statistics were used in analyzing the data obtained. A selection of descriptive statistical methods and diagrams were used in the initial display of data. These include: frequencies and percentages.

The first hypothesis states that urban dynamics is influenced by availability of low income/high density housing in the study area was tested using two-sample chi square (χ^2) method. The chi square test aided the study to determine if there is a difference between low income housing and urban dynamics. The test is based on a comparison of the observed values with the expected if the two distributions are independent. Thus, (χ^2) tests if data in the table differ significantly from the expected when the two variables were independent of each other. In other to test the hypothesis, primary data elicited to influence urban dynamics were analysed using (χ^2) test. The observed frequencies from the responses from the 9 LGAs of interest constituted the data that were analysed.

The second hypothesis which states that vulnerability to disasters is a function of socio-economic indices, housing characteristics and provision of infrastructural facilities and services was analysed using multiple regression model involving dummy variables or logistic model. This model is appropriate because the dependent variable is dichotomous (binary) as respondents had either experienced disasters or not. The model is probabilistic and also allows for the prediction of likelihood (odd ratio).The regression model analysed is stated as follows:

$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10}$.................. + e

Where:

Y is vulnerability to disaster index (flooding, fire outbreak, building collapse and disease outbreak)

a is the intercept

b is the slope

e is the stochastic disturbance or error term

Predictive factors for socio-economic indices are:

X_1 Age: this is constructed as non-discrete variable

X_2 Gender: since there are two groups, the female group is used as the base and dummy is constructed for male.

X_3 Marital Status: this variable has four categories and the married category is used as the based category while dummy is constructed for other categories.

X_4 Employment: this variable has six categories and the business man category is used as the based category while dummy is constructed for other categories.

X_5 Household Size: this is constructed as non-discrete variable

X_6 Level of Education: this variable has four categories and the tertiary education category is used as the based category while dummy is constructed for other categories.

X_7 Income: this is constructed as non-discrete variable

Predictive factors for household and housing characteristics are:

X_8 Age of Building: this is constructed as non-discrete variable

X_9 Types Dwelling Unit: this variable has four categories and the rooming apartment category is used as the based category while dummy is constructed for other categories.

X_{10} Number of Rooms in Building: this is constructed as non-discrete variable

X_{11} Number of Persons per Room: this is constructed as non-discrete variable

X_{12} Distance to Structures to the Right, Left, Rear and Front: all are constructed as non-discrete variable

X_{13} Material Used in Construction: Unit: this variable has two categories and sandcrete block category is used as the based category while dummy is constructed for other categories.

X_{14} Drainage Conditions: this variable has three categories and semi blocked drainage category is used as the based category while dummy is constructed for other categories.

X_{15} Building Setback to Drainage and Water Bodies: this is constructed as non-discrete variable

Predictive factors for housing infrastructural facilities and services include:

X_{16} Sources of Domestic Water: this variable has four categories and well/borehole category is used as the based category while dummy is constructed for other categories.

X_{17} Toilet Facility: this variable has four categories and using water closet ensuite as the based category dummy is constructed for other categories.

X_{18} Number of Persons per Toilet Facility: this is constructed as non-discrete variable

X_{19} Waste management: this variable has three categories and government collection is used as the based category while dummy is constructed for other categories.

X_{20} Frequency of Collection: this variable has four categories and weekly collection is used as the based category while dummy is constructed for other categories

There are certain rules for creating dummy variables. A variable with two categories are usually described as dichotomous. The requirement that if K categories exist, by default, there must be K – 1 dummy variable is valid when an intercept (a) is included in the logistic regression equation. This is because inclusion of all K categories would render the normal equations unsolvable. Therefore, it is important in regression analysis involving an intercept to exclude one of the dummies from the equation. The exclusion does not result in loss of information; however, the excluded category becomes a reference point on which the actions of other dummies are predicted and interpreted. The excluded category in the literature is referred to as the base category (Gujarati 2009). This rule was taken into consideration in the regression analysis.

The third hypothesis which states that occurrence of disasters differs significantly between residential neighbourhoods (low, medium and high densities) was tested using the Analysis of Variance (ANOVA) technique. In most planning situations, the interest of intervention is focused on whether the observed differences between more than two means are attributable to chance or they are indications of actual differences among means of the parent population from where the samples were drawn. The most appropriate statistical methodology employed in analysing this is ANOVA. The available secondary data on fire outbreak and building collapse satisfied the assumptions of ANOVA which include the followings:

i. Each data is independent and does not relate to any of the other values. One way ANOVA should not be used when data values are related. For instance, ANOVA should not be performed when the same variable is tested repeatedly
ii. The population from which the samples are drawn can be approximated closely with normal distribution.
iii. The data for each group have that same variance (standard deviation squared).

The study ensured that the ANOVA assumptions were satisfied before subjecting data on fire outbreak and building collapse to the analysis.

3.7 Conclusion

This chapter highlighted the sources of data on which the relationship between urban dynamics and vulnerability to disaster could be examined. The cross sectional research design was adopted for the study and data were collected from households, National Emergency Management Agency, Lagos State National Emergency Management Agency, Lagos State Ministries of Physical Planning and Urban Development, Environment, Housing, Health and other critical stakeholders in disaster management. The GIS was also used to explore the extent of land use and land cover change. The next chapter will provide an insight into the process and trigger mechanism of urban dynamics and the nexus with vulnerability to disaster.

CHAPTER FOUR

THE PROCESS AND CONTRIBUTING FACTOR TO URBAN DYNAMICS

4.1 Introduction

Urban dynamics looks at land use change, economic development and population growth in urban environment over time in order to provide a historical perspective of land use change and an assessment of the spatial patterns, rates, correlation, trends, and impacts of that change. Organically, cities grow without defined form and morphology, spread over every available empty space and overrun the ability of public services, where they exist, to meet demands or cope with the growth. Property developers, corporations, migrant workers, government bureaucracies, and public institutions play important role in the growth and reshaping of cities to curtail and give systemic order to this organic growth.

Universal argument for urban dynamics is hinged on population growth, economic development, urban expansion and socio-economic implications on land use, land market, land use regulations and public policies on infrastructural facilities and housing (Forrester, 1969). Population forecast for Nigerian urban centres projected a stable population growth in the near future. However, the expectations of a more sustainable development have not been fulfilled. While some parts of Lagos State are losing significant population, the share of population in other area is growing very fast. In view of this development, this section, among other things, explains why intra-urban dynamics is taking place by comparing spatial patterns of population growth, previous housing development strategies and the effects on the living environment in Lagos State.

4.2 Activators of the process of urban dynamics

The spatial pattern of population growth and the burgeoning urban expansion in Lagos State is skewed towards the urban fringe. This phenomenon is producing an important land use pattern that is manifesting in the destruction of natural environment and in the habitation of areas vulnerable to disasters as shown in subsequent section on flood risk assessment. Urban development associated with lateral expansion in Lagos State and by extension Nigeria, is connected to deforestation and occupation of environmentally protected areas, especially the water-shed. In terms of population growth, the demography of the study area has been very unevenly distributed in the past few decades. This uneven distribution and the present urban dynamics (process) is traceable to the hosting of the Festival of Arts and Culture (FESTAC) in 1977 by Nigeria which made available 11,422 and 3,044 housing units in Festival Town and Ipaja Town respectively as contained in Tables 4.1 and 4.2 (Federal Housing Authority, 2010). The provision of the FESTAC houses is a major contributory factor to urban dynamic. This increased the housing capacity to accommodate about 101,262 persons officially thereby adding impetus to already growing population of Lagos.

Gleaning from Tables 4.1 and 4.2, the FHA produced 14,466 housing units for different categories of income groups. Within this number, 64.8 % of housing units produced in the two estates were meant for low income earners, 35 % for medium income group and the remaining 0.2 percent were occupied by the high income earners.

Table 4.1 Housing unit produced by FHA in FESTAC Town, 1974 - 1989

S/N	Types of residential development	Unit produced	Beneficiary
1	T1 (1 Bedroom in a Block of 3 Flat)	1,698	Low Income
2	T2 (2 Bedroom in a Block of 12 Flat)	4,164	Low income
3	T3 (2 Bedroom Bungalow Without Garage)	72	Low Income
4	T4 (2 Bedroom Bungalow Garage)	340	Medium Income
5	T5 (3 Bedroom in a Block of Flat)	1388	Medium Income
6	T6 (3 Bedroom in a Block of 8 Flat)	472	Medium Income
7	T7 (3 Bedroom Terrace House Storey Building)	355	Medium Income
8	T8 (3 Bedroom Semi Detached Storey Building)	1840	High Income
9	T9 (3 Bedroom Detached Storey Building with Garage and Boy's Quarters)	373	High Income
10	T10 (5 Bedroom Detached Storey Building with Garage and Boy's Quarters)	71	High Income
11	Other (Not Specified)	487	Medium/High
	Total	**11,422**	

Source: Adapted from Alabi, 2011

Table 4.2 Housing unit produced by FHA in Ipaja New Town, 1982 - 1990

S/N	Types of residential development	Unit produced	Beneficiary
1	T2 (2 Bedroom in a Block of 12 Flat)	1512	Low Income
2	T3 (2 Bedroom Bungalow Without Garage)	72	Low Income
3	T4 (2 Bedroom Bungalow Garage)	387	Medium Income
4	T5 (3 Bedroom in a Block of 16 Flat)	504	Medium Income
5	T6 (3 Bedroom in a Block of 8 Flat)	224	Medium Income
6	T7 (3 Bedroom Terrace House Storey Building)	335	Medium Income
7	T9 (3 Bedroom Detached Storey Building with Garage and Boy's Quarters)	2	High Income
8	T10 (5 Bedroom Detached Storey Building with Garage and Boy's Quarters)	4	High Income
	Total	**3,040**	

Source: Adapted from Alabi, 2011

Also, the housing policy of the 1979 – 1983 civilian administration activated massive intra-urban and rural-urban migration to Lagos Mainland and its hinterland. The main focus of the Second Republic Civilian Administration of the 1979 – 1983 in the State was to provide at least 20,000 units of affordable low cost housing in 12 locations across the State for low income earners especially the Civil Servants, through the Lagos State Development and Property Corporation (LSDPC). The period also heralded Lagos State into the city of millions in terms of population. The locations and number of housing blocks built are shown in Table 4.3.

Table 4.3 Locations and number of units built in Jakande estates in the 1980s

S/N	Name of estate	LGAs	Unit produced	Beneficiary
1	Abesan-Ipaja	Alimosho	4272	Low Income
2	Amuwo Odofin	Amuwo-Odofin	2068	Low Income
3	Dairy Farm, Agege	Agege	708	Low Income
4	Ojokoro	Agege	534	Low Income
5	Oke Afa Isolo	Oshodi-Isolo	1410	Low Income
6	Badagry	Badagry	1122	Low Income
7	Lekki	Lekki	1506	Low Income
8	Epe	Epe	2068	Low Income
9	Iba	Ajeromi-Ifelodun	1560	Low Income
Sub Total			**15248**	
10	Ketu Alapere	Kosofe	1140	Medium Income
11	Ogba	Ikeja	936	Medium Income
12	Omole	Ikeja	100	Medium Income
13	Ijaiye	Ifako-Ijaiye	796	Medium Income
14	Adeniji Adele	Lagos Island	1206	Medium Income
Sub Total			**4178**	
15	Amuwo-Odufin Phase I and II	Amuwo-Odofin	304	High Income
16	Ogudu I and II	Kosofe	126	High Income
Sub Total			**430**	
Sub Total			**19856**	

Sources: Adapted from Alabi, 2011 and Lagos State Development and Property Corporation (LSDPC), 2012

The development of the housing estates across the study area, at that time, was aimed at decreasing and improving population concentration from the congested Lagos Island; improving the squalor and poverty many people lived in; and to provide comfortable houses for people within the low-income bracket. From Table 4.3 out of the 19856 housing units provided in the Jakande Estates across the State, 76.8 % were built for low income households, 21.0 % for medium income households while 2.2 % were built for high income households. Consequently, while the central business district such as Ikoyi, Victoria Island and Lagos Island have lost population in absolute terms, some areas where the low cost housing estates are located (Alimosho, Kosofe, Ijeromi-Ifelodun, Amuwo-Odofin, Oshodi-Isolo and Ikorodu LGAs) have expanded significantly in terms of population and spatial expansion since the 1980s. Currently, Alimosho LGA has the highest population figure (1,277,714) in Lagos State. The population figure for Alimosho LGA is close to the total population of Lagos State before the development of housing estate in the LGA in the 1970s.

Also, embargo on employment into the State Civil Service during the period under review, led to gross inadequacy in the enforcement of development control edicts. Inferring from the interview conducted with the officers of the Lagos State Urban and Regional Planning Board, the whole of Lagos State had less than 30 Town Planners to oversee physical planning and urban development from early 1980s till late 1990s. These situations were further compounded in the 1980s and 1990s by the downward spiral of the Nigeria's economy. Accordingly, accompanying the physical expansion of all the listed housing estate locations characterized by significant population growth are haphazard development, urban decay, inadequate infrastructural facilities and services. However, it could be argued that with the coming of democratic governance in 1999, there has been significant residential real estate investment in the study area. In addition to this, with the advent of the new housing policy in 2002, the private sector has embarked on residential housing projects in Lagos State to meet the ever-increasing housing needs of the residents.

Most of the housing units built by private companies, due to the economic consideration and the urge for short term recoupment of investment and speedy replication of housing stock have been offered almost exclusively to the medium and high income families. Thus, as noted by Alabi (2011), the spatial distribution of organized private sector housing estates indicated that significant number of the estates is located along Lagos-Epe Express Way. Accordingly, the private sector housing support is in the areas far removed from the deprived or informal neighbourhoods. Surprisingly, the bulk of such investment took place in areas that lost a significant share of their population judging from the 1991 and 2006 census figures. From this development, there seems to be a disconnection between housing production by private companies and the strong dynamics of population growth in the study area's informal settlement locations (Torres, *et al* 2007; Alabi, 2011).

Therefore, contrary to the benefits expected from the housing-for-all policy of the second republic administration, the demographic growth associated with the provision of affordable housing resulted in the expansion of existing poor and informal housing in most parts of Lagos State. Additionally, the benefits accruing from the economic expansion of the second republic era to drive developmental agenda were truncated by the oil glut of early 1980s and further sapped by the Structural Adjustment Programme (SAP) of late 1980s. The oil glut and the Structural Adjustment Programme activated the delay effect in infrastructural provision and economic development (most of the industrial estates buildings in 1980s are presently being used as warehouses) to meet the needs of the expanding city. Consequently, as the city population and physical expansion are evolving at geometrical progression, the economic intervention and infrastructural facilities and services to support the growth were emerging at arithmetic progression. Hence, there is a visible delay in responding to the infrastructural needs of the growing population and the expanding Lagos city frontiers.

As shown in Figure 4.1, the declining population growth areas (Lagos Island, Mushin, Surulere, Apapa and Eti-Osa, Victoria Island) decreased from 76.8 % to 5.5 % of the total population between 1911 and 2010. However, in 2010, the population of the urban fringes (Alimosho Ikorodu, Agege, Ojo, Kosofe, Ifako-Ijaiye, Ajeromi-Ifelodun, Epe) increased geometrically to accommodate 73.9 % of the total population of Lagos State. In other words, population of Lagos mainland increased by only 32.3 % while that of Lagos suburb increased by 87.4% between 1911 and 2010. Without the burgeoning contributions, in terms of migration for employment opportunity occasioned by the attractive principle and natural increase in population of the urban fringe, the urban dynamics of the study area would have maintained a stable equilibrium supported by economic growth as postulated by Forrester (1969).

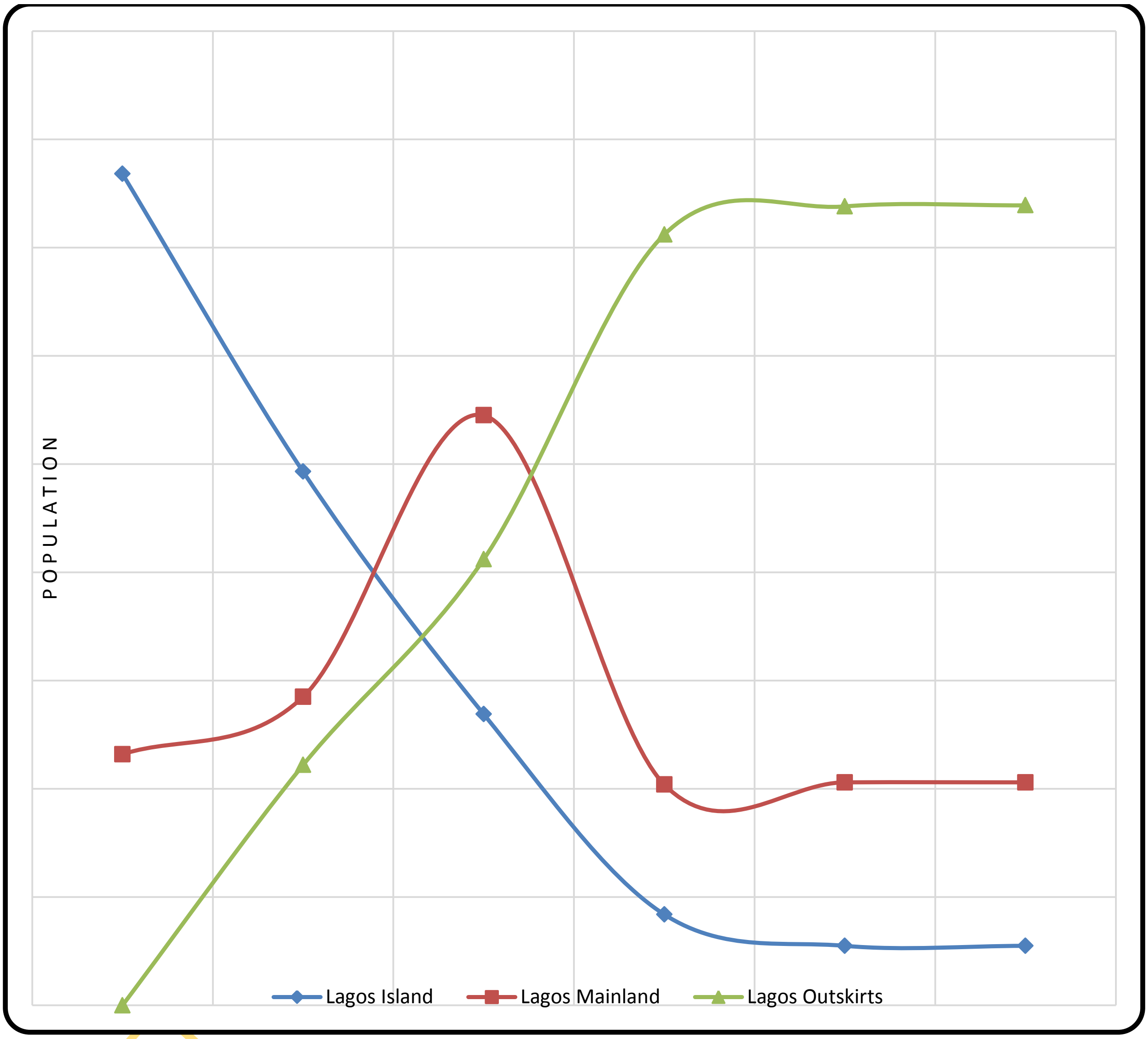

Figure 4.1 Population trend in Lagos State 1911 -2010

Sources: Sources: Mabogunje *et al*, 1978, Mabogunje, 2003; United Nations Population Fund (UNFPA) 2007; FGN 2007 census figures (Projection 2010)

4.3 Urban dynamics and vulnerability to disaster: The nexus

The research into urban dynamics by Forrester (1969), Alfeld (1995), among other urban dynamics proponents, has shown that depressed areas, the most vulnerable to disasters in cities, are triggered by low-income housing rather than commonly presumed housing shortage. The targeted low income housing and pro-poor urban policy without corresponding progressive economic development have combined to give incentives to overstretch the existing facilities and services, increase in-migration of unskilled workers and expansion of informal settlements to accommodate the migrants. Deducing from the examples of the low-income high density housing in Lagos State and elsewhere in the developing countries, the low-income groups, by default, always use available housing at higher population densities (Alfeld, 1995; Ramroth, 2007). Housing at higher population density, as noted by Myers (2010), accommodates more low-income urban population which, in the long run, will have direct deleterious effects on economic growth, industrialization and sustainable development.

A social trap is created where low-cost housing and the associated informal settlement beckon additional low-income people. Consequently, unemployed people will continue to migrate to the city until their numbers sufficiently exceed the available jobs while the standard of living declines below the sustainable average (Forrester, 2009). Income to the area is significantly low to maintain and support the existing residential structures leading to decline in infrastructural facilities and services, overcrowding and vulnerability to disasters. Excess low income residential buildings threaten an area in two ways: they occupy land so it cannot be used for job - creating buildings, and they attract a population that needs jobs (Forrester, 1969). Any change, which would otherwise raise the standard of living, only triggered the urban dynamics by taking off the economic pressure momentarily and causes population to rise enough that the standard of living again falls to the barely tolerable level. Without a self-regulating system in place, the condition of the depressed area is further compounded by its vulnerability to disasters as shown schematically in Figure 4.2.

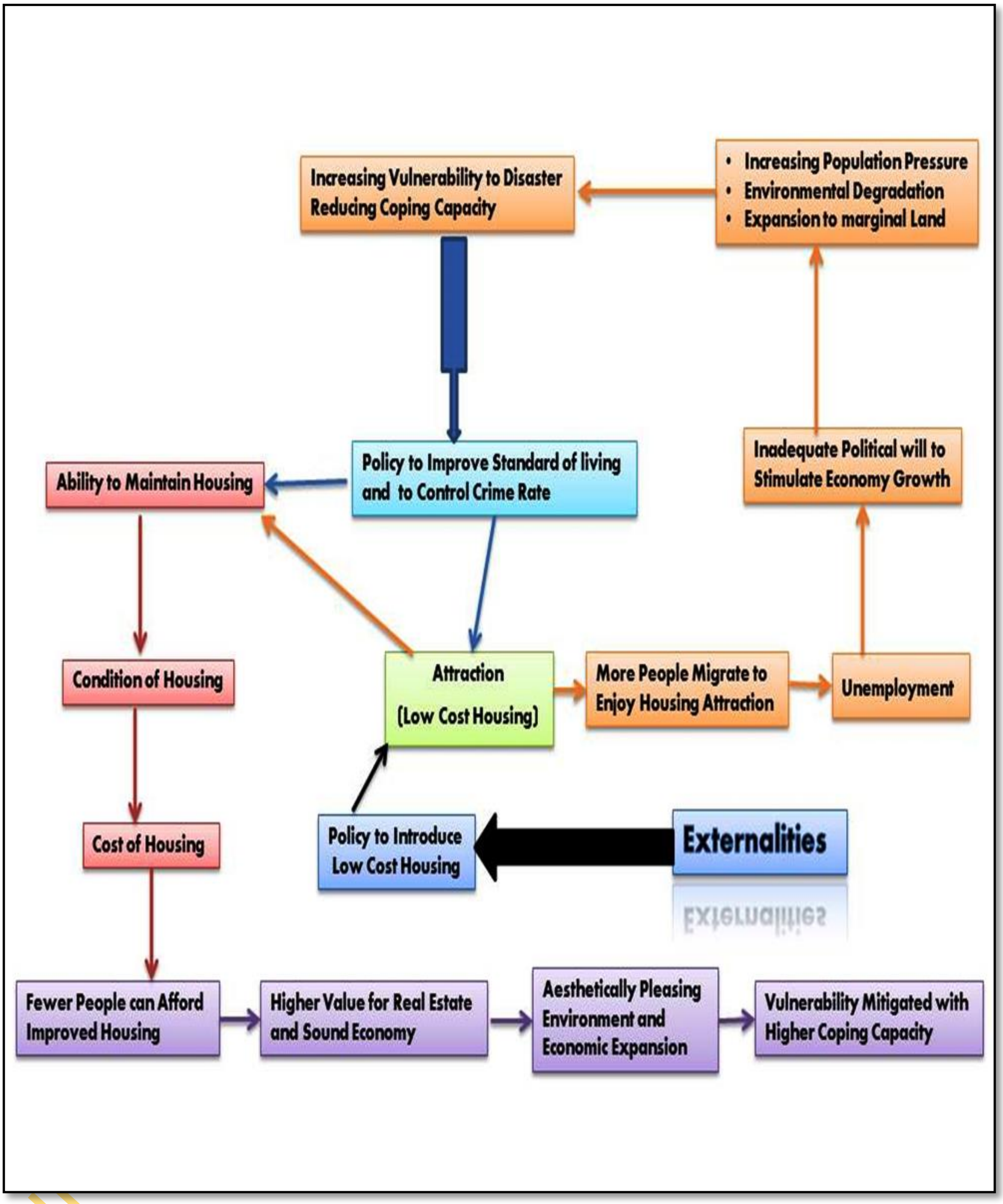

Figure 4.2 Process of urban dynamics and vulnerability to disaster.

Sources: Adopted from Forrester (1969), Alfeld (1995)

A powerful dynamic force such as: urban renewal, establishment of industrial estate, proactive programme for crime control, will establish equilibrium between all areas in total attractiveness as highlighted in Figure 4.2. As used here, attractiveness is the composite effect of all factors that cause population movement toward or away from an area. If a programme, for instance, the low income housing production makes some urban area more attractive, population to the area rises until the component of attractiveness is driven down far enough to establish equilibrium. All other things being equal, an increase in population of a city will crowd housing, overload job opportunities, cause congestion, increase pollution, encourage crime, and reduce every component of the quality of life (Agbola, 2005a). Efforts to improve some conditions of a city, as shown by the FHA and Jakande Estates programmes, resulted temporarily in improved standard of living until other conditions required to sustain the improved standard deteriorate to re-establish equilibrium. Thus, the overall condition of urban life, for any particular economic class of population, cannot be appreciably better or worse than that of the remainder of the country to and from which people may come. Therefore, programmes aimed at improving a city can succeed only if they result, eventually, in raising the average quality of life for the country as a whole.

Concentration of population in an urban location undermines cohesiveness and inclusiveness of communities and makes government bureaucracy too large. The combination of all these, in the long haul, will reduce the quality of life and increase vulnerability to disaster. Any proposed programme aimed at improving the quality of life and standard of living should, as priority; deal with both the quality of life and the factors affecting population growth. For instance, raising the quality of life means releasing stress from crowding, reducing pollution, alleviating hunger, and providing health facilities and services. But these pressures are the influences that control population movement. Therefore, to raise one component of quality of life without intentionally creating compensating counter-pressures to prevent a rise in population will be self-defeating.

There are many possible combinations of forces that an urban area can exert. The particular combination will determine the population mix and the economic health of a city. The depressed areas in Lagos, from available evidence, are created by combination of forces in which economic depression (oil glut) that stagnate the overall economic development of Nigeria and the attraction syndrome created by provision of excess low income housing in the 1970 to early 1980 led to increasing migration, population increase, unemployment coupled with the burgeoning of informal settlements as shown in Figure 4.2. To address the situation the civilian government (1979 – 1983) introduced Austerity Measures in 1981 while the military government implemented the Structural Adjustment Programme (SAP) in 1986. The SAP had a negative effect on urban growth and development. The programme led to reduction in investments in the urban sector as government drastically reduced the amount spent on the provision of social infrastructures. It led to the closure and collapse of many industries either due to lack of foreign exchange to import raw materials or inability to compete favourably with imported goods due to high cost of production. There was also a fall in real urban income, for instance, as noted by Potts (2012) the real wage fell by 90 per cent in Nigerian cities especially in Lagos from 1981–1990. However, the availability of low income housing (Jakande estates) draws the lowest income group to Lagos state, primarily as construction workers including other allied workers (for mass housing production) and later as settlers until the migrants exceed the economic opportunities of the State that the low standard of living, the frustration, the crime rate, expansion to marginal land and vulnerability to disaster counterbalance the housing availability.

Table 4.4 Perception of urban dynamics as a product of low income housing

LGAs	Driven by low income housing	Not driven by low income housing	Total
Alimosho	176 (62.2)	107 (37.8)	283 (100)
Mushin	57(38.1)	91 (61.9)	148 (100)
Oshodi – Isolo	112 (58.6)	79 (41.4)	191 (100)
Ajeromi – Ifelodun	141(62.7)	84 (37.3)	225 (100)
Surulere	43 (42.2)	59 (57.8)	102 (100)
Lagos Mainland	29(45.3)	35 (54.7)	64 (100)
Kosofe	34 (43.0)	45 (57.0)	79 (100)
Ikorodu	143 (62.9)	84 (37.1)	227 (100)
Shomolu	114 (54.5)	95 (45.5)	209 (100)
Total	**849(55.5)**	**679 (44.5)**	**1528 (100)**

Source: Field survey, 2011.

In analysing urban dynamics perception, Table 4.4 shows that 55.5% of the respondents were attracted to their present neighbourhood due to the availability of low income housing while 44.5 % did not. The first hypothesis which stated that urban dynamics is influenced by the availability of low income housing was analysed using chi square (χ^2) two-sample text. The calculated χ^2 is shown in Table 4.5. As highlighted in the Table, the calculated χ^2 value is 48.4. The table χ^2 value at 0.05 significant level is 15.51. The result of the analysis shows that the association between attraction component of urban dynamics and low income housing is significant at 0.05 confidence level with 8 degree of freedom. This means that the odd of the table χ^2value occurring accidentally is less than 0.05. Therefore, the research hypothesis which states that urban dynamics in the study area is significantly influenced by the availability of low income housing is accepted

Table 4.5 Test of association between urban dynamics and low income housing

LGAs	$O - E^2 / E$	
	Expected	**Observed**
Alimosho	157.0	126.0
Mushin	82.3	65.7
Oshodi – Isolo	106.2	84.8
Ajeromi – Ifelodun	125.2	99.8
Surulere	56.7	45.3
Lagos Mainland	35.6	28.4
Kosofe	43.9	35.1
Ikorodu	126.0	101.0
Shomolu	116.3	92.7
Total	**48.4**	

χ^2 = 48.4, degrees of freedom = 8, probability = (table value) at 0.05 significant level = 15.51

Source: Derived from Table 4.4

Low income housing programmes, done with the best of intentions, as highlighted without feasible and functional economic interventions and population control moves exactly in the opposite and depressing direction. It draws more low-income people. It makes the area differentially more attractive to the poor who need jobs and less attractive to those who create jobs. Unfortunately, as the area becomes more destitute, pressures rise for still more adjoining low-cost housing as highlighted in chapter 5 on land use and land cover change. The consequence is a downward spiral that draws in the low-income population, depresses their economic condition, prevents escape, and reduces hope. To escape from the social trap created, Ramroth (2007), Myer (2010) and Martinez-Viveros and Lopez-Caloca (2010)) the new population equilibrium that will develop, with the present political dispensation as epitomized by the present administration in Lagos State, should endeavour to differentiate between social and economic goods and make some characteristics of the social system to counterbalance the additional attractiveness inherent in the State.

From this development, it is important to note that feasible urban development and urban dynamics catalyst should discourage provision of spot low cost - low income housing without corresponding replication in other parts of the country, coupled with sound economic growth to aid sustainable development and economic viability of any given urban environment. For instance, the significance of Eti-Osa and the emergence of Lekki to the economy of Lagos State compared to Alimosho, Ikorodu, Amuwo Odofin and Kosofe presuppose that pro-poor policy will not only affect the socio-economic sustainability but will also influence vulnerability patterns and exposure to disasters. It may be argued that, in terms of vulnerability to disaster; Eti-Osa and Lekki, by virtue of geographic locations, are more vulnerable to flooding and ocean surge than the mainland LGAs. However, as discussed in the conceptual framework section, disaster risk is a product of hazards and the vulnerability of the community in relation to the capacity of the community to cope with the disaster. Thus, the risk of a disaster happening depends on: what the hazard is; how vulnerable the community is; and how well the community can limit the damage by being prepared and forewarned. From all indications, available evidence has shown that high income residential districts have higher capacity (socio-economically, politically and psychologically) to cope with disasters than the low-income residential neighbourhoods as illustrated in subsequent sections.

4.4 Conclusion

The chapter provided an insight into the urban dynamic process. Findings of the chapter revealed that the pro poor urban policy of the 1970s – 1980s that provided huge amount of housing units for the low income earners. The associated benefits of the policy was truncated by the oil glut of early 1980s and further sapped by the structural adjustment programme (SAP) of the late 1980s. The inability of successive governments to spread the programme across the nooks and crannies of the country triggered the present urban dynamics in the State. The association between low income housing and urban dynamics was tested using chi square (χ^2). The calculated χ^2 48.4 at 8 degree of freedom is significant at 95 % confidence level (0.5 level). Therefore, areas that are losing population happen to be where the larger percentage of contemporary housing provision is being developed. The inability of the urban manager to meet the demands of the ever increasing population predisposed and increases the vulnerability of informal households to disaster. Also, availability off low income housing attract more low income earners with in the long run will affects economic growth, industrialization and sustainable development. Due to demand for urban land and the burgeoning urban expansion, the next chapter, using GIS, captures the extent to which land use and land cover have changed, vegetation to urban, from 1984 – 2010

CHAPTER FIVE

LAND USE LAND COVER CHANGE AND FLOOD RISK ASSESSMENT: SCENARIO SIMULATION FOR VULNERABILITY ANALYSIS

5.1 Introduction

Flood is among the most devastating nature induced hazards in the world claiming lives and properties more than other natural phenomena (Ologunorisa and Abawua, 2005; Khan *et al*, 2011). In the past decade in Nigeria, thousands of lives and properties worth millions of Naira have been lost directly or indirectly to flood yearly. In most urban centres of the country, most especially in fast growing towns such as Lagos, human population increase, coupled with urban concretisation, streams and channel obstruction due to bad waste disposal habit and other human activities in flood plains are considered to be the major causes of floods (Ishaya *et al*, 2011).

In analyzing extreme events such as flood, many of the critical problems that arise are inherently spatial. Whether an analyst is assessing the potential impact of a hazard, or an emergency manager is identifying the best evacuation routes during a disaster, or a civil engineer is planning a rebuilding effort following a disaster, or an urban planner is analyzing the trend in land use and land cover change and associated disasters over time, all of these individuals undertake tasks with a strong spatial component. For this reason, geographical space is a valuable framework for analyzing and evaluating many problems that arise in the context of emergency management. GIS were designed to support geographical inquiry and, ultimately, spatial decision making. The value of GIS in emergency management arises directly from the benefits of integrating a technology designed to support spatial decision making into afield with a strong need to address numerous critical spatial decisions. For this reason, new applications of GIS in emergency management have flourished in recent years (Cova and Church, 1997).

5.2 Land use and land cover change

There are various techniques for the assessment of flood risk such as assessing meteorological parameters, hydrological parameters, socioeconomic factors, and a combination of hydro-meteorological and socioeconomic factors along with assessment based on geographical information system (Khan *et al*, 2011). Geographical Information System (GIS) is a useful tool to assess flood risk in flood-prone areas. Recently, GIS technique has been able to unite all the known procedures and factors for predicting flood risk (Ologunorisa and Abawua, 2005). Flood risk assessment was done to highlight the vulnerability component of the study area.

The Land Use/Land Cover maps of the study area for 1984 and 2010 were generated from the false colour composite imageries. As shown in Figures 5.1 and 5.2, Alimosho, Kosofe and Ikorodu Local Government Areas lost a lot of vegetation (78.3%) to urban land use as presented in Figure 5.3. Ikorodu and Kosofe Local Government Areas also lost some water (8.3%) to urban land use as shown in Figure 6.4. The Land Use and Land Cover Change trend in the Figures also corroborate the impact of the urban dynamics highlighted in Chapter Four. From the trend it could be inferred that prior to FESTAC and the 1979 – 1983 Civilian Administration decisions to locate Housing Estates in some of the LGAs of interest (Alimosho, Kosofe, Ikorodu, and Oshodi-Isolo) a larger chunks of these LGAs were under vegetation as illustrated in Figures 5.1 and 5.3. The implementation of the pro-poor housing scheme increases the rate of intra- and inter-migration to these LGAs. The increasing population could be said to be associated with the attraction principle (provision of housing and employment opportunities) of urban dynamics process that in the long haul draws more low income household into the LGAs. At this period, availability of open-virgin land coupled with inefficiency in the enforcement of Urban and Regional Planning Law increase the lateral expansion and compounded deforestation.

As the pace of growth quickens, each newly constructed building depicts the vegetation and fuels more growth. Today, the choice sites have been developed while competitions for the remaining land by the medium and high income households has pushed price of the remaining land beyond the reach of the poor households. Thus, the available land that could be developed by the poor is, more or less, marginal land at flood plains. The available flood plains for the poor, due to scarcity of land for development are currently being developed by the rich through reclamation of flood plain for residential development. This explains the perennial flood of River Ogun destroying lives and property at Kosofe LGA. Also Oke-Afa and Ipaja in Oshodi-Isolo and Alimosho LGAs have been experiencing yearly flooding at an increasing rate due mainly to settlements encroachment into flood plains and swamps.

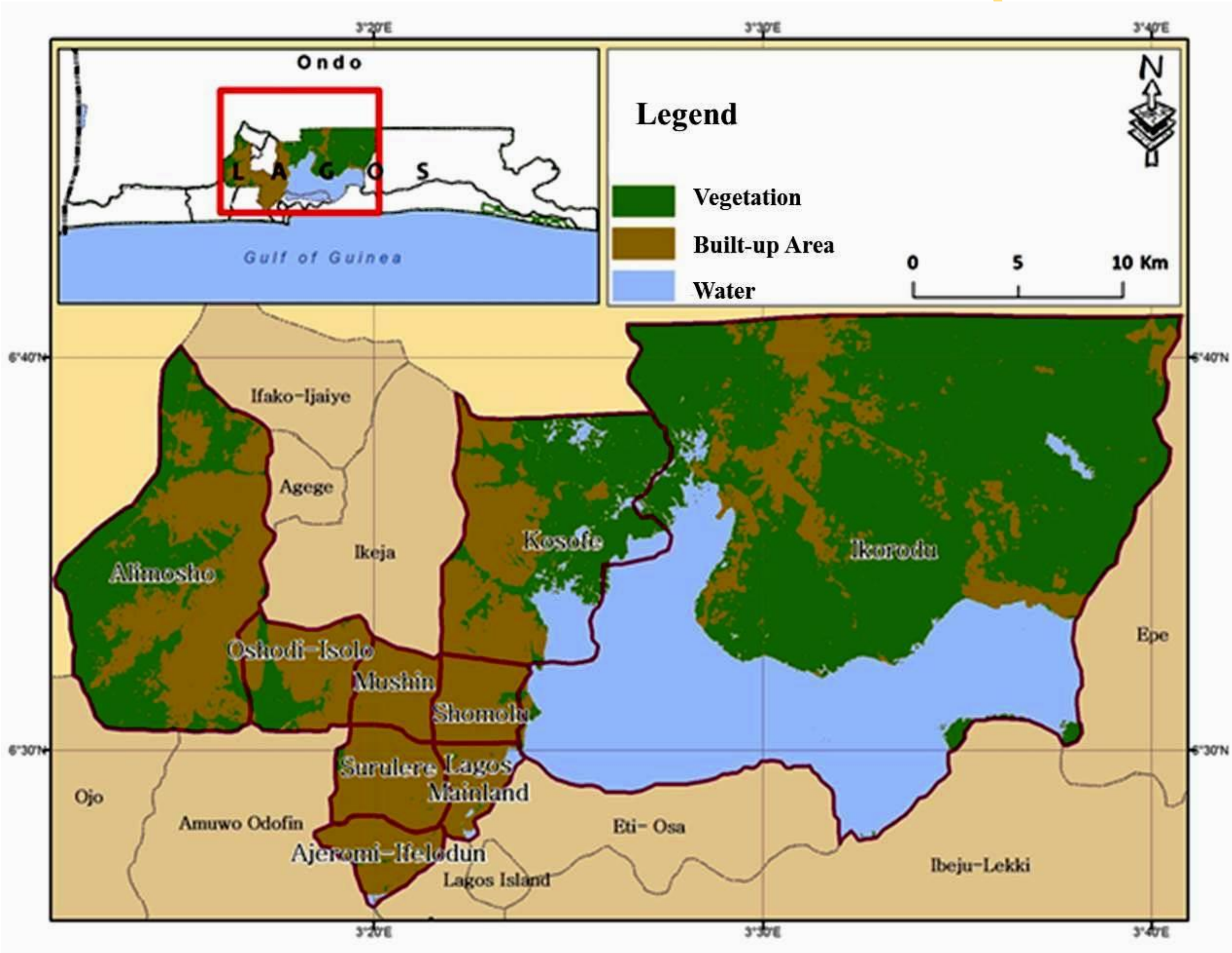

Figure 5.1 Land use and land cover as at 1984

Source: Author, 2012

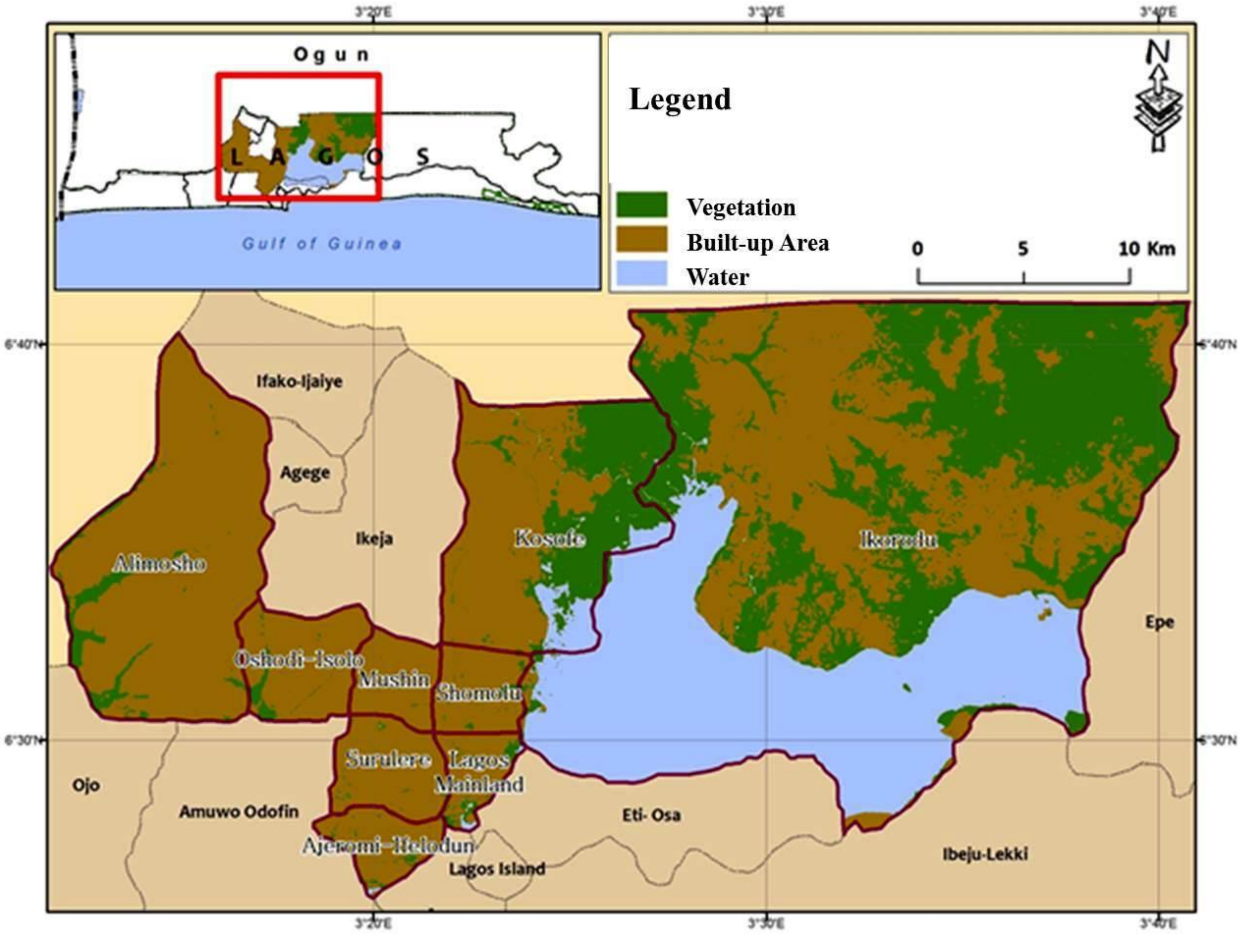

Figure 5.2 Land use and land cover as at 2010

Source: Author, 2012

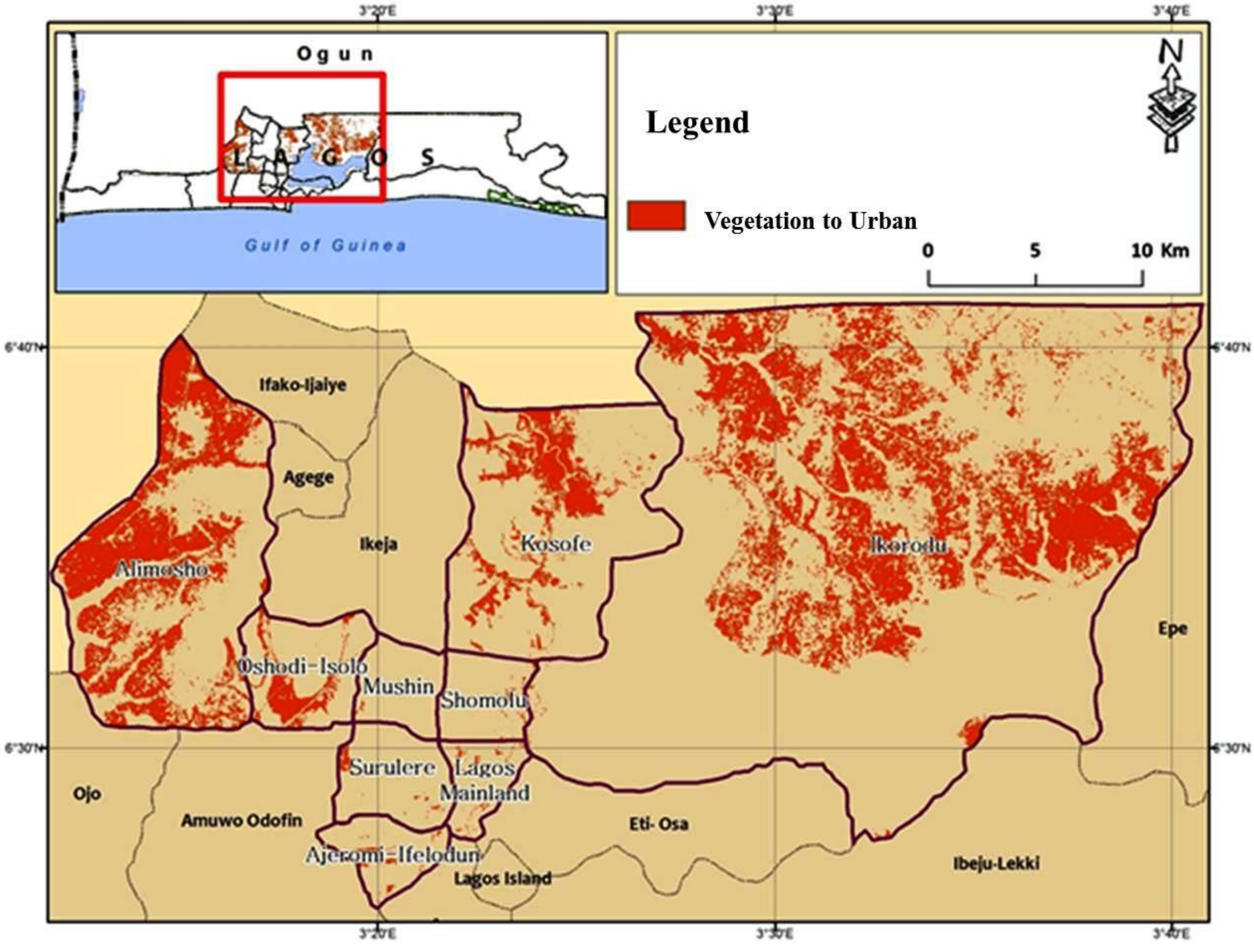

Figure 5.3 Loss of vegetation to urban land (1984 -2010)

Source: Author, 2012

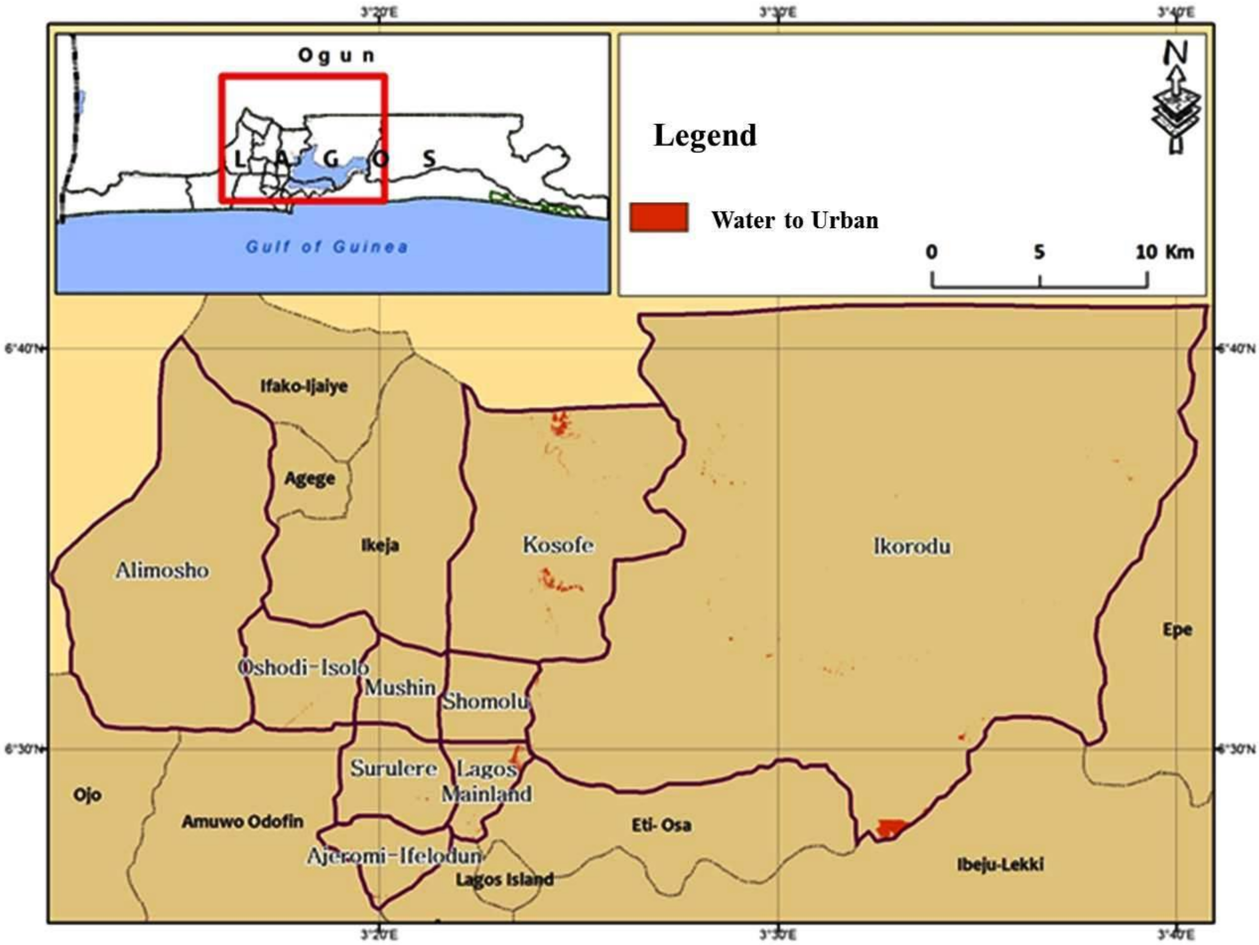

Figure 5.4 Reclamation of wetland (1984 -2010)

Source: Author, 2012

Land has been reclaimed in these areas to accommodate urban expansion and spatial development. Overall, as indicated in Figure 5.5, about 8 % of water bodies were lost to urban land use and 55 % of vegetation was also lost to urban land use. This can be attributed to the urban dynamic process, the associated attraction and rapid urbanization that have taken place in Lagos over the last 30 years. A cursory look at Tables 5.1 reveals that the study area has changed from vegetation - having the greatest percentage of the total land use at 46.5 % in 1984 - to urban at 51.2 % within 30 years. The present situation as relates to land use and land cover change is more precarious due largely to human desire for accommodation, ineffective development control and inability of government's agencies to manage the expansion of development into flood plains and natural vegetation zones.

Table 5.1 Statistics of the land use land cover change of the study area 1984 - 2010

Land cover	1984 Area (km^2)	Percentage	2010 Area (km^2)	Percentage
Vegetation	393.53	46.5	225.14	26.6
Built up area	243.72	28.8	432.84	51.2
Water	208.26	24.7	187.53	22.2
Total	**845.51**	**100.00**	**845.51**	**100.00**

Source: Derived from Figures 5.1 and 5.2

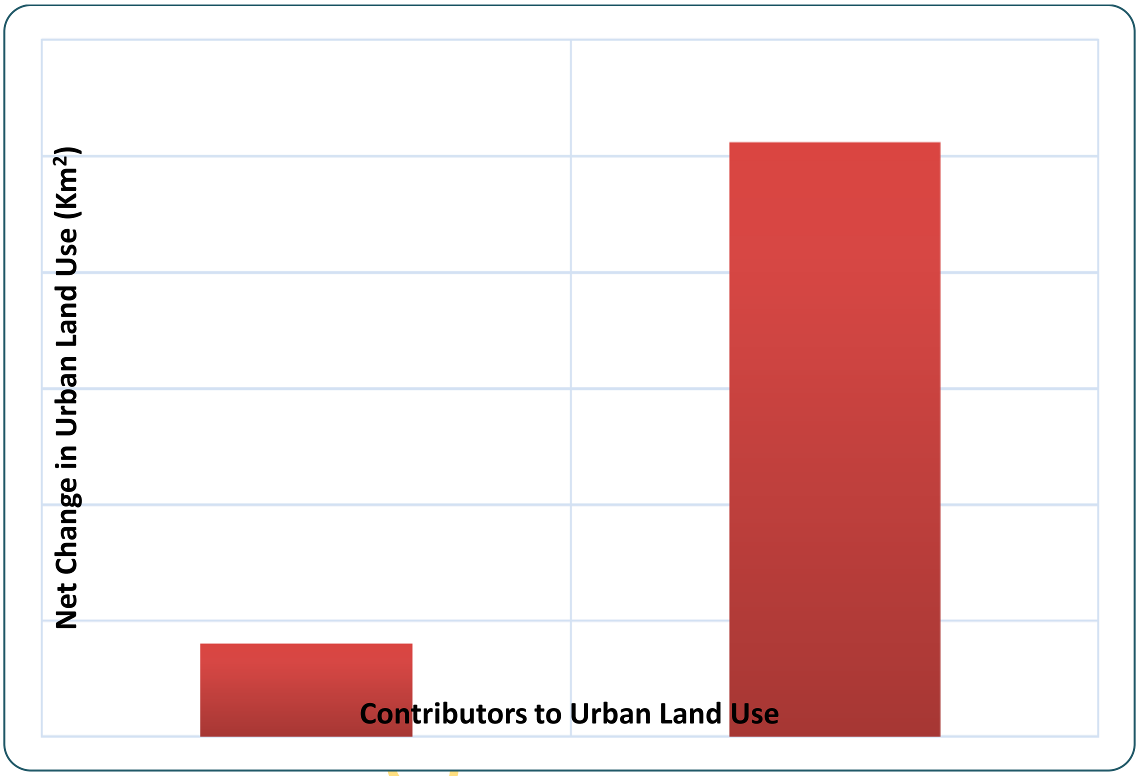

Figure 5.5: Contributors to net change in urban land use

Derived from Figures 5.3 and 5.4

5.3 Simulations

Taking into consideration the elevation and gradient of the study area (Figure 3.1), the study developed and simulated flood risk in the advent of a sea level rise of 1 metre equivalence of the flood disaster experience in 2011 in Lagos State, and areas with a high likelihood to be affected by flood were calculated. Areas with elevation lower than 1m were characterized as high risk while areas with elevation higher than 1m were characterized as low risk areas for both 1984 and 2010 as presented in Figures 5.6 and 5.7. From the analysis, Kosofe, Surulere, Ikorodu and Ajeromi-Ifelodun are the most flood prone Local Government Areas. The projected population of these four high risk LGAs as at 2010 is 2,671244. The population is more than the total population for Bayelsa State which is 1,704515. A substantial number of people would be at risk in 2010 than in 1984 due to the change in land use most especially in Kosofe and Ikorodu Local Government Areas: the areas that are flood prone were mainly covered by vegetation and water in 1984, as highlighted in Figures 5.1 – 5.3, but have been urban conurbated and reclaimed in 2010. The trend in urban conurbation still exists unabated till date. Currently, more people would be vulnerable to flood in 2012 than in 2010.

To simulate another scenario, a sea level rise of 2 metres, similar to excess water release from Lagdo Dam, Cameroun induced flood in 2012 affecting 14 States in the country was projected. In this case, the elevation used for delineating flood prone areas was changed to 2m as shown in Figures 5.8 and 5.10. Oshodi and Alimosho Local Government Areas would have had less population at risk in 1984 (Figure 5.8), but by 2010, the population at risk had increased due to the change in land use form vegetation to urban (Figure 5.9).

Finally, the 2 flood risk layers, 1m and 2m of 2010 were combined by multiplying the risk score of each layer and classifying the risk into 3 flood-risk categories: high, moderate and low risk as shown in Figure 6.10). In the study area, Kosofe, Ikorodu, Ajeromi – Ifelodun, Lagos Mainland and Surulere Local Government Areas are the most susceptible to flood while Alimosho is the least susceptible to flood.

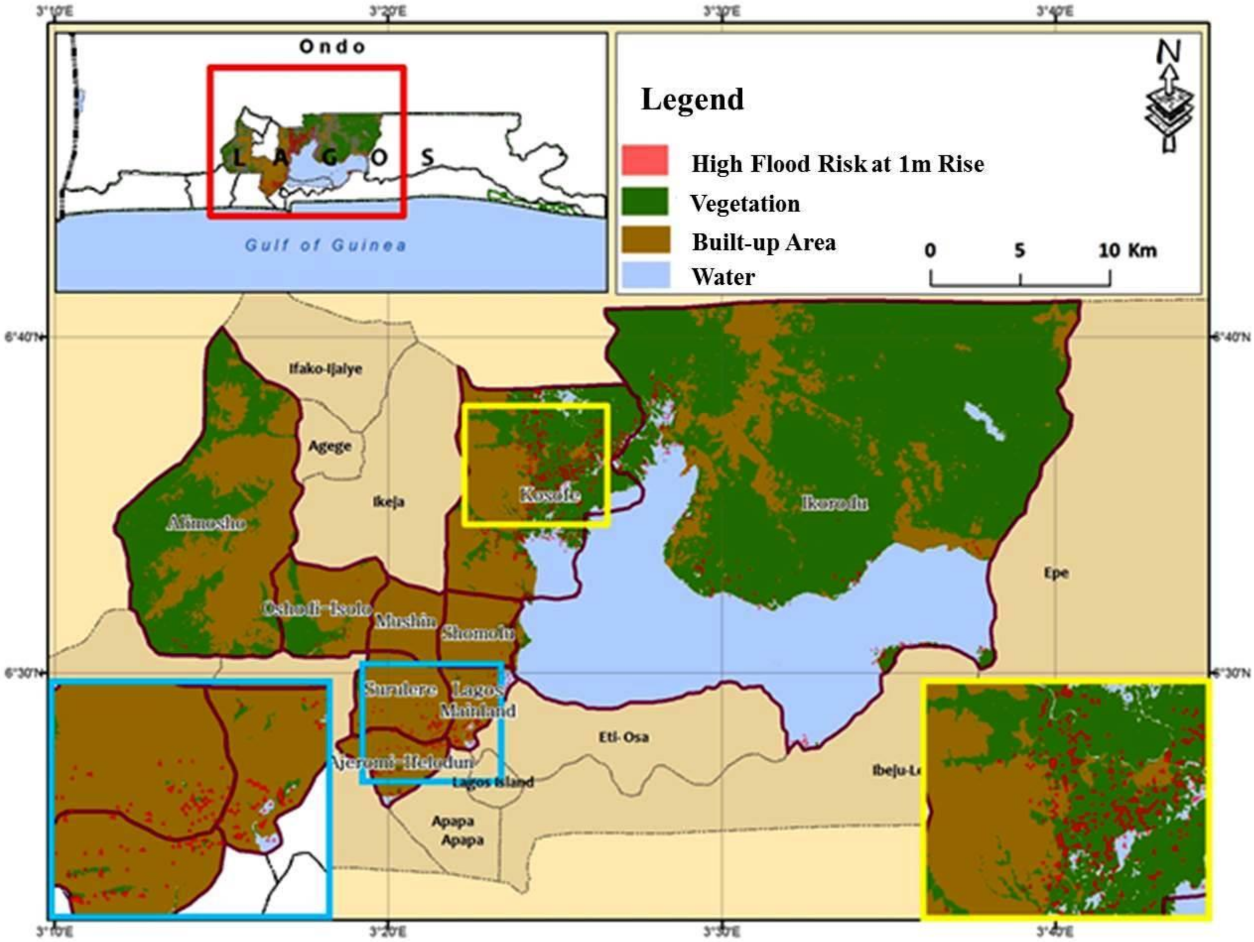

Figure 5.6 One metre sea rise flood risk 1984

Source: Author, 2012

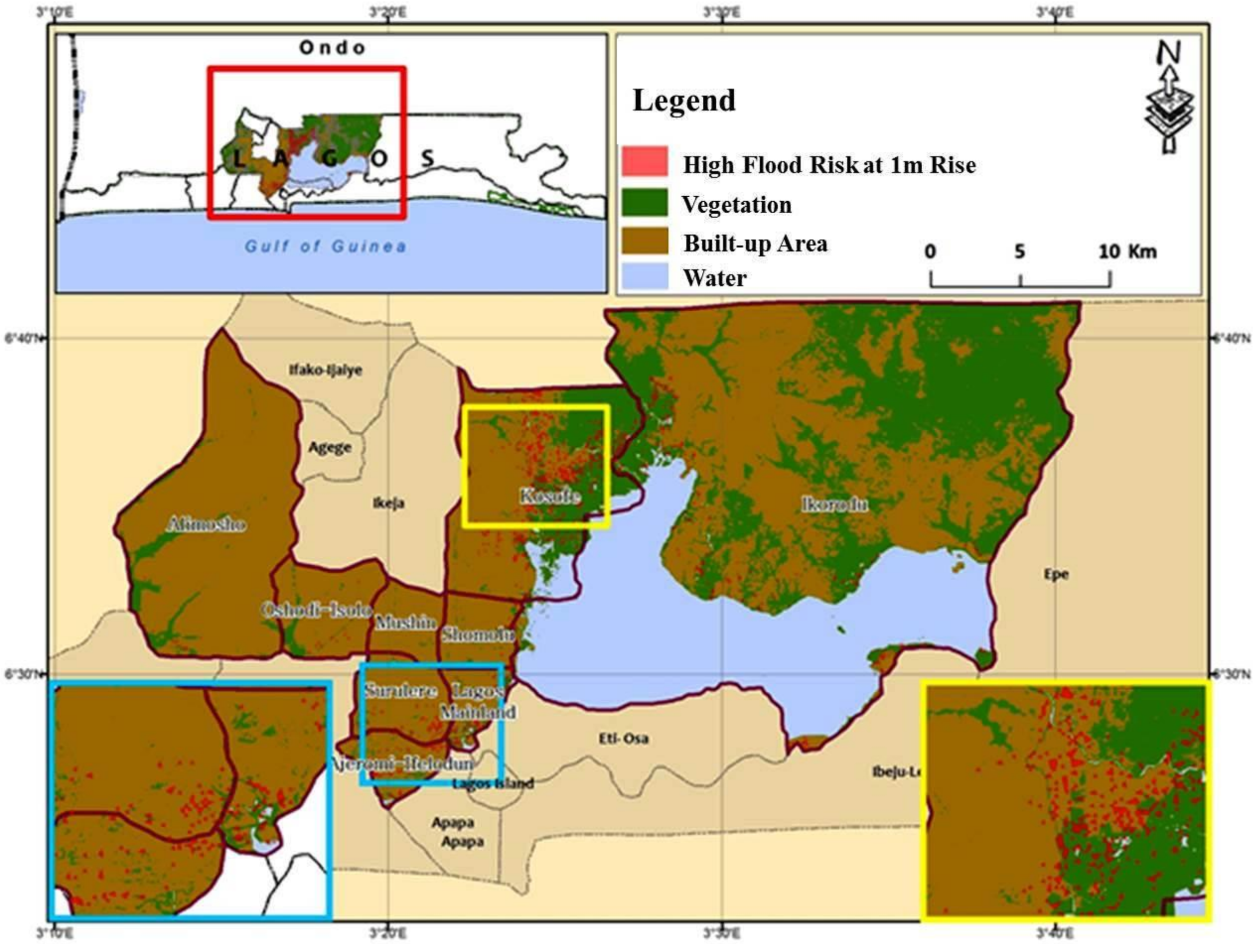

Figure 5.7 One metre sea rise flood risk 2010

Source: Author, 2012

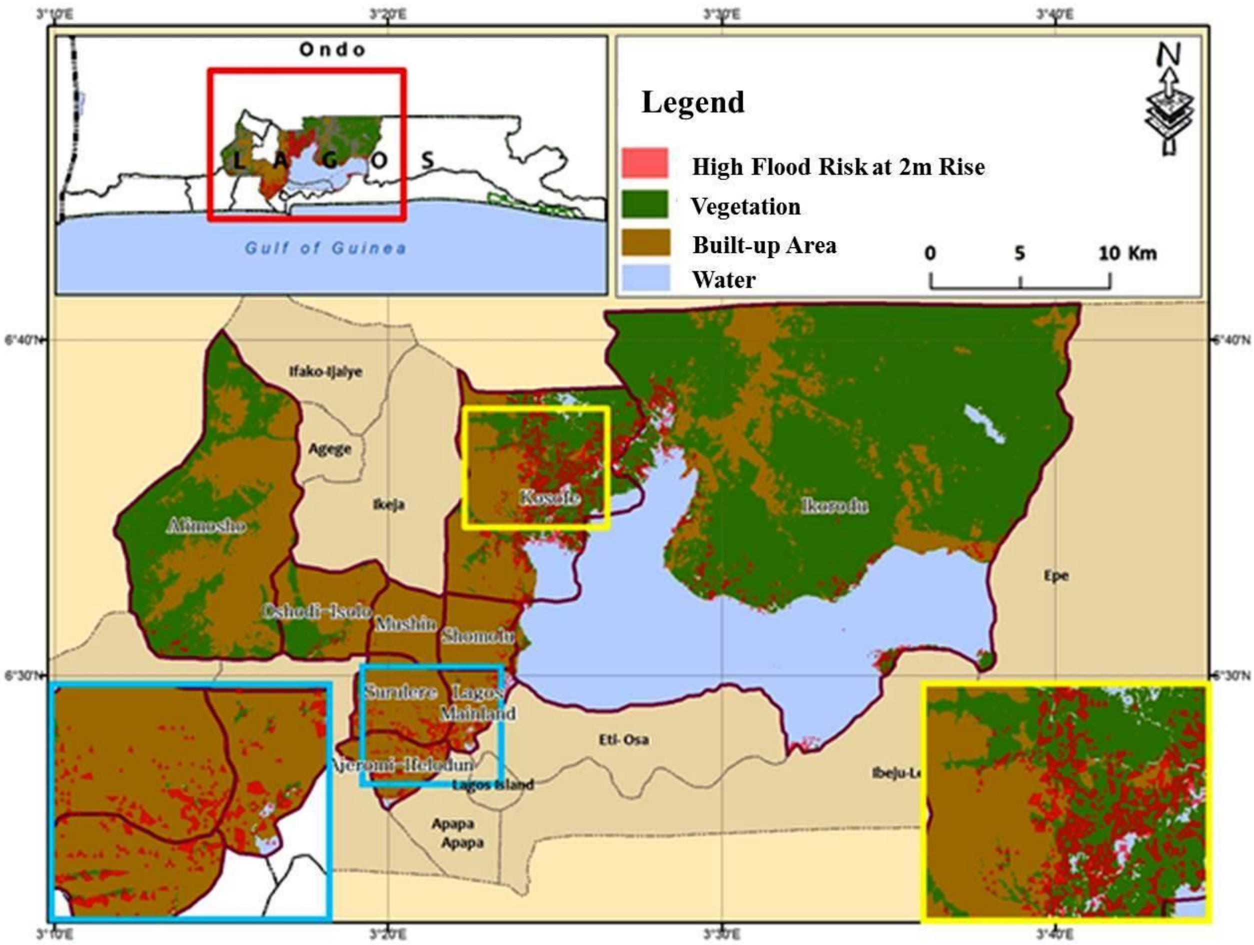

Figure 5.8 Two metres sea rise flood risk 1984

Source: Author, 2012

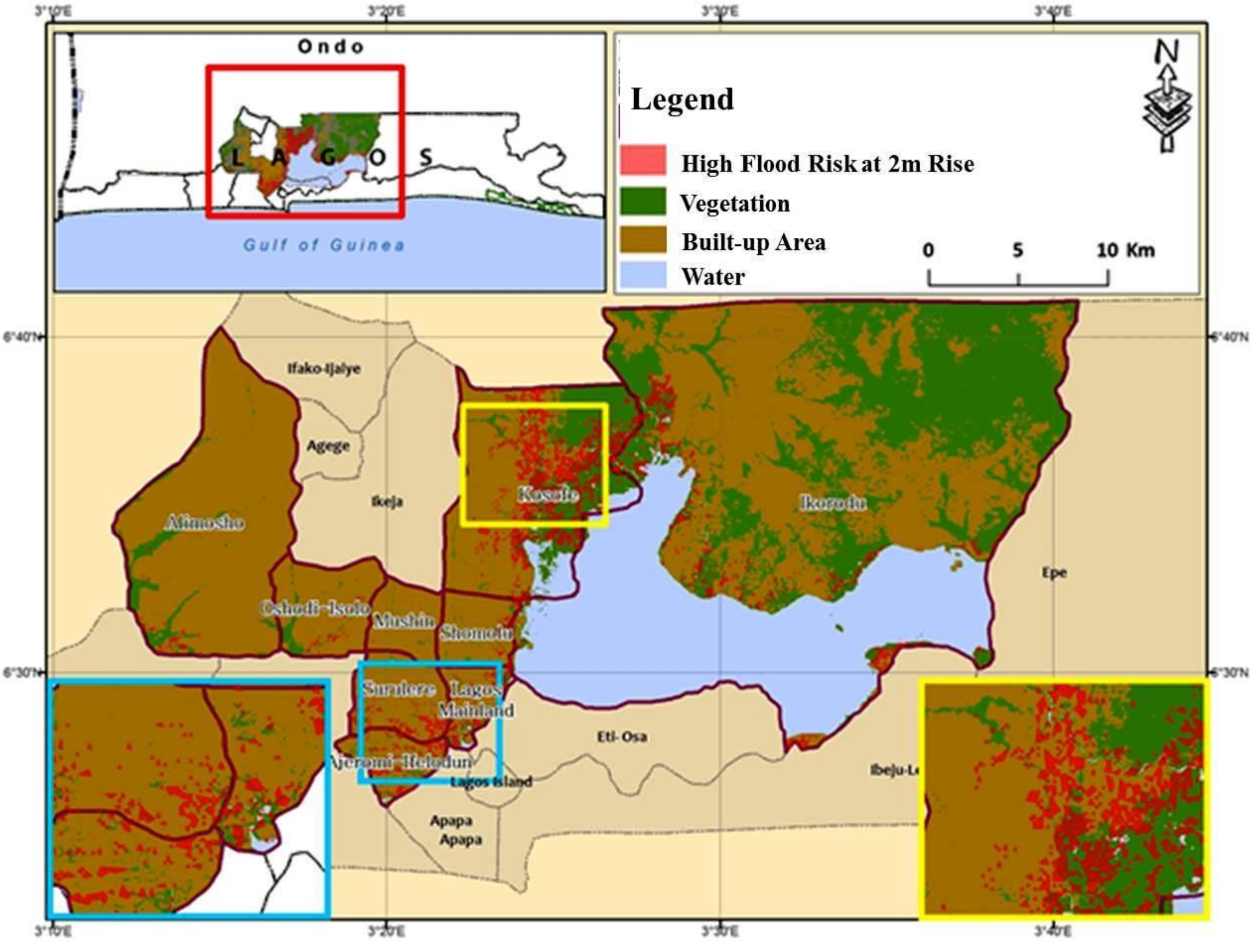

Figure 5.9 Two metres sea rise flood risk 2010

Source: Author, 2012

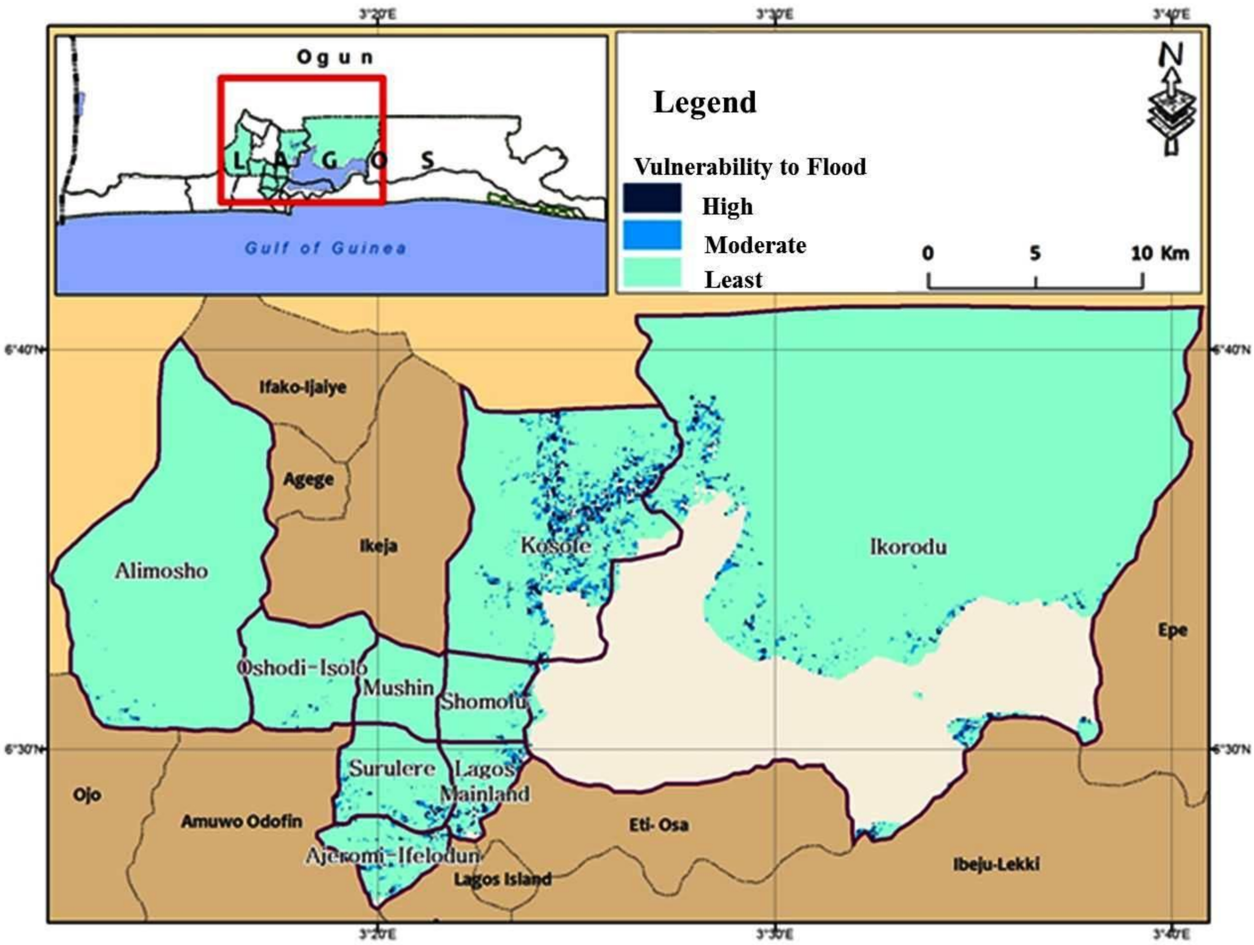

Figure 5.10 Flood risk zone profile

Source: Author, 2012

5.4 Conclusion

Using Geographic Information Systems to analyse the land use and land cover change from 1984 to 2010, the study has shown that about 8% and 45% of water and vegetation respectively have been converted to urban land use. Also, vegetation that accounted for the greater percentage of the land cover at 46.5% in 1984 has been converted urban at 51.2% in 2010. The simulation of flood risk at 1 metre by the study indicated that in 1984, most areas at risk were under vegetation. However, by 2010 Kosofe, Surulere, Ikorodu and Ajeromi-Ifelodun were the most flood-prone Local Government Areas. Simulation at 2 metres of flood water indicated that Kosofe, Ikorodu, Shomolu. Lagos Mainland, Surulere, Ajeromi–Ifelodun and a larger part of Mushin, Oshodi – Isolo and Alimosho due to land use and land cover change would be submerged. The next chapter looks at socio-economic indices of respondents, household characteristics and available housing facilities and services as predictor of vulnerability to disaster.

CHAPTER SIX

SOCIO-ECONOMIC STATUS OF RESPONDENTS AND VULNERABILITY TO DISASTER

6.1 Socio-economic status of the respondents

This chapter highlights the socio-economic status of the respondents, household and housing characteristics and the basic infrastructural facilities and services available. The variables considered include: neighbourhoood density, age, marital status, gender, educational attainment, occupation, income level, household size, type of dwelling unit, physical characteristics of building, water, sanitation and hygiene (WASH) and waste management strategies.

A cursory view of the Table 6.1 reveals that Lagos North Senatorial District (Alimosho 18.5%, Mushin 9.7% and Oshodi Isolo 12.5%) represented 40.7% (622) of the respondents while Lagos West Senatorial District (Ajeromi-Ifelodun 14.7%, Surulere 6.7% and Lagos Mainland 4.3%) accounted for 25.7% (391) of the respondents. The remaining 33.6% (515) of the respondents resided in Lagos East Senatorial District (Ikorodu14.8 %, Kosofe 5.2% and Shomolu 13.6%).

In terms of density, as measured by number of houses per square kilometre, 35.7% (546) of the respondents disaggregated into 41.9% (296) in Lagos Mainland (LM) and 30.4% (250) in Lagos Suburb (LS) were living in low density area. About 55.0% (833) resided in medium density area representing 43.6% (308) in LM and 63.9% (525) in LS; while 9.8% (149) of the respondents, 14.4% (102) in LM and 5.7% (47) were residing in the low density area (Table 6.1). To validate the responses of the respondents with the study area, Table 6.1 shows that 31.9% (488) of those interviewed have been residing in the study area for up to 20 years.

Additionally, 30.8% (463) of the respondents have been living in the study areas for close to 30 years while 22.0% (336) resided in the study area for up to 10 years. Those that have been residing in the enumerated areas for close to 40 years were represented by 8.6% (135) while those living in the enumerated areas for more than 40 years accounted for 6.7% (106). Inferring from the number of years the respondents have been residing in the enumerated area, it could be deduced that information given by them should be a fair representation of the actual situation on ground.

Table 6.1 Questionnaire distribution, respondents' density and residency status

Items		Respondents (%)	
LGA		**Lagos Mainland**	**Lagos Suburb**
Alimosho		0(0)	288(18.5)
Mushin		148(9.7)	0(0)
Oshodi/Isolo		196(12.5)	0(0)
Ajeromi-Ifelodun		0(0)	229(14.7)
Surulere		106(6.7)	0(0)
Lagos Mainland		64(4.3)	0(0)
Kosofe		0(0)	79(5.2)
Ikorodu		0(0)	226(14.8)
Shomolu		192(15.6)	0(0)
Total		706(100)	822(100)
Density of the area	**Respondents (%)**		
High density	546 (35.7)	296(41.9)	250(30.4)
Medium density	833 (54.5)	308(43.6)	525(63.9)
Low density	149 (9.8)	102(14.4)	47(5.7)
Total	1528 (100)	706 (100)	822(100)
Duration of residency?			
Up to 10	336 (22.0)	220(31.2)	243(29.6)
11 – 20	488 (31.9)	245(34.7)	243(29.6)
21 – 30	463 (30.8)	152(21.5)	184(22.4)
31 – 40	135 (8.6)	53(7.5)	82(10)
Above 41	106 (6.7)	36(5.1)	70 (8.6)
Total	1528 (100.0)	706(100)	822(100)

Important social attributes of the socio-economic indices of the respondents considered are age, gender, marital status, educational qualification, occupation and income classifications. As presented in Table 6.2, the age classifications show that up to 30 years old were represented by 5.7% (87) with 3.8% (27) and 7.3% (60) in LM and LS respectively. Twenty four per cent (368) were 30-40 years old, 20.1% (142) in LM and 27.5% (226) in LS; 41.3% (631) constituted the 41 – 50 years classification with 49.6% (350) in LM and 34.2% (281) in LS.

The age cohort of while 51 and above accounted for 28.9% (442) classified into 26.5% (187) in LM and 31.0% (255) in LS. Also, from the total population sampled, 59.4% (908) were male and the remaining 40.6% (442) were female. The marital status of the respondents, as shown in Table, shows that 6.7% (103) were single, 6.1% (43) in LM and 7.3 (60) in LS; married were represented by 87.8% (1342) with the percentage share in LM and LS represented by 88.0% (621) and 87.7% (721) respectively. The widowed, divorced and separated accounted for 2.8% (43), 1.4% (21) and 1.2% (19) representing 2.4% (17), 1.8% (13), 1.7% (12) in LM and 3.2% (26), 1.0% (8), 0.9% (7) in LS respectively. The inference of the age classifications and the marital status is that majority of those sampled were the heads of the family. This further gave credence to the quality and reliability of the data obtained from the respondents.

Table 6.2 Socio-economic indices: age, gender and marital status of respondents

Items	All respondents (%)	Lagos mainland	Lagos suburb
Age of respondent			
up to 30	87 (5.7)	27(3.8)	60(7.3)
31-40	368 (24,1)	142(20.1)	226(27.5)
41-50	631 (41.3)	350(49.6)	281(34.2)
51-60	287 (18.8)	119(16.9)	168(20.4)
abv. 60	155 (10.1)	68(9.6)	87(10.6)
Total	1528 (100)	706(100)	822(100)
Gender			
Male	908 (59.4)	396(56.1)	512(62.3)
Female	620 (40.6)	310(43.9)	310(37.7)
Total	1528 (100)	706(100)	822(100)
Marital status			
Single	103 (6.7)	43(6.1)	60(7.3)
Married	1342 (87.8)	621(88)	721(87.7)
Widowed	43 (2.8)	17(2.4)	26(3.2)
Divorced	21 (1,4)	13(1.8)	8(1)
Separated	19 (1.2)	12(1.7)	7(0.9)
Total	1528 (100)	706(100)	822(100)

Source: Field Survey, 2011.

Analyzing the socio-economic characteristics of the respondent further, Table 6.3 shows that 3.9% (60) categorised into 3.7% (26) in LM and 4.1% (34) in LS of those interviewed had no formal education; 22.1% (337), 20.7% (146) in LM and 24.5% (201) in LS had primary/adult education; 10.2% (156) with 6.5% (46) in LM and 13.4% (110) in LS obtained secondary school certificates. As submitted by the respondents, 3.2% (965), 69.1% (488) in LM and 58.0% (477) had obtained post-secondary school education. This structure of educational attainment shows that the literacy level of the respondents is high and majority of those interviewed have adequate knowledge to comprehend what the study is all about. Also the education profile presupposed that the majority of the respondents should be living in low density neighbourhoods as against the housing density observed in Table 6.1. Naturally in Nigeria, employment/occupation structure, to a larger extent, is a function of education level attained. However, as shown in Table 6.3, from the people interviewed, 3.4% (52) disaggregated into 3.0% (21) in LM and 3.8% (31) in LS were unemployed, 0.8% (12), 0.7% (5) in LM and 0.9% (7) in LS were artisans; farming constituted 4.8% (73), 1.3% (9) in LM and 7.8% (64) in LS were farmers. A higher percentage of the respondents (38.3%) 585 break up into 28.8% (203) in LM and 46.5% (382) in LS engaged in business/trading activities; professionals in different fields of human endeavours accounted for 36.1% (552), 48.4% (342) in LM and 25.5% (210) in LS. about 10.0% (155) classified into 12.9% (91) in LM and 7.8% (64) in LS were public/civil servants; 4.1% (63), 3.4% (24) in LM and 4.7% (39) in LS were retirees while the remaining 2.4% (36) accounted for others activities ranging from informal activities to semi-formal occupation classifications.

However, in terms of income of the respondents as shown in Table 6.3, majority of the respondents , 92.1% (1407) with 93.5% (660) in LM and 90.9% (747) in LS earned less than ₦80,000 per month while a fraction, 7.9% (121), 6.5% (46) in LM and 9.1% (75) in LS earned above ₦80,000 monthly. The consequences of the education, occupation and income strata are that majority of the respondents were under employed based on the comparison between the number of persons with post-secondary education and the nature of occupation the respondents were engaged in. Also, the income accruing to the respondents monthly could hardly meet the daily needs of the majority of the respondents bearing in mind the high cost of living. This could have an adverse bearing on the disposable capital and overall standard of living of the respondents while capacity to cope with disasters could also be compromised leading to increasing poverty and vulnerability to disasters.

Table 6.3 Socio-economic indices: educational qualification, occupation and income

Items	All respondents (%)	Lagos mainland	Lagos suburb
Educational qualification			
None	60 (3.9)	26(3.7)	34(4.1)
primary/adult education	347 (22.8)	146(20.7)	201 (24.5)
secondary education	156 (10,2)	46(6.5)	110(13.4)
post-secondary education	965 (63,2)	488(69.1)	477(58)
Total	1528 (100)	706(100)	822(100)
Occupation			
Unemployed	52 (3.4)	21(3)	31(3.8)
trading/business	585 (38.3)	203(28.8)	382(46.5)
Artisan	12 (0.8)	5(0.7)	7(0.9)
Farming	73 (4.8)	9(1.3)	64(7.8)
civil servant	155 (10.1)	91(12.9)	64(7.8)
Professional	552 (36.1)	342(48.4)	210(25.5)
Retired	63 (4.1)	24(3.4)	39(4.7)
other (specify)	36 (2.4)	11(1.6)	25(3)
Total	1528	706(100)	822(100)
Monthly income (Naira)			
Less than 20,000	443 (29.0)	194(27.5)	249(30.3)
20,001-40,000	435 (28.5)	225(31.9)	210(25.5)
40,001-60,000	315 (20.6)	154(21.8)	161(19.6)
60,001-80,000	214 (14.0)	87(12.3)	127(15.5)
Above 80,001	121 (7.9)	46(6.5)	75(9.1)
Total	1528 (100)	706(100)	822(100)

Source: Field Survey, 2011.

6.2 Housing and household characteristics

Impact of disaster is significantly related to inherent vulnerability and risk factors in a given environment. Therefore, the housing and household characteristics of the respondents are expected to play a vital role in determining how safe or unsafe a specific environment is for habitation, work and recreation. The housing and household features are highlighted in Tables 6.4 and 6.5.

Table 6.4 reveals that 26.6% (407) of the houses under review, 30.7% (217) in LM and 23.1% (190) in LS were 0 - 10 years old, 24.1% (263) of the buildings, 24.2% (171) in LM and 24.0% (197) in LS were between 11-20 years old. Twenty one to thirty (21-30) years accounted for 14.6% (223) of the houses, 18.1% (128) in LM and 11.6% (95) in LS; 21.7% (332) houses, 18.1% (128) in LM and 24.8% (204) in LS were 31-40 years ago while 13.0% (198) of the structures, 8.8% (62) in LM and 16.5% (136) in LS were erected over 41 years ago. This shows that houses in the study area conformed to the successive Lagos State Governments continuous decongestion policy of Lagos Island and the attraction of the mainland and the city fringe to intra- and inter-migrants due to the availability of land for low income housing as postulated by urban dynamics theory.

Due to the relatively young age of the buildings in the study area, majority of the houses were constructed using sandcrete block representing 88.0% (1343) classified into 83.9% (592) in LM and 91.4% (751) in LS; 3.8% (59) of the buildings, 5.5% (39) in LM an 2.4% (18) in LS were built using stone while 3.8% (59) with 3.9% (28) in LM and 3.8% (31) in LS were built with burnt bricks. Mud structures accounted for only 2.0% (31) of the buildings, while other materials such as wooden plank, corrugated iron sheet among others, were represented by the remaining 0.9% (14). Also, the type of housing tenure system indicated that 17.5% (268) of the respondents, 11.5% (81) in LM and 22.7% (187) were living in their own apartments Owner occupiers). A higher proportion of the respondents 76.8% (1174), disaggregated into 86.3% (609) in LM and 68.7% (565) were living in rented apartments Thirty-five (2.3%), 1.1% (8) in LM and 3.3% (27) were institutional building while those living or squatting in family houses were accounted for only 3.3% (51) of the respondents, 1.1% (8) in LM and 5.2% (43) in LS.

Table 6.4, also, shows that 80.2% (1225) of the houses, 85.7% (605) in LM and 75.4% (620) in LS were Brazilian rooming apartment popularly called face-me-I-face you; 18.4% (281) classified into 13.3% (94) in LM and 22.7% (187) in LS were flat; duplex accounted for 0.9% (14), 0.7% (5) in LM and 1.1% (9) in LS while the remaining 0.5% (8) were compound buildings/structures.

The type of dwelling unit identified in the study area had a significant relationship with the number of rooms in a given structure. As documented in Table 6.4, the least number of rooms in a building could either be found in duplex or flat structures which jointly accounted for 19.3% (295) of the dwelling units. Therefore, less than 5 rooms were accounted for by 2.2% (34) of the buildings, 0.7% (5) in LM and 3.5% (29) in LS; 43.0% (657) of the houses, 35.7% (252) in LM and 49.3% (405) had between 6-10 rooms. Up to 15 rooms accounted for 19.0% (291) with 15.4% (109) in LM and 22.1% (182) in LS; 16-20 rooms were represented by 18.3% (279), 18.8% (133) in LM and 17.8% (146) in LS. The percentage for 21-25 rooms was 14.7% (215), 27.1% (191) in LM and 4.1% (34) in LS while above 25 rooms were represented by 2.7% (42) classified into 2.3% (16) in LM and 3.2% (26) in LS. With this high number of rooms available in each building especially in LM coupled with the high population density inherent in the study area, the carrying capacity of such buildings could be compromised leading to building collapse as captured in chapter seven of this study.

Table 6.4 Housing and household characteristics

Items	All respondents	Lagos mainland	Lagos suburb
Age of building			
up to 10	407 (26.6)	217(30.7)	190(23.1)
11 – 20	368 (24.1)	128(18.1)	95(11.6)
21 – 30	223 (14.6)	171(24.2)	197(24)
31 – 40	332 (21.7)	128(18.1)	204(24.8)
41 and above	198 (13.0)	62(8.8)	136(16.5)
Total	1528 (100)	706(100)	822(100)
Material used for wall			
Block	1343 (88.0)	592 (83.9)	751(91.4)
Mud	59 (3.8)	39(5.5)	20(2.4)
plank and iron sheets	18 (1.2)	16(2.3)	2(0.2)
Stone	49 (3.2)	31(4.4)	18(2.2)
burnt brick	59 (3.8)	28(3.9)	31(3.8)
Total	1528 (100)	706(100)	822(100)
Type of house tenure			
owner-occupier	268 (17.5)	81(11.5)	187(22.7)
Rented	1174 (76.8)	609(86.3)	565(68.7)
institutional property	51 (3.3)	8(1.1)	27(3.3)
family house	35 (2.3)	8(1.1)	43(5.2)
Total	1528 (100)	706(100)	822(100)
Types of dwelling unit			
rooming apartment	1225 (80.2)	605(85.7)	620(75.4)
Flat	281 (18.4)	94(13.3)	187(22.7)
Duplex	14 (0.9)	5(0.7)	9(1.1)
Compound	8 (0.3)	2(0.3)	6(0.7)
Total	1528 (100)	706(100)	822(100)
Number of rooms			
up to 5	34 (2.2)	5(0.7)	29(3.5)
6-10	657 (43.0)	252(35.7)	405(49.3)
11-15	291 (19.0)	109(15.4)	182(22.1)
16-20	279 (18.3)	133(18.8)	146(17.8)
21-25	215 (14.7)	191(27.1)	34(4.1)
Above 25	42 (2.7)	16(2.3)	26(3.2)
Total	1528 (100)	706(100)	822(100)
Number of households			
up to 5	431 (28.2)	120 (17.0)	311(37.8)
6-10	704 (46.1)	316(44.6)	388(47.2)
11-15	204 (13.4)	144(20.4)	60(7.3)
16-20	172 (11.3)	119(16.9)	53(6.4)
21-25	12 (0.8)	4(0.6)	8(1.0)
Above 25	5 (0.3)	3(0.4)	2(0.2)
Total	1528 (100)	706(100)	822(100)

Source: Field survey, 2011.

Due to the existing high population and higher demand for housing in the enumerated area, it is expected that the higher the number of rooms available in a building, the higher the number of persons occupying such buildings. This is in consonance with the study area's evolving urban dynamics process characterized by increasing population growth, stagnant economy, high unemployment and pressure on existing infrastructural facilities and services. As noted by Torres *et al* (2007), the ever-increasing population in the urban low income residential neighbourhood further aggravated the existing vulnerability components of the low income high density urban suburb. This effect is illustrated succinctly in Table 6.5. From this development, one of the key implications of these indices is that the achievement of Millennium Development Goal 7, Target 11, especially availability of sufficient living area is threatened. In addition to this, the physical condition of the buildings as illustrated, also, shows that only 5.8% (88) of the houses, 2.8% (20) in LM and 8.3% (68) in LS were in sound/good condition, 86.6% (1324) of the buildings, 92.9% (656) in LM and 81.3% (668) in LS were in need of minor renovation and maintenance, 7.4% (113), 4.2% (30) in LM and 10.1% (83) in LS were due for major renovation and maintenance while the remaining 0.2% (3) were in need of one form of renovation or another as a result of pressure on the carrying capacity of the buildings. The vivid example of this precarious condition could be seen in the majority of the Low Cost and or Low Income Housing Estates.

The setbacks (left, right, rear and front) among buildings peaked at 2-4 metres. In terms of drainage to support free flow of storm water, it was observed that 41.3% (631) of the respondents' buildings sampled, 56.9% (402) in LM and 27.7% (229) in LS were provided with drainage channels for surface run off while 58.7% (897) of the buildings, 43.1% (304) in LM and 72.3% (593) in LS were without drainage channel. Deducing from the buildings that were provided with drainage facility, 46.1% (291) of such buildings, 36.1% (145) in LM and 63.8% (146) in LS could facilitate free flow of storm water, 53.9% (340) disaggregated into 63.9% (257) in LM and 36.2% (83) in LS were totally blocked while 3.5% (23) could hardly allow water to flow through it due to siltation by refuse and sand. In summary, majority of the buildings sampled did not have optimal and or functional storm water drainage system. The implication of this condition is that when it rains, most parts of the study area experienced flooding ranging from flash flood to total inundation as a result of inadequate drainage. The stagnant water within most of the existing drainage networks in the study area also acts as breeding ground for diseases carrying vectors thereby increasing the vulnerability component of the areas to disasters.

Table 6.5 Number of persons per room and housing conditions

Items	All respondents	Lagos mainland	Lagos suburb
Persons per room			
Up to 3	162 (10.6)	566(80.2)	788(95.9)
4 – 6	1354(88.6)	136(19.3)	26(3.2)
7- 10	9(0.6)	3(0.4)	6(0.7)
10-13	1(0.1)	0(0)	1(0.1)
Above 14	2(0.1)	1(0.1)	1(0.1)
Total	1528(100)	706(100)	822(100)
Building condition			
Good	88(5.8)	20(2.8)	68(8.3)
needs minor repair	1324(86.6)	656(92.9)	668(81.3)
major repair	113(7.4)	30(4.2)	83(10.1)
others (specify)	3(0.2)	0(0)	3(0.4)
Total	1528(100)	706(100)	822(100)
Drainage channel			
Available	631(41.3)	402(56.9)	229(27.7)
not available	897(58.7)	304(43.1)	593(72.3)
Total	1528(100)	706(100)	822(100)
Condition of available drainage			
Free and flowing	291(46.1)	145(36.1)	146(63.8)
Blocked	340(53.9)	257(63.9)	83(36.2)
Total	631(100)	402(100)	229(100)

Source: Field survey, 2011.

6.3 Housing infrastructural facilities and services

Housing, according to Egunjobi and Alabi (2007), encompasses houses and its immediate environment. Therefore, a healthy and well planned residential housing neighbourhood should be characterized by functional network of drainage, road, refuse disposal system, sanitation, improved and regular water and electricity supply, recreational ground among other infrastructural facilities and services. Thus, the concept of housing recognizes that occupancy of housing involved the consumption of housing facilities and utility services. It is against this backdrop that the data for housing facilities and services of the studied area were analysed and presented in Tables 6.6 and 6.7

6.3.1 Water, Sanitation and Hygiene (WASH)

Almost fifty per cent of the developing world's population – 2.5 billion people – lack improved sanitation facilities, and over 884 million people still use unsafe drinking water sources. Inadequate access to safe water and sanitation services, coupled with poor hygiene practices, kills and sickens thousands of children every day, and leads to impoverishment and diminished opportunities for thousands more (Brocklehurst, 2011). Poor sanitation has many other serious repercussions. Children – and particularly girls – are denied their right to education because their schools lack private and decent sanitation facilities. Women are forced to spend large parts of their day fetching water. Poor farmers and wage earners are less productive due to illness, health systems are overwhelmed and national economies suffer (UN-Habitat, 2010). Without adequate WASH (water, sanitation and hygiene), sustainable development is impossible (Brocklehurst, 2011).

A cursory look at Table 6.6 shows that only 6.9% (105) of those interviewed were connected to public pipe borne water. Majority 85.6% (1308) classified into 91.1% (643) in LM and 80.9% (665) in LS had overtly or covertly usurped the function of the municipal authority by supplying their water needs through personal wells and boreholes. About 6.0% (95) with 2,4% (17) in LM and 9.5% (78) in LS accessed water needs by patronising street water hawkers (from questionable sources), 1.2% (18) sourced water from pond/stream, 0.7% (5) in LM and 1.6% (13) while 0.1% (2) of the respondents used a combination of sources to get water for domestic purposes. This is in line with the tenet of urban dynamics process which stated that as population increases and city expands laterally without corresponding economic growth, the capacity of the urban managers to provide portable water is usually overstressed (Martinez-Viveros and Lopez-Caloca 2010).

As noted by UN-Habitat (2003b), a household is considered to have access to improved drinking water if it has sufficient amount of water (50 litres per person per day) for family use, at an affordable price (less than 10% of the total household income) available to household members without being subjected to extreme effort (less than one hour a day for the minimum sufficient quantity). From Table 6.6, most of the respondents, 92.3% (1411) disaggregated into 94.1% (651) in LM and 90.8% (747) in LS fetched water for domestic needs within their neighbourhood while 7.7% (117) break up into 5.9% (42) in LM and 9.1% (75) in LS met their water needs outside the neighbourhood.

From the earlier analysis, majority of the respondents met their water needs individually through wells and boreholes. However, to determine the portability of the water supplied individually, the distance of well and or boreholes from soak-away or refuse dump; as potential contaminant through underground seepage was analysed. From Table 6.6, 0.7% (9) of the respondents, 0.6% (4) in LM and 0.6% (5) in LS had their wells/boreholes about 10 metres away from either septic tank (soak-away) or refuse dump, 51.5% (787) of the respondents', 64.2% (453) in LM and 40.6% (334) wells/boreholes were located 11-20 metres away from septic tanks, 10.6% (162) of the boreholes and wells, 9.3% (66) in LM and 11.7% (96) in LS were located 21-30 metres away from contaminants. About 10.0% (152) of the respondents' wells/boreholes, 6.1% (42) in LM and 13.3% (109) in LS were sited 31-40 metres away from contaminants. The wells/boreholes that were located above 40 metres away from refuse dump and or soak-away accounted for 27.3% (418) with 19.8% (140) in LM and 33.95 (278) in LS.

The minimum standard from septic tanks (soak-away) and refuse dump according to Centres for Disease Control and Prevention (2009) and Advanced Purification Engineering Corp (APEC) (2013), ranges between 50 – 100 feet approximately 15.24 – 30.48 metres. The implication of this is that water from wells/boreholes could be contaminated by underground seepage from soak-away or refuse dump taken into consideration the distance and the location of such contaminant either uphill or downhill in relation to the wells/boreholes as shown in Table 6.6. Thus, contaminated water by soak-away pits and or pit toilets in relation to distance, location and gradient of water sources could further increase vulnerability to disease infection and other water related maladies.

Table 6.6 further indicates that 15.1% (231) of the respondents, 11.6% (82) in LM and 18.1% (149) in LS were using water closets en-suite, 80.6% (1231) were using shared water closets among and between households, 85.0% (600) in Lm and 76.8% (631) in LS among and between households; 2.8% (43) of the respondents 1.4% (10) in LM and 4.0% (33) in LS were using Ventilated Improved pit (VIP) latrine. About 1.0% (10) were using pit latrine while the remaining 0.8% (13) did not have sanitary facilities. In terms of access and usage of the sanitary facilities, 7.5% (115) of the available facilities, 3.8% (27) in LM and 10.7% (88) in LS were shared by 1-2 persons; 49.4% (755) of the facilities, 54.8% (387) in LM and 44.8% (368) in LS were shared by 3-4 persons, 38.2% (583) of the facilities, 39.9% (282) in LM and 36.6% (301) were shared by 5-6 persons; while the remaining 4.9% (75) facilities, 1.4% (10) in LM and 7.9% (65) in LS were shared by 7 and above persons. The implications of the high ratio of persons to facilities as noted by Habitat (2003b), Nwaka (2005) and Agbola, *et al* (2007) include severe and acute public health and sanitation hazards coupled with emotional stress and rapid spread of infectious diseases leading to high national health care cost and health burden.

Table 6.6 Water supply, sanitation and hygiene

Items	All respondents	Lagos mainland	Lagos suburb
Main source of water			
tap/piped water	105(6.9)	39(5.5)	66(8)
well/borehole	1308(85.6)	643(91.1)	665(80.9)
stream/pond	18(1.2)	5(0.7)	13(1.6)
street hawkers	95(6.2)	17(2.4)	78(9.5)
Combined sources	2(0.1)	2(0.3)	0(0)
Total	1528(100)	706(100)	822(100)
Distance to source of water			
within the compound	165(10.8)	48(6.8)	117(14.2)
outside neighborhood	117(7.7)	42(5.9)	75(9.1)
within the neighborhood	1336(81.5)	611(86.5)	624(75.9)
Total	1528(100)	706(100)	822(100)
Well distance to contaminants			
0-10m	9(0.7)	4(0.6)	5(0.6)
11-20m	787(51.5)	453(64.2)	334(40.6)
21-30m	162(10.6)	66(9.3)	96(11.7)
31-40m	152(9.9)	43(6.1)	109(13.3)
41-50m	360(23.6)	126(17.8)	234(28.5)
above 50m	58(3.7)	14(2)	44(5.4)
Total	220(14.4)	706(100)	822(100)
Well location to contaminants			
up hill	203(13.3)	52(7.4)	151(18.4)
down hill	1025(67.1)	528(74.8)	497(60.5)
same level	92(6.0)	40(2.6)	52(6.3)
No response	208(13,6)	86(5.6)	122(14.8)
Total	1528(100)	706(100)	822(100)
Toilet facility			
water closet (separated)	231(15.1)	82(11.6)	149(18.1)
water closet (shared)	1231(80.6)	600(85)	631(76.8)
VIP latrine	43(2.8)	10(1.4)	33(4)
Pit latrine	10(0.7)	5(0.7)	5(0.6)
Bush	13(0.8)	9(1.3)	4(0.2)
Total	1528(100)	706(100)	822(100)
Person(s) per toilet facility			
1-2	115(7.5)	27(3.8)	88(10.7)
3-4	755(49.4)	387(54.8)	368(44.8)
5-6	583(38.2)	282(39.9)	301(36.6)
7-8	75(4.9)	10(1.4)	65(7.9)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

6.3.2 Waste generation and management

One of the most indispensable but intractable urban services in the developing and developed countries is the management of waste generated in cities. The problem is further compounded especially in the developing countries by the increasing rate of urbanisation. Consequently, the immense and ever-increasing amount of solid waste generated have long outstripped the capacity of nature to deal with it naturally and of city authorities to collect and dispose waste safely, efficiently and scientifically (Agbola and Kasim 2009).

From the respondents as highlighted in Table 6.7, the waste generated consists mainly of bio-degradable household/domestic waste as represented by 89.9% (1367) of the respondents classified into 88.0% (621) in LM and 90.8% (746) in LS. Other types of waste accounted for 10.1% (155). The wastes generated were collected by both the government and private sector agencies. As illustrated in Table 6.7, government agencies were responsible for the collection of 81.8% (1250) of the waste, 87.4% (617) in LM and 77.0% (633) in LS; 14.2% (217) of the waste were collected by organized private collectors, 8.2% (58) in LM and 19.3% (159) in LS. Local cart pushers collected 3.7% (56), 4.0% (28) in LM and 3.4% (28) in LS while the remaining 0.3% (5) were burnt, converted to compost and or reused.

The holistic management of solid waste is a major challenge waiting for proactive solution from municipal authorities in Nigeria (Agbola and Kasim, 2009). The challenge is often manifested mainly at the point of collection and in the frequency of collection and disposal methods. As highlighted in Table 6.7, only 1.4% (21) of the respondents had their waste collected daily, 1.6% (11) in LM and 1.2% (10) in LS; 3.2% (49) admitted that the waste was collected twice a week, 87.0% (1330) of the waste generated by the respondents, 89.1% (629) in LM and 85.3% (701) in LS was collected weekly while 8.3% (128) of the respondents 5.5% (39) in LM and 10.2% (84) in LS had their waste collected irregularly without a fixed pattern or duration of collection. The implication of this for urban vulnerability, as noted by Veenhuizen (2006), is that solid waste is population dependent, therefore, the general consensus is that as the urban population continues to grow rapidly, the heap of wastes generated will lower the aesthetic value of the urban environment, pollute land, air and water, serve as breeding ground for disease-bearing vectors thereby increasing the vulnerability component of the urban environment to disasters

When the wastes generated were not collected or there were delays in collection, the people interviewed had their waste disposed using the following methods: 3.6% (55), 4.5% (32) in LM and 2.8% (23) in LS of the waste generated were dumped it in mostly illegal communal dumps; 64.9% (992) disaggregated into 75.1% (530) in LM and 56.2% (462) in LS used any available bush or unprotected open spaces, 7.2% (110) with 8.6% (61) in LM and 6.0% (49) in LS deposited waste in the drainage and or stream channels; 19.4% (296) of the respondents 10.2% (72) in LM and 27.3% (224) in LS burnt the waste in communal open space. The remaining 5.0% (75) of the respondents adopted the use of road kerbs and shoulders as waste dump sites. Accordingly and due to the shortcoming to effectively manage waste generated, urban waste remains a serious problem that could, on one hand contaminate the soil and water bodies, encourage disease outbreak and endanger human health and the environment. On the other hand, those dumped within the drainage and stream channels compounded the perennial flooding experienced in the study area (Osuntokun, 1997).

Table 6.7 Waste generation and management

Items	All respondents	Lagos mainland	Lagos suburb
Types of waste generated			
Household waste/domestic waste	1367(89.9)	621(88)	746(90.8)
Others (non-biodegradable)	161(10.1)	85(12.0)	76(9.2)
Total	1528(100)	706(100)	751(100)
Method of waste collection			
government agency	1250(81.8)	617(87.4)	633(77)
organized private collector	217(14.2)	58(8.2)	159(19.3)
local chart pushers	56(3.7)	28(4)	28(3.4)
others (specify)	5(0.3)	3(0.4)	2(0.2)
Total	1528(100)	706(100)	822(100)
Frequency of collection			
Daily	21(1.4)	11(1.6)	10(1.2)
twice a week	49(3.2)	22(3.1)	27(3.3)
Weekly	1330(87.0)	629(89.1)	701(85.3)
Irregularly	128(8.3)	44(6.2)	84(10.2)
Total	1528(100)	706(100)	822(100)
Disposal of wastes not collected			
Communal dumps	55(3.6)	32(4.5)	23(2.8)
In the bush/open space	992(64.9)	530(75.1)	462(56.2)
Water drainage/stream/canal	110(7.2)	61(8.6)	49(6)
burnt in a communal open space	296(19.4)	72(10.2)	224(27.3)
road side or median	75(5.0)	8(1.1)	54(6.6)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

The second hypothesis which stated that vulnerability to disasters is not a function of socio-economic indices, housing characteristics and provision of infrastructural facilities and services; was analyzed using multivariate logistic regression model. Table 6.8 presents the result of the logistic regression predicting vulnerability with respondents' socio-economic indices, housing characteristics and provision of infrastructural facilities and services. The result R^2 shows that about 40% of the vulnerability to disaster attributes can be explained by socio-economic indices, housing characteristics and provision of infrastructural facilities and services. The analysis shows that the model's fit is acceptable while the overall model fit is significant at the 1% level of confidence. Therefore the hypothesis: vulnerability to disasters is a function of socio-economic indices, housing characteristics and provision of infrastructural facilities and services is significant at 95% confidence level.

From Table 6.9, it can be deduced that socio-economic indices of the respondents play important role in determining the vulnerability to disaster. Analysis from the Table shows that as age of respondents' increases, occurrence of flood increases by 1% while occurrence of building collapse and fire outbreak significantly reduce 6% and 3% respectively. For disease outbreak, as age increases; the occurrence of disease significantly increases by 3%. All these could be attributed to lack of safety-nets and social security package for the elderly, reduced opportunity for employment and capacity to undertake arduous job by the aged and unsustainable pension returns for the retirees. Thus, the elderly have a decreased ability to engage in livelihood activities and this creates a reliance on family and kinship networks, though due to sheer poverty and lack of material resources, the support these networks provide can be weak and can lead to destitution. From this development, it is possible to infer that as age increases, the capacity for sustainable economic opportunity decreases, therefore, the capacity to inhabit choice location not liable to disaster reduced while the most viable options available are areas and or locations vulnerable to disaster.

Analyzing the marital status and its effects, it is observed that singles whether widowed, divorced or separated are more exposed to disaster than married. For instance, from Table 6.9, the probability for a widowed and divorced/separated to inhabit building liable to collapse increase significantly by 370% and 240% respectively compared to the base category. Also, respondents that are either divorced or separated marital status have increased odd of experiencing flood and disease outbreak by 587% and 620% respectively in relation to married, that base group. This observation is attributable to lower socio-economic status of most single-headed poor households. Evaluating the analysis on employment characteristics using business men and women as base, the Table shows that the odd for professional to inhabit area vulnerable to flood increases significantly by 85%, retired persons susceptibility to fire outbreak increases by 1000%. However, the likelihood of disease outbreak significantly reduces for artisan, civil servant and retired by 55%, 42% and 48% respectively as shown in Table 6.8. Also from the regression analysis, the number of person in a household has both negative and positive relationship with occurrence of disaster. For instance, as household number increases, the likelihood of occurrence of flood increases significantly by 9%, the probability for fire outbreak increases by 82% while occurrence of building collapse increases by 12%. Therefore, one can infer that as the number of persons per household, the disposable income available to household decreases.

Education is also found to influence hazard and disaster patterns. In term of disasters occurrence, the likelihood of flood increases significantly by 53% for those with primary education and reduces for those with secondary education by 76% compared to those with tertiary qualification. Also, the probability for fire outbreak and building collapse decreases with education attainment. For instance, it is shown that those with no education are about 3 times more likely to experience building collapse than those in the base category (tertiary); in other words, no education raises the odd of building collapse by about 300%. Equally, from the analysis, the probability of those with secondary education experiencing fire outbreak increases by 473% over those with tertiary qualification, the base category. Furthermore, evaluating the impact of income on vulnerability to disaster, it is observed that as household's income increases probability of it residing in area liable to flooding decreases by 57% and the odd for disease outbreak reduces by 31%. This established strong relationship between household's income and choice of place of residence in relation to flood occurrence.

With increasing population, exposure to hazards is, also, increasing. This phenomenon is compounded by dense concentration of population in often-unsafe human settlements. Urban centres were usually built on accessible locations with inherent risks such as coastlines to facilitate transport, or flood plains. Urbanization and increasing competition for land, results in unregulated construction that invariably spills into adjacent high-risk areas such as hillsides, low laying areas, industrial areas or right off ways. Thus, in Lagos State it is observed that there is positive correlation between the socio economic characteristics and vulnerability to disaster. The poor tends to live in disaster prone areas, which are the least expensive, and the only residential site available to them (Ojo, 2013).

As noted in Chapter 4, the inability of the State to effectively enforce development control component of the Urban and Regional Planning Law in the 1980s to 1990s coupled with increasing population, predisposed the study area to disasters. Therefore, with reference to age of building as determinant of vulnerability, it is shown from the regression analysis that as age of building increases, the occurrence of disaster increases by 5% and 7% for flood and building collapse respectively due to the inability of the urban managers to maintain the existing drains that have been silted up with wastes and pressure on carrying capacity of aging buildings.

Table 6.8 Logistic regression diagnostic tests for socio-economic indices, household characteristics and housing facilities and services

	Flooding	Fire outbreak	Building collapse	Disease outbreak
Wald (X^2)	*650.420****	*462.663****	*335.817****	*518.453****
Pseudo-R^2	*0.473*	*0.706*	*0.524*	*0.384*
-2 Log Likelihood	*1365.056*	*243.655*	*386.749*	*159.297*
Percent correctly classified	*79.5*	*97.3*	*95.5*	*74.5*

Source: Field survey, 2011.

Table 6.9 Logistic regression results predicting disasters on socio-economic indices

	Flooding		**Fire outbreak**		**Building collapse**		**Disease outbreak**	
	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio
Age	0.005**	***1.005***	-0.066***	***0.936***	-0.039**	***0.961***	0.026***	***1.026***
Male (Female)	0.217	***1.243***	0.199	***1.22***	0.967***	***2.63***	0.202	***1.224***
Single (Married)	-0.446	***0.64***	-1.927**	***0.146***	-0.153	***0.858***	0.023	***1.023***
Widowed	0.896	***2.451***	1.122	***3.071***	1.547**	***4.7***	-0.503	***0.605***
Divorced/Separated	1.928***	***6.874***	0.735	***2.086***	1.176*	***3.242***	1.976***	***7.214***
Unemployed (Business)	0.383	***1.467***	1.28	***3.598***	-0.686	***0.504***	-0.672	***0.511***
Artisan/Farming	0.196	***1.216***	0.086	***1.09***	0.254	***1.289***	-0.787***	***0.455***
Civil Servant	-0.338	***0.713***	-0.873	***0.418***	0.897	***2.451***	-0.559**	***0.572***
Professional	0.616**	***1.851***	0.411	***1.509***	0.459	***1.583***	-0.352	***0.703***
Retired	-0.435	***0.647***	2.405**	***11.081***	0.264	***1.302***	-0.652*	***0.521***
Persons Per Household	0.088**	***1.092***	0.202*	***1.817***	0.114**	***1.121***	0.025	***1.025***
Education None (Tertiary)	0.297	***1.346***	1.242	***3.463***	1.299*	***3.665***	0.783	***0.457***
Education Primary	0.423*	***1.526***	1.072*	***2.92***	0.769	***2.158***	0.248	***1.281***
Education Secondary	- 1.448***	***0.235***	1.746***	***5.732***	0.822	***2.275***	-1.156***	***0.315***
Income	-0.84***	***0.432***	-0.201	***0.818***	0.409	***1.505***	-0.368**	***0.692***

Note: *, **, * Depict significance at 10 %, 5 % and 1 % respectively. Reference category in brackets**
Source: Field survey, 2011.

From the results on types of dwelling units, as shown in Table 6.10, using rooming apartment as base, it is observed that the occurrence or odd of fire outbreak is about 3 times more likely to occur in flat apartment than those in the base category (rooming apartment). Smith, (2004), opines that as socio-economic status increases, the allure of residing in area liable to flood also increases. Therefore, the results from the analysis show that flood disaster increases significance by 27,830% for those households residing in duplex than those residing in rooming apartment. The explanation of this is that most of the high income residential neighbourhoods are built in reclaimed flood plain thereby increasing the vulnerability component of such environment to flood. There is also significant reduction in the likelihood of building collapse in flat apartment by 60% than those in rooming apartment. However, residing in block of flats increases the likelihood of disease outbreaks by 50% over those in the base category (rooming apartment). The outcomes of this analysis validate the importance of attraction of water bodies for human settlement and the significant contribution of inundating water as a major causal factor of other hazard such as disease outbreak, flooding, building collapse, erosion, and general land degradation.

The analysis also captures the number of rooms in a building and the number of persons per room and their effects on disasters. From the results, as number of rooms increases, flooding reduce by 3% while likelihood of disease outbreak increases by 2% with increasing number of rooms. From the Table it is shown that as the number of persons per room increases, the probability of flood disasters decreases significantly by 16% and also increases significantly by 89% for disease outbreak. In terms of material used for construction, using sandcrete block as base, it is observed that other building materials like mud, iron sheet, plank and tarpaulin double the probability for flood, fire out break and disease outbreak significantly by 53%, 49% and 43% respectively. The listed building materials are, most often than not, associated with informal housing and are seen as relic of poverty, hence, there is an observed strong relationship between such materials and disaster occurrence. It is also important to note that non-sandcrete block building materials has no significant effect on building collapse. This infers that when makeshift building or structure collapsed it is seldom a disaster but a normal and expected occurrence.

Availability of functional and adequate drainage network contributes to outcome and impact of disaster. From Table 6.10, taken non-availability of drainage as base free flowing drainage reduces the probability of flood significance by 63%. Blocked drainage also reduces the likelihood of flood significantly by 42% compared to where there is no drainage. The stagnant water dammed by the blocked drainage created a breeding ground for mosquito and other related water borne disease. From the analysis, therefore, blocked drainage significantly increases the occurrence of disease outbreak by 2% in relationship to the base category. Furthermore, evaluating the result of setback to water bodies, it can be deduced that as set back increases (in metre) the probability of occurrence of flood decreases significantly by 40%.

The import of basic infrastructural and housing facilities as physical planning requirement in vulnerability analysis in line with the MDGs position on sustainable development cannot be over emphasized. It is from this background that the impact of improved water, sanitation and hygiene (WASH) and solid waste management on disaster vulnerability is presented as follows. Using pipe borne water source as the base category, it is observed that odd of disease outbreak increases about 8 times for those using boreholes than those in the base category. Furthermore, for disease outbreak, the disaster that is most associated with poor hygiene, using water closet en-suite as base, it is observed that using shared water closet and ventilated improved pit latrine (VIP) reduces disease outbreak significantly by 68% while ordinary pit latrine increases the probability of disease outbreak significantly by 43% over the base category. From this analysis, it could be inferred that ventilated improved pit latrine is better than open pit latrine as viable sanitation and hygiene strategy. It is also observed that availability of all the types of toilet facilities decreases occurrence of disease outbreak. In terms of number of person per toilet facility, it can be deduced that as number of persons in a household increases, the odd for disease outbreak also increases significantly by 76%.

Table 6.10 Logistic regression results predicting disasters on household and housing characteristics

	Flooding		Fire outbreak		Building collapse		Disease outbreak	
	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio
Building Age	0.044***	***1.045***	0.03	***1.031***	0.071***	***1.074***	0.009	***1.009***
Dwelling Flat (Room)	-0.258	***0.773***	1.255**	***3.507***	-0.924**	***0.397***	0.407**	***1.502***
Dwelling Duplex	3.361**	***28.828***	-0.008	***0.992***	-0.786	***0.456***	0.828	***2.288***
Dwelling Compound	-0.238	***0.789***	-19.003	***0***	-18.093	***0***	0.342	***1.408***
Building Rooms	-0.031**	***0.97***	0.002	***1.002***	0.001	***1.001***	0.028**	***1.028***
Person Per Room	-0.171***	0.842	0.096	***1.1***	-0.133	***0.875***	1.116***	***1.891***
Material Non-Block (Block)	0.427***	***1.533***	0.398**	***1.488***	-0.63	***0.533***	0.337**	***1.431***
Drainage Free (Semi Blocked)	-1.127***	***0.324***	-0.818	***0.441***	0.38	***1.463***	0.251	***1.286***
Drainage Blocked	-0.551***	***0.577***	0.834	***2.303***	0.726	***2.067***	1.106***	***3.023***
Setbacks	-0.518***	***0.595***	-0.093	***0.912***	0.19	***1.209***	-0.098	***0.907***

Note: *, **, * Depict significance at 10 %, 5 % and 1 % respectively. Reference category in brackets**
Source: Field survey, 2011.

From Table 6.11, the analysis from waste generation and management shows that using government collection of waste as base category, private collection of waste increases disease outbreak significantly by 150% while cart pusher as manager of waste reduces significantly the odd of flood and disease outbreak by 72% and 41% respectively in relation to the base category. This highlighted the importance of cart pushers as viable scavenging agents that reduces the quantum of waste along the waste management spectrum through recovery of reusable and salvageable items from the waste generated.

Explicitly, the likelihood of disease outbreak increases by 51% when waste is managed by private sector compared to government. The likelihood of disease outbreak decreases also by 59% when managed by cart pusher in relation to government. Moreover, the impact of collection arrangement varies for flood and disease outbreak. It is noted that daily collection of household waste significantly reduces likelihood of flood by 147% while irregular collection increases the likelihood of flood by 62% in relation to base category. The result for disease outbreak indicates that daily collection decreases the probability of disease outbreak significantly by 66% while irregular collection increases probability of disease outbreak significantly by 400% in relation to the base category. The implication of this is that as household wastes accumulated within a given settlement, without functional management strategy, the vulnerability to disaster of such environment increases

Table 6.11 Logistic regression results predicting disasters on housing facilities and services

	Flooding		Fire outbreak		Building collapse		Disease outbreak	
	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio	Coeff. (B)	Odd Ratio
Water Tap (Well/Borehole)	0.986**	***2.682***	0.686	***1.985***	-0.141	***0.868***	2.272***	***9.694***
Water Stream	-0.1	***0.904***	-0.364	***0.695***	-18.749	***0***	0	***1***
Water Hawkers	-1.043***	***0.352***	-1.139	***0.32***	0.593	***1.809***	0.342	***1.407***
Toilet Water Separated (En-suite)	-0.219	***0.803***	0.968**	***2.633***	0.911**	***2.486***	-0.964***	***0.382***
Toilet Pit	-1.615***	***0.199***	1.649*	***5.201***	0.418	***1.519***	-0.966*	***0.381***
Toilet Pail/Bush	-1.317**	***0.268***	1.231	***3.426***	1.423*	***4.151***	1.207**	***0.436***
Person Per Toilet	0.523***	***1.686***	-0.695**	***0.499***	-0.068	***0.934***	1.273***	***0.761***
Waste Private (Government)	0.209	***1.232***	0.827	***2.286***	0.832	***2.297***	0.919**	***2.506***
Waste Chart	-1.291***	***0.275***	-0.235	***0.79***	-0.403	***0.668***	-0.523***	***0.593***
Waste Collection Daily (Weekly)	-0.904	***2.47****	-0.654	***0.52***	-0.284	***0.752***	-0.064**	***1.660***
Irregular Collection	0.469	***0.626*****	0.948*	***2.581***	0.7	***2.014***	1.61***	***5.001***

Note: *, **, * Depict significance at 10%, 5% and 1% respectively. Reference category in brackets**
Source: Field survey, 2011.

6.4 Conclusion

This chapter highlighted the point that vulnerability to disaster is a function of several factors and these include socio-economic indices, housing characteristics, availability of infrastructural facilities and services and the attendant urban dynamics processes. The findings show that the low-income groups, by default, always use available housing at higher population densities (Alfield, 1995; Ramroth, 2007). Deducing from the Chapter, 88.6% of the respondents observed that 4 – 6 persons were living in a room. This negates the Millennium Development Goals 7 Target 11 recommendation of 2 - 3 persons for the ideal number of persons per room to avoid overcrowding.

The result of the logistic regression analysis revealed that the model's fit is significant at 0.05 confidence level. In disaggregating some of the results of the regression analysis, the study revealed that the probability of flooding increases significantly by 53% for those with primary education and reduces for those with secondary education certificate by 76% compared to those with tertiary qualification (the base category). Also, the probability of fire outbreak and building collapse decreases with educational attainment. Equally, evaluating the impact of income on vulnerability to disaster, it is observed that as income increases, the probability for flood reduces by 57% and the odd for disease outbreak reduces by 31%. The inference from the study depicted that the higher the household's socio-economic status, the lower the probability of being housed in a disaster-prone areas. Thus, there is inverse relationship between the household's socio-economic status and the probability of being accommodated in disaster-prone areas

The availability of functional and adequate drainage networks contribute to the outcome and impact of disaster. From the logistic regression analysis, free flowing drainage reduces the probability of flood by 63% while blocked drainage also increases the occurrence of disease outbreak by 2% in relationship to the base category. Furthermore, evaluating the result of setback to water bodies, it can be deduced that as the setback increases (in metre), the probability of occurrence of flood decreases significantly by 40%. The next chapter presents the prevailing hazards and vulnerability pattern in Lagos State.

CHAPTER SEVEN

PREVAILING HAZARDS AND VULNERABILITY TO DISASTERS

7.1 Introduction

Although damaging events are classified according to natural and human causes, they have to reach certain human effects thresholds, such as death, injury and economic loss, before they are identified as disaster. The world has experienced dramatic environmental and socio-economic changes in recent decades. Consequently, as noted by Yodmani (2001), there has been an exponential increase in human and material losses from disaster events, although there were no clear evidences that the frequency of disastrous events had increased. However, according to Makoka and Kaplan (2005), phenomena such as population growth, rapid urbanization processes, increasing poverty, environmental degradation and climate change have affected the social and economic development in many parts of the world.

These phenomena indicate that the rise in disasters and its impact are functions of the vulnerability of people all over the world that were induced by the human determined path and justified quest for development (Ojo, 2013). It is important to note that increase in vulnerability is not uniform (Quarantelli, 2005). There are large variations across regions, nations, provinces, cities, communities, socio-economic classes, ages, castes and genders. For instance, Yodmani (2001), gives a classic example of earthquakes in San Francisco, United States of America and Managua, Nicaragua. Earthquake of magnitude 6.4 in San Francisco, California in 1971, a city of over 7 million people, reported only 58 deaths. In 1973, an earthquake of magnitude 6.2 in Managua, Nicaragua reduced the centre of the city into rubble and killed over 6,000 people. Similar patterns can be seen in other recent disasters occurrence.

7.2 Perception on vulnerability to disasters

Vulnerability to hazards is a function of several factors including the level of poverty, population growth and distribution and the attendant urban dynamics. The conditions of human settlements and infrastructure therein, the level of environmental degradation, the level of public awareness and public policy on disaster management should also be taken into consideration. However, one of the most challenging urban planning issues in urban studies and allied disciplines is the increasing rates of growth of towns and cities, especially in the developing countries where less planning and proactive intervention are done to accommodate such growth in a sustainable manner (Agbola, 2005a).

It is obvious that nature and human induced disasters abound in Lagos State and a number of individuals are living in harms ways as manifested in the impact and level of destruction associated with yearly flooding and incessant building collapse and fire outbreaks as shown in Tables 7.7 and 7.9. However, Table 7.1 elicits reactions from the respondents to determine if there was prior information by agencies of government prohibiting them from living in any specific part of their neighbourhood. As expected, going by the general inefficiency of government's Ministries, Departments and Agencies (MDAs), only 2.6% (40) of the respondents had prior information while 97.4% (1488) did not.

Furthermore, to ascertain if the respondents had an understanding of what constitutes hazard or disaster, they were asked to define hazard/disaster. The definitions were given as follows: 9.6% (146) defined disaster as something that is risky or misfortune like diseases outbreak. Almost 11% (162) saw it as an unexpected and unpleasant bad incidence causing damage to property or suffering to human while 79.8% (1219) defined disaster as destruction of lives and properties by natural or human activities. However, in terms of vulnerability to disasters, 13.9% (213) people interviewed agreed that their environment/locality/houses were vulnerable to one form of disaster or another while 86.1% (1341) disagreed. Deducing from the responses, it could be argued that the level of public awareness and sensitization campaign about what constitute a disaster by MDAs is generally low.

Table 7.1 shows that only 12.2% (187) of the respondents had experienced disaster personally while 87.8% (1341) had not and this is contrary to recorded evidence and physical observations. From this development, it can be deduced that: there is no public awareness on the part of governments to educate the inhabitants of hazard prone areas about the prevailing hazard; people have short memories of hazard while others believed that the prevailing hazard would not turn to disaster in their life time. In addition, majority of the people living in hazard-path would hardly give the correct position in relation to disaster due to deep skepticism towards researchers; seeing them as agent of government especially from the backdrop of recent stance of Lagos State Government to demolish houses on flood plain and right of ways to mitigate disaster impacts and to reverse the current urban dynamics process. For the purpose of this study, prevailing hazards in Lagos State that were analyzed include the following: flood, fire, building collapse and diseases outbreak.

Table 7.1 Perception of respondents on vulnerability to disaster

Items	All respondents	Lagos mainland	Lagos suburb
Vulnerability information			
Information available	40(2.6)	3(0.4)	37(4.5)
Information not available	1488(97.4)	703(99.6)	785(95.5)
Total	1528(100)	706(100)	822(100)
Definition of a disaster			
Something that is risky	147(9.6)	46(6.5)	101(12.3)
Unpleasant or damaging event	162(10.6)	65(9.2)	95(11.6)
Destruction of lives/properties	1219(79.8)	595(84.3)	626(76.2)
Total	1528(100)	706(100)	822(100)
Is your area vulnerable			
Vulnerable to disaster	213(13.9)	86(12.2)	127(15.5)
Not vulnerable	1315(86.1)	620(87.8)	695(84.5)
Total	1528(100)	706(100)	822(100)
Experienced disasters			
Experienced disaster	187(12.2)	74(10.5)	113(13.7)
Have not experienced disaster	1341(87.8)	632(89.5)	709(86.3)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

7.3 Flood hazard

Flooding, as noted by Smith (2004), is the most common environmental hazard worldwide, after disease and transport accidents. Every year, floods claim around 20,000 lives and adversely affecting at least 20 million people worldwide, mostly through displacement and homelessness (Smith 2004; Hoyois *et al* 2007). However, in addition to deaths from drowning, flood-related mortality includes epidemics; outbreak of gastro-intestinal diseases especially in developing countries where sanitation standards are low and or not inexistence. Also, the incidence of water-related diseases such as typhoid and or malaria could double the initial endemic mortality rate. Hence, owing to geographical location and low lying (plain) and coastal nature of Lagos, the study area is highly vulnerable to flood associated with both nature and human induced hydrological hazard as shown in Table 7.2.

Table 7.2 indicates that close to two-third ($^{2}/_{3}$) representing 62.9% (961) of the respondents, 70.3% (496) in LM and 56.6% (465) in LS had been affected by flood while 37.1% (567) were safe from the menace of flood. In terms of frequency of occurrence from the total number of respondents that had experienced flood, 14.5% (139) experienced flood every time it rains, 85.2% (819) with 85.5% (424) in LM and 84.9% (395) occasionally experienced flood when it rains while 0.3% (3) of those who had experienced flood in their neighbourhoods submitted that the occurrence did not follow any defined pattern. As shown in the Table, the impact of the flood to affected persons includes injury or death (27.4%), hindrance to mobility (21.1%), destruction of property (15.8%), traumatization (12.6%), stagnant foul-smelling water (12.3%), and outbreak of diseases (10.8%).

Table 7.2 Perception of respondents on flood hazard

Items	All respondents	Lagos mainland	Lagos suburb
Occurrence of flooding			
Flood has occurred	961(62.9)	496(70.3)	465(56.6)
It has not occurred	567(37.1)	210(29.7)	357(43.4)
Total	1528(100)	706(100)	822(100)
Frequency of occurrence			
Every time it rains	139(14.5)	72(14.5)	67(14.5)
Occasionally when it rains	819(85.2)	424(85.5)	395(84.9)
Without regular pattern	3(0.3)	0(0)	3(0.6)
Total	961(100)	496(100)	465(100)
Impact of flooding			
Traumatic and bad experience	121(12.6)	67(14.8)	54(10.6)
Caused injury and death	263(27.4)	127(20.0)	136(26.8)
Destruction of properties	152(15.8)	56(12.4)	96(18.9)
Stagnant foul-smelling water	118(12.3)	76(16.8)	42(8.3)
No movements	203(21.1)	84(18.5)	119(23.4)
Diseases outbreaks	104(10.8)	43(9.5)	61(12.0)
Total	961(100)	453(100)	508(100)

Source: Field survey, 2011.

Presenting the respondents perception on causes of flood in Table 7.3, natural causes such as excessive rainfall ranked highest with 97.0% (932) of the respondents affirming it as major cause, human activities such as inadequate drainage network, deforestation, building on flood plains, among others ranked second with 91.7% (917), act of God ranked third with 20.4% (196) while other causes accounted for 0.1% (1). Also, while ranking the vulnerability indices of the study area, location of property in hazard prone area (river floodplain, right of way of drainage network) ranked first with 58.3% (891), this was followed by improper planning or building design with 56.5% (863) while inadequacy in the enforcement of flood related laws and policies was ranked by 52.2% (797) of the respondents.

Table 7.3 Perception of respondents on causes of flood

Items	All respondents	Lagos mainland	Lagos suburb
Flood as natural disaster			
Natural causes	932(97.0)	489(98.6)	443(95.3)
Not natural	29(3.0)	7(1.4)	22(4.7)
Total	961(100)	496(100)	465(100)
Flood as human induced disaster			
Human induced	881(91.7)	449(90.5)	432(92.9)
Not human induced	80(8.3)	47(9.5)	33(7.1)
Total	961(100)	496(100)	465(100)
Flood as act of God			
Act of God	196(20.4)	81(16.3)	85(18.3)
Not act of God	765(79.6)	415(83.7)	380(81.7)
Total	961(100)	496(100)	465(100)
Other caused of flood			
Others	1(0.1)	1(0.1)	0(0)
Natural, Human and Act of God	960(99.9)	495(99.9)	465(100)
Total	961(100)	496(100)	465(100)
Human induced vulnerability			
Property in hazard prone area	891(58.3)	459(65.0)	432(52.6)
Improper planning or design	863(56.5)	537(76.1)	326(39.7)
Inadequacy of laws and policies	797(52.2)	440(62.3)	357(43.4)

Source: Field survey, 2011.

As opined by Blaikie *et al* (1994) and Wu, *et al* (2002), vulnerability conditions are rooted in historical, cultural, social and economic processes that impinge on individual's or society's ability to cope with disasters and to respond to them. This assertion was buttressed when the respondents were asked the reasons why they were still living in the house or locality despite the occurrence of flood. As highlighted in Table 7.4, 6.7% (64) of the respondents 6.0% (30) in LM and 7.3% (34) in LS submitted that nearness to place of work influenced their decision to stay, 10.8% had cheap rent, 8.6% (43) in LM and 13.2% (61) in LS as factor influencing their decision to inhabit flood prone localities. One hundred and seventeen representing 12.2%, 10.8% (54) in LM and 13.5% (63) in LS submitted that the houses vulnerable to flood they were inhabiting were either to include family or personal house, while 69.7% gave reasons ranging from affinity to the neighbourhood, no alternative accommodation, nearness to place of worship among others. This is disaggregated into 74.4% (369) in LM and 66.0% (307) in LS

As precarious as the vulnerability attributes of the respondents were, only 7.6% of them had witnessed measured and interventions by government agencies to prevent and mitigate flooding. The interventions include: demolition of building on floodplain, clearing of silted drains, repair of roads and construction of drainage by the community or government, aimed at combating the menace of flood. About Ninety-three per cent of them had been living with the flood hazard without any measure either by government or community to ameliorate the vulnerability components of the inhabitants and the general environment. Similarly, while some of the respondents said that flood could not be mitigated, others gave a list of what could be done to prevent the reoccurrence of flood in their neighbourhoods to include: demolition/relocation of building from the floodplain 0.9% (13); 91.5% (877) break up into 92.3% (458) in LM and 90.1% (419) in LS affirmed that construction of functional drainage network would help to prevent flood and 4.3% (40) of the respondents, 3.6% (18) in LM and 4.7% (22) in LS voted for non-structural planning methods through development control and functional management of the environment such as: flood plain zoning, flood plain building code and flood plain buyout programme to prevent the reoccurrence of flood.

Table 7.4 Respondents' reasons for residing in flood prone area and mitigation strategies

Items	All respondents	Lagos mainland	Lagos suburb
Reasons for tenancy			
Nearness to place of work	64(6.6)	30(4.2)	34(4.1)
Cheaper rent	104(10.8)	43(6.1)	61(7.4)
Family house	90(9.3)	34(4.8)	56(6.8)
Personal house	27(2.8)	20(2.8)	7(0.2)
others (religion, no alternative)	676(70.3)	369(74.4)	307(66.0)
Total	961(100)	496(100)	465(100)
Measures to combat flood			
Available measures	73(7.6)	42(8.5)	31(6.7)
No measure	888(92.4)	454(91.5)	434(93.3)
Total	961(100)	496(100)	465(100)
Prevent the reoccurrence			
cannot be prevented	31(3.3)	12(2.5)	19(4.1)
property relocation	13(0.9)	8(1.6)	5(1.1)
adequate drainage network	877(91.5)	458(92.3)	419(90,1)
Planning and management	40(4.3)	18(3.6)	22(4.7)
Total	961(100)	496(100)	465(100)

Source: Field survey, 2011.

Plate 7.1 Flood inundated Apapa – Oshodi Express way

Source: Field survey, 2011.

7.4 Fire hazard

It is noted that the four elements that shape cities in the world are: water, air, land and fire. Destructive as it may be, fire has been a fundamental force in determining the form of cities and the way buildings should be arranged within the cities. For instance, today's modern city building codes and zoning ordinances contain regulations to prevent fire and control its spread (Ramroth, 2007). However, in the study area, a good representation of fire situation in the country, incidence of fire would hardly contribute to the improvement and or adherence to building codes to prevent the outbreak or minimize its impact. The analysis from response on fire outbreaks is given in Table 7.5.

Table 7.5 shows that 6.2% (94) of the respondents, 6.7% (47) in LM and 5.7% (47) in LS had witnessed fire outbreak in their neighbourhoods while 93.8% (1434), 93.3% (659) in LM and 94.3% (775) in LS had no prior experience of fire outbreak. Almost 10% (9) of such outbreaks occurred in the houses they were residing in, 13.8% (13) occurred in close proximity, while 76.6% (72) of the fire outbreaks occurred within the localities or neighbourhoods where the respondents resided. The causes of fire in the study area were classified into two: human mistakes and natural occurrence. The human mistake which accounted for 62.8% (59) and include: mishandling of fire or electrical appliances, careless handling of combustible materials especially in the kitchens, power surge/high voltage from the Power Holding Company of Nigeria (PHCN), faulty power generating sets, improper planning or design, inappropriate and or fake building materials and building in close proximity to one another. The natural causes represented 37.2% (35) was seen as fire outbreak induced by mostly lightening. In addition to this, the frequency of occurrence of fire outbreaks over the years was given as once 42.6% (40), twice 8.5% (8) and more than twice 48.9% (46). Also from Table 7.5, only 6.6% (101) could recall measures by either the community or government to combat fire outbreaks, 87.2% (1332) did not know of any measure while the remaining 6.2% (95) of the respondents did not respond to the question.

Table 7.5 Perception of respondents on fire hazard

Items	All respondents	Lagos mainland	Lagos suburb
Occurrence of fire-outbreak			
It has occurred	94(6.2)	47(6.7)	47(5.7)
Not occurred	1434(93.8)	659(93.3)	775(94.3)
Total	1528(100)	706(100)	822(100)
Location of occurrence			
My house/environment	9(9.6)	6(12.8)	3(6.4)
Close building/proximity	13(13.8)	0(0)	13(27.7)
In the neighbourhood	72(76.6)	41(87.2)	31(65.9)
Total	94(100)	47(100)	47(100)
Frequency of occurrence?			
Once	40(42.6)	14(29.8)	26(55.3)
Twice	8(8.5)	5(10.6)	3(6.4)
More than twice	46(48.9)	28(59.6)	18(38.3)
Total	94(100)	47(100)	47(100)
Causes of the fire-out breaks			
Human mistakes	59(62.8)	37(78.7)	22(46.8)
Natural occurrence (lightening)	35(37.2)	10(21.3)	25(53.2)
Total	94(100)	47(100)	47(100)
Measures to combat fire			
Fire extinguisher, fire service	101(6.6)	67(9.5)	34(4.1)
No measure	1332(87.2)	607(86.0)	725(88.2)
No response	95(6.2)	32(4.5)	63(7.7)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

Analyzing the vulnerability attributes of the respondents to fire outbreak, as shown in Table 7.6, 13.5% (207) of the respondents, 13.2% (93) in LM and 13.9% (114) in LS agreed that their houses were vulnerable to fire outbreak while 86.5% (1321) of them, 86.8% (613) in LM and 86.1% (708) in LS did not agree. The response to fire outbreak, outside the day-to-day public awareness on preventive measure through the mass media, is usually the establishment of Fire Service Stations. By law, each of the 774 Local Government Areas in Nigeria is expected to establish at least a fire station. Table 7.6 reveals that the established Fire Service Stations were in close proximity to most of the respondents. Ninety one per cent (1389) of the houses enumerated, 87.3% (616) in LM and 94.0% (773) in LS have Fire Stations located between 0 – 2km away from them. Within 2 to 4km from Fire Service Stations were represented by 8.3% (127) with 12.3% (87) in LM and 4.9% (40) in LS. 0.8% (12) of the houses has the Fire Service Stations located outside 4km radius from the respondents' buildings.

However, in terms of response time to fire incidence, 93.8% (1434) disaggregated into 92.2% (651) in LM and 94.3% (775) in LS affirmed that the response rate/time was slow, 4.2% (63) submitted that the response time was appropriate while 2.5% (39) of the respondents, 4.3% (30) in LM and 1.1% (9) in LS were indifference to the response time. According to them, the response time was not an issue but what was done after the arrival of the Fire Service was more important than speed of arrival at the fire scene. Comparing the response time to what is obtainable in, for instance, Israel with international acclaimed proactive policy and structure on emergency response capacity, Lagos state and to a larger extent, the country still has a long way to go. In Israel, it had been empirically tested that response time to any emergency had always been less than 4 minutes. The country is further working fervently to reduce the response time to less than 2 minutes of any emergency incident. This is achievable through the principle of neighbourhood emergency response plan. In every neighbourhood, there is a specially trained Emergency Response Term (ERT) equipped emergency response vehicle to provide the minimum level of response to save lives and protects properties immediately an emergency occurred.

In Nigeria, according to the National Emergency Management Agency (NEMA) (2010), the average response time to fire emergency ranges between 1 – 4 hours. This is due mainly to the chaotic nature of the Nigerian roads and inaccessibility of most of the informal settlements where significant percentage of fire outbreak occurred.

However, from the interview conducted with the Lagos State Fire Services, the respondent claimed that most of the responses to fire outbreaks in the State were more of rescue call rather than actual call to put-off fire outbreak. Thus, Fire Services are called when fire outbreak has overwhelmed the capacity of the local volunteers to control it. By that time, the impact of the fire would have escalated beyond the ability of Fire Services.

From the percentage of those that agreed that their houses were vulnerable to fire outbreak as shown in Table 7.6, 36.2% (75) classified into 30.5% (29) in LM and 41.1% (46) in LS submitted that nearness to work places informed the continuation of their tenancy in the houses, 28.5% (59) of the respondents, 34.7% (33) in LM and 23.2% (26) in LS represented those that chose cheaper rent; family and or personal houses were represented by 22.7% (47) with 22.1% (21) in LM and 23.2% (26) in LS. The remaining 12.6% (26) of the respondent chose a combination of stated factors as determinant of their residency in areas vulnerable to fire outbreak.

Table 7.6: Respondents' response to fire outbreak

Items	All respondents	Lagos mainland	Lagos suburb
Vulnerability to fire hazard?			
Vulnerable	207(13.5)	93(13.2)	114(13.9)
Not vulnerable	1321(86.5)	613(86.8)	708(86.1)
Total	1528(100)	706(100)	822(100)
Distance to Fire Stations			
0 – 2000 metres	1389(90.9)	616(87.3)	773(94.0)
2001 – 4000 metres	127(8.3)	87(12.3)	40(4.9)
4001 metres and above	12(0.8)	3(0.4)	9(1.1)
Total	1528(100)	706(100)	822(100)
Response time			
Slow	1426(93.3)	651(92.2)	775(94.3)
Fast	63(4.2)	25(3.5)	38(4.6)
Indifference	39(2.5)	30(4.3)	9(1.1)
Total	1528(100)	706(100)	822(100)
Reasons continued tenancy			
Nearness to place of work	75(36.2)	29(30.5)	46(41.1)
Cheaper rent	59(28.5)	33(34.7)	26(23.2)
Family house	28(13.5)	11(11.6)	17(15.2)
Personal house	19(9.2)	10(10.5)	9(8.0)
Others: religious, no alternative	26(12.5)	10(10.8)	16(14.0)
Total	207(100)	93(100)	114(100)
Fire-outbreak be prevented			
Handling combustible items	371(24.3)	191(27.1)	180(21.9)
Switched off appliances	347(22.7)	152(21.5)	195(23.7)
Using fire-resistant material	379(24.8)	138(19.4)	241(29.3)
Better design of infrastructure	212(13.9)	96(13.6)	116(14.1)
Adherence of building code	219(14.3)	129(18.3)	90(10.9)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

Plate 7.2 Fire disaster at Euroasia Plaza, 10/12 Breadfruit Street, Lagos

Source: NEMA, 2012

Plate 7.3: Newly procured fire tender vehicles and equipment by Lagos State Government

Source: Lagos State Fire Services, 2012

Table 7.7: Recorded fire outbreaks and number of deaths and properties affected in Lagos State (2008 – June 2012)

No	Location of buildings	Local Government	Number of lives and properties affected	Date of incidence
1	Ladejobi Street, College Road, Ijora Badia	Lagos Mainland	1 Building	21st January, 2008
2	34 Road, 3rd Avenue, Gowon Estate	Alimosho	1 Building	21st January, 2008
3	17, Olu Aina Street	Mushin	1 Person Dead and a Building Burnt	6th April, 2008
4	Alarape Market, Bajulaiye	Shomolu	25 shops	8th April, 2008
5	59, Owodunni Street, Palm Groove	Shomolu	3 Buildings	27th April, 2008
6	Agric Bus Stop, Lagos Road	Ikorodu	1 Person Dead, 16 Injured, 7 Vehicles and I Motorcycle Burnt	3rd May, 2008
7	Ojelade Street, Off Ikorodu Road, Fadeyi	Mushin	3 Buildings and 31 Vehicles	7th May, 2008
8	Park E, Nigerian Railway Corporation	Lagos Mainland	7 Persons Dead and a Building Burnt	28th June, 2009
9	341, Oloko Crescent, Ogba	Ikeja	1 Person Dead and a Building Burnt	30th May, 2009
10	Olososun Bus Stop, Kudirat Abiola Way, Oregun	Ikeja	3 Persons Dead, 10 Injured and 3 Vehicles Burnt	3rd July, 2009
11	113, Isolo Road Ikotun Egbe	Alimosho	2 Persons Dead a Building and Motorcycle Burnt	25th July, 2009
12	Afprint Plc, Mile 2, Oshodi Express Way	Oshodi – Isolo	10 Persons Dead, 4 Injured and Buildings Burnt	5th Sept, 2009
13	Alinson Close, Agric, Ikorodu	Ikorodu	2 Persons Dead and a Building Burnt	22nd Dec., 2009
14	Shogunle Bus Stop, Shogunle	Oshodi – Isolo	1 Person Dead and 3 Vehicles Burnt	19th Feb. 2010
15	9, Oloje Street, Papa Ajao	Mushin	5 Persons Dead and a Building Burnt	5th May, 2010
16	Near Phoenix Steel Ltd, Ogijo	Ikorodu	3 Persons Dead, a Vehicle and 3 Motorcycles Burnt	11th May, 2010
17	Bola Ahmed International Truck Terminal Sari-Iganmu	Apapa	8 Tankers	25th May, 2010
18	B Close, 21 Road, FESTAC Town	Amuwo - Odofin	2 Persons Dead	31st May, 2010

19	Lagos Ibadan Express Way Close to Otedola Housing Estate	Kosofe	25 Persons Dead and 21 Vehicles Burnt	15th August, 2010
20	Mowo Bus Stop, Ikoga, Badagry	Badagry	1 Person Dead and a Vehicle Burnt	5th Sept, 2010
21	17, Owokoniran Street, Ijegun-Egba, Satellite Town	Amuwo – Odofin	2 Person Dead and a Building Burnt	15th April, 2011
22	Yaba Access Bridge, Jibowu	Lagos Mainland	3 Persons Dead, 13 Injured and 4 Vehicles Burnt	21st April, 2011
23	43, Orile Iganmu	Apapa	2 Person Dead and a Building Burnt	22nd July, 2011
24	Durojaiye Street, Off Sowemimo Street, Ajangbadi Road, Okokomaiko	Ojo	2 Person Dead and a building Burnt	8th August, 2011
25	1A, Ade Omoruibi Street, Off Ayetoro Street, Aguda, Surulere	Surulere	2 Person Dead and a Building Burnt	26th August, 2011
26	44, Ijaiye Street, Off Olayinka Street, Apapa	Apapa	2 Person Dead and a Building Burnt	14th October, 2011
27	86, Dagbolu Street, Idi-Iroko Bus Stop, Ogolonto	Ikorodu	3 Person Dead and a Building Burnt	7th December, 2011
28	Apapa – Oshodi Express Way, Mile 2	Oshodi – Isolo	2 Person Dead, a Vehicle and Motorcycle Burnt	17th January, 2012
29	Mile 2 Garage Mile 2	Oshodi – Isolo	3 Persons Dead and 39 Vehicles Burnt	17th February, 2012
30	6A, Fasasi Street, Ashapo, Olodi Apapa	Apapa	2 persons Dead and a Building Burnt	21st March, 2012
31	12/14 Olanuji/Popoola Street, Toyin, Iju Ishaga	Ifako-Ijaiye	168 Persons Dead, 12 Injured, a Aircraft, 3 Buildings Burnt	3rd June, 2012
32	44B, Central Mosque Street, Ikota Town, Ajah	Eti – Osa	2 Person Dead and a Building Burnt	5th June, 2012

Source: Lagos State Fire and Safety Services, 2012

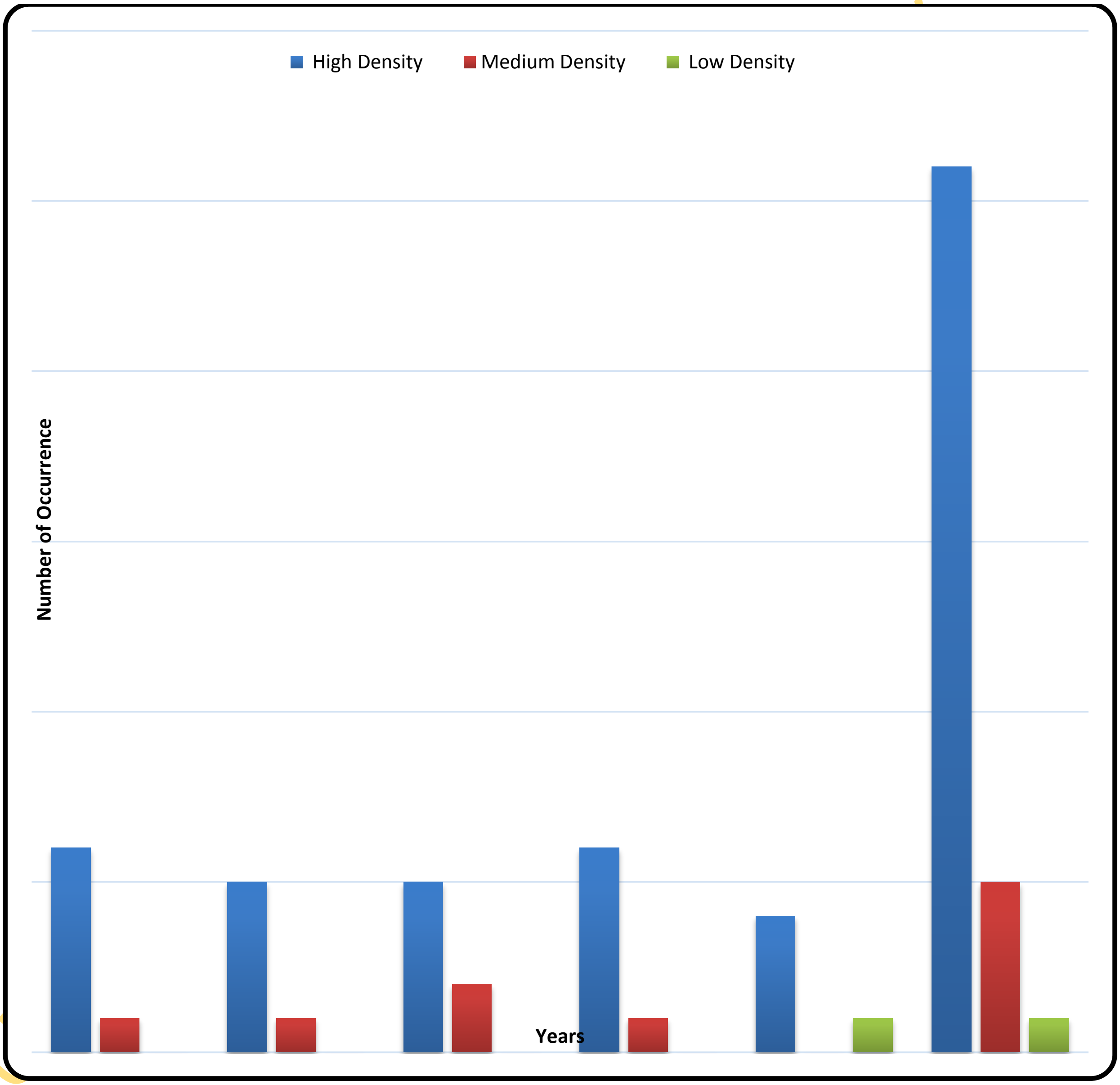

Figure 7.1 Analysis of recorded fire outbreaks in neighbourhoods 2008 – 2012

Source: Derived from Table 7.7

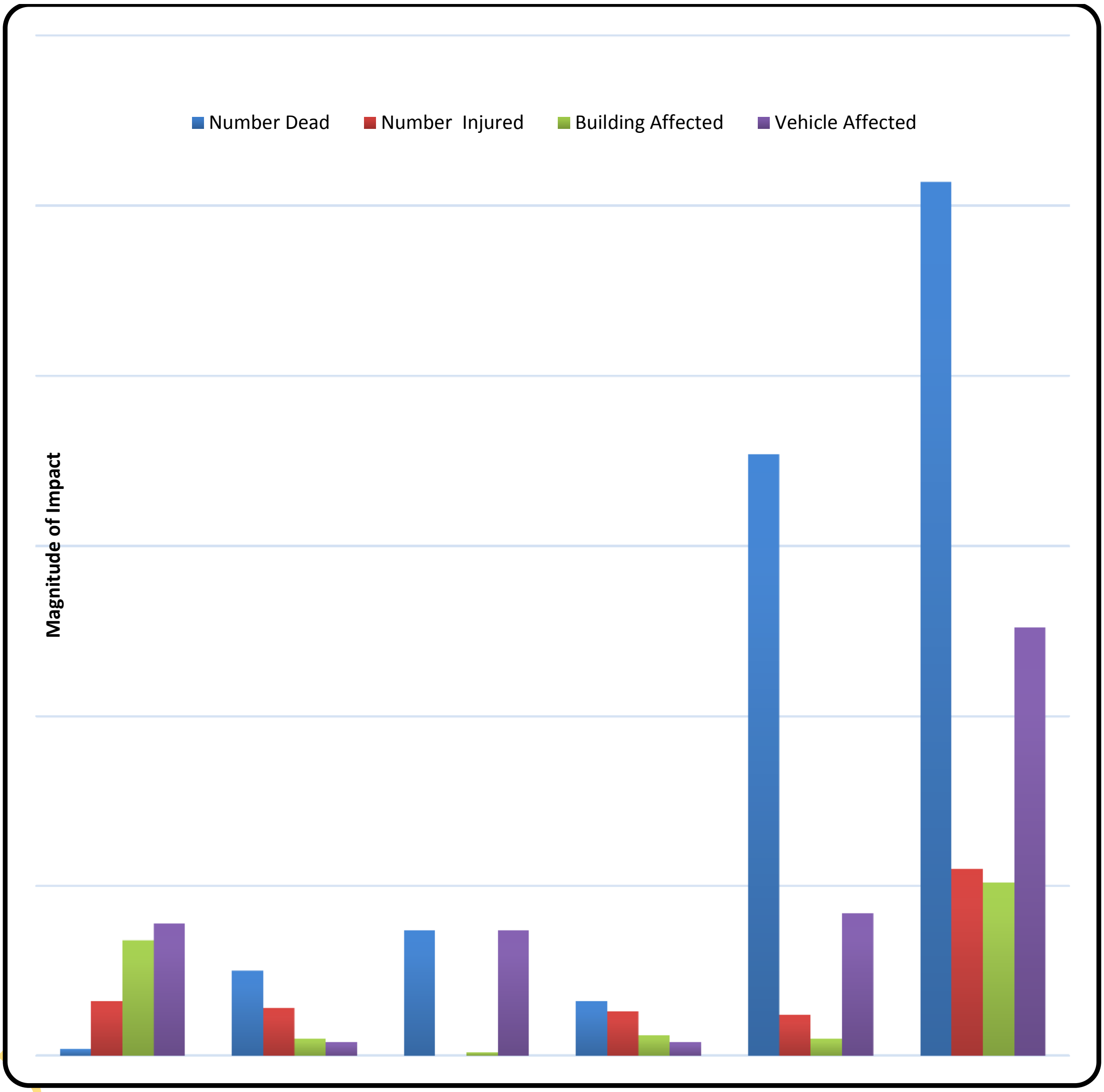

Figure 7.2 Analysis of fire outbreak and impact

Source: Derived from Table 7.7

From the available data from the Lagos State Fire Services, 32 cases of fire outbreaks have been recorded from 2008 to June 2012. It is important to note that the Lagos State Fire Services started systematic data recording with the establishment of Lagos State Emergency Management Agency (LASEMA) in 2008. As shown in Table 7.7 and Figure 7.1, in terms of spatial distribution of fire outbreaks, the frequency of occurrence, in the years under review, is highest in the high density neighbourhoods which accounted for 81.3% of the incidence, the occurrence at the medium density neighbourhoods represented 15.6% while the low density neighbourhood only recorded 3.1% incidence of fire outbreak. Figure 7.2 shows the impact of fire outbreak in Lagos State. Inferring from the Figure, averagely per year, 52 persons have died, 11 persons injured, 10 buildings and 25 vehicles were burnt from fire related incidences since 2008.

7.5 Building collapse

Structural disasters are as old as the act of building itself. Architects and urban designers have learnt to build through trial and error. Over the centuries, there have been improvement but there is still much to learn (Ramroth, 2007). Structural failure in buildings, in broad terms, comes in various forms and degrees of severity; the worst of which is a collapse. Deterioration or decay, especially of vigour or usefulness of a building, can be categorized as a failure of some sort but a total loss of bearing strength resulting in a sudden breakdown, physical depletion and or falling apart is termed a collapse. Several causes of building failure had been attributed to either natural or man-induced phenomena. Human-induced phenomena consist of collapse borne out of human's negligence in areas such as soil type, building design and planning, foundation works, quality of building materials and quality of workmanship. All contractors are expected to consider all these points while laying the foundation of a building.

The challenge in most cases is the human error of poor monitoring of works on site. The cause of a building failure is unique to each building. Falobi, (2009), summarizes the various causes of building collapse to include: the quality of the blocks used, quality of concrete used, poor compaction and consolidation of foundation soil and weak soil. Other causes are factors such as greed, incompetence, corruption, poor planning, inadequate public awareness and education, and limited financial and technical resources while the existing Urban and Regional Planning Laws and Building Codes, meant to guide builders were rendered ineffective because of lack of political will to enforce same by the Town Planning Authorities.

A cursory look at Table 7.8 indicates that 6.3% (97) of the respondents had seen building collapse in their neighbourhoods while 93.7% (1431) had not witnessed it in their localities. The causes of the collapse included sub-standard and or inferior building materials accounting for 75.3% (73) of the causes, age of building as a factor influencing collapse was given by 14.4% (14) of the respondents while structural default, re-modification of building especially adding floors that the original structural capacity of the building could not withstand and building on floodplain accounted for 10.3% (10) of the causes. Furthermore, from the total respondents that had experienced building collapse, 55.7% (54) affirmed that it frequently occurred while 44.3% (43) did not agree to this. However, in terms of yearly frequency of occurrence, 26.8% (26) indicated that it occurred only once in a year, twice per year were represented by 16.5% (16), 12.4% (12) agreed that building collapsed more than twice in a year while 44.3% (43) stated that there was no definite pattern to the occurrence of building collapse in their neighbourhoods.

Also, from Table 7.8, only 6.4% (98) had heard of or witnessed any intervention by either the communities or government to curb and or prevent the occurrence of building collapse. However, to significantly reduce or eradicate the incidence of building collapse in the study area, the following suggestion were proffered by the respondents: 2.0% (31) highlighted retrofitting and reconstruction using standardized building materials; demolition of aged and or structural defective building (urban renewal) before they collapse were accounted for by 0.7% (11) of the respondents; 40.1% (612) submitted that eradication of quack in the building production industry would go a long way in eradicating incessant building collapse; adherence to the provisions of the building codes were represented by 3.4%; (52) supervision of building construction activities by relevant professionals constituted 28.4% (434) while monitoring and enforcing adherence to approved building plans were listed by 25.4% (388) of the respondents as measures to prevent building collapse. For effective disaster management, communities must be saddled with stronger role to reduce vulnerability to hazard. This would help in merging the disaster reduction strategies defined by policy makers with the needs and resources of the local community, where eventually the success and failures of disaster management activities will be tested (Yodmani, 2001).

Table 7.8 Perception of respondents on building collapse

Items	All Respondents	Lagos mainland	Lagos suburb
Building collapse in the locality			
Witness building collapse	97(6.3)	48(6.8)	49(6)
Has not witness building collapse	1431(93.7)	658(93.2)	773(94)
Total	1528(100)	706(100)	822(100)
Causes the collapse			
Materials used was substandard	73(75.3)	41(0.1)	32(0)
The building is too old	14(14.4)	10(0.6)	4(0.6)
Others (default, modification)	10(10.3)	4(1.3)	6(0.6)
Total	97(100)	48(100)	49(100)
Frequency of building collapse			
Frequently	54(55.7)	33(68.8)	21(42.9)
Not frequent	43(44.3)	15(31.2)	28(57.1)
Total	97(100)	48(100)	49(100)
Frequency of occurrence yearly			
Once	26(26.8)	11(22.9)	15(30.6)
Twice	16(16.5)	8(16.7)	8(16.3)
More than twice	12(12.4)	10(20.8)	2(4.1)
Occurred with no definite pattern	43(44.3)	19(39.6)	24(49.0)
Total	97(100)	48(100)	49(100)
Existing measures/intervention			
Interventions have been done	98(6.4)	53(7.5)	45(5.5)
No intervention	1430(93.6)	653(92.5)	777(94.5)
Total	1528(100)	706(100)	822(100)
Curbing building collapse			
Retrofitting and reconstructions	31(2.0)	19(2.7)	12(1.6)
Demolition defective buildings	11(0.7)	7(1.0)	4(0.5)
Eradication of quacks	612(40.1)	381(54.0)	231(28.1)
Adherence to building code	52(3.4)	13(1.8)	39(4.7)
Supervision by professionals	434(28.4)	176(24.9)	258(31.4)
Adherence to approved plans	388(25.4)	110(15.6)	278(33.7)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

Also from Appendix II, out of 138 buildings that collapsed in Lagos State between 1978 to July 2013, 77.6% were residential buildings; commercial buildings accounted for 13.0% while the remaining 4.9% were institutional buildings and the remaining 4.5% collapsed buildings were used for religious purposes. In terms of spatial distribution of the collapsed buildings, the occurrences of building collapse were highest in high density low income neighbourhood. Thus, as indicated in Table 7.9, out of the recorded cases of building collapse incidences in Lagos State, 62.3% (86) occurred in low income neighbourhood, 29.2% (40) occurred in medium income neighbourhoods while 8.5% (12) occurred in high income district. In relation to urban dynamics, it could be deduced that as the population of the study area increases, the number of collapsed buildings increases. For instance, the numbers of recorded collapsed buildings from 1978 – 1990, 1991 – 2000 and 2001 – June 2012 were 31, 38 and 63 respectively. From this analysis, it could be inferred that as population increases, the carrying capacity, the standard of building materials used and expected time for completion were compromised leading to increasing rate of building collapse.

It is must be stated that every incidence is unique and must so be treated by adopting unique approach and thorough investigation to discover hidden causative factors for each occurrence. That structural defects have accounted for greatest number of collapses requires further investigation to ascertain the remote causes of such defects. High occurrences of collapsed buildings in Lagos Island, Surulere, and Lagos Mainland Local Government Areas of the metropolis should not be treated as mere coincidence; they were swampy, sand-filled, and reclaimed terrains close to the Lagoon. As noted by Oni (2010) detailed study of the geophysical characteristics of the soils in all locations of the study area must be carried out urgently to establish their compositions and appropriate measures taken if the seemingly stunning prediction in this study is to be averted

Table 7.9 Analysis of recorded building collapse by residential neighbourhoods

Year	High density	Medium density	Low density	Yearly frequency of collapse
1983	2	1	0	3
1984	0	1	0	1
1985	4	2	1	7
1986	2	3	0	5
1987	6	1	0	7
1988	0	0	0	0
1989	2	2	0	4
1990	3	0	0	3
1991	0	1	1	2
1992	2	1	0	3
1993	1	0	0	1
1994	5	0	0	5
1995	2	5	1	8
1996	2	1	0	3
1997	0	0	0	0
1998	1	1	0	2
1999	3	1	1	5
2000	5	3	1	9
2001	5	0	0	5
2002	6	2	1	9
2003	5	3	0	8
2004	2	1	0	3
2005	2	4	0	6
2006	9	3	2	14
2007	1	0	0	1
2008	4	1	1	6
2009	2	1	1	4
2010	1	1	1	3
2011	2	0	0	2
2012	3	1	0	4
2013	2	1	1	4
Total	**86**	**40**	**12**	**138**

Source: Derived from Appendix II

Plate 7.4 Collapsed residential building at Jakande Estate, Oke Afa, Oshodi Isolo, LGA.
Source: NEMA, 2012

The third hypothesis was analysed using analysis of variance (ANOVA) technique. The hypothesis states as follows: occurrence of disasters differs significantly between residential neighbourhoods. The ANOVA technique compared outcome measurement (means) between multiple groups. These observed differences are represented by F Statistic. After ensuring that the assumptions of ANOVA were satisfied (independence of data and approximation of normal distribution for the sampled population) the data set for fire outbreak and building collapse contained in Tables 7.7 and Table 7.9 were analysed focusing on three groups – low, medium and high densities residential neighbourhoods

The means and standard deviations for the fire outbreak and building collapse are shown in Table 7.10. The between and within sample sum of squares as well as appropriate degrees of freedom are shown in Table 7.10. From the Table of F distribution, the residual degrees of freedom for fire outbreak and building collapse give a value of 5.79 at 5% level. The calculated F for fire outbreak and building collapse were 77.29 and 17.88 respectively (Table 7.11). Consequently, the hypothesis which states that occurrence of disasters differs significantly between residential neighbourhoods is accepted.

Table 7.10 Fire outbreak and building collapse descriptive

	N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Fire outbreak descriptive								
High	5	5.20	.837	.374	4.16	6.24	4	6
Medium	5	1.00	.707	.316	.12	1.88	0	2
Low	5	.20	.447	.200	-.36	.76	0	1
Total	15	2.13	2.356	.608	.83	3.44	0	6
Building collapse descriptive								
High	29	2.72	2.170	.403	1.90	3.55	0	9
Medium	29	1.34	1.317	.245	.84	1.85	0	5
Low	29	.38	.561	.104	.17	.59	0	2
Total	87	1.48	1.771	.190	1.11	1.86	0	9

Source: Computed from Tables 7.7 and 7.9

Table 7.11 Fire outbreak and building collapse ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Fire outbreak					
Between Groups	72.133	2	36.067	77.286	0.000
Within Groups	5.600	12	.467		
Total	77.733	14			
Building Collapse					
Between Groups	80.552	2	40.276	17.884	0.000
Within Groups	189.172	84	2.252		
Total	269.724	86			

Source: Computed from Table 7.10

Sequel to the initial analysis of variance, however, it is important to determine whether any two groups within the analysis are similar or different. The examination of differences between pairs of groups after the global ANOVA analysis is called Post Hoc Analysis (least significant differences). In this study, the Tukey's Honestly Significant Difference was used to determine the minimum difference between the means of interest. From Table 7.12 the difference between the means of low and medium densities, low and high densities and medium and high densities residential neighbourhoods are greater than the least significant differences. The study concludes that the difference in mean ranks for building collapse and fire outbreak in the residential neighbourhoods differ significantly in virtue at 5% level

Table 7.12 Least significant difference (multiple comparisons) for building collapse and fire outbreak

					95% Confidence Interval	
(I) Density	(J) Density	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
High	Medium	4.200*	.432	.000	3.26	5.14
	Low	5.000*	.432	.000	4.06	5.94
Medium	High	-4.200*	.432	.000	-5.14	-3.26
	Low	.800	.432	.089	-.14	1.74
Low	High	-5.000*	.432	.000	-5.94	-4.06
	Medium	-.800	.432	.089	-1.74	.14
Fire outbreak						
High	Medium	1.379*	.394	.001	.60	2.16
	Low	2.345*	.394	.000	1.56	3.13
Medium	High	-1.379*	.394	.001	-2.16	-.60
	Low	.966*	.394	.016	.18	1.75
Low	High	-2.345*	.394	.000	-3.13	-1.56
	Medium	-.966*	.394	.016	-1.75	-.18

*. The mean difference is significant at the 0.05 level.

Source: Computed from Table 7.10

7.6 Biophysical hazards: Disease epidemics

As opined by Smith (2004), biophysical hazard covers a wide spectrum of environmental risk created by interactions between the geophysical environment and biological organisms, including humans. In many developing countries, human disease is the most common and also the most deadly environmental hazard. However, in Africa, several hazards underlie biophysical disasters with the most common being epidemics, mainly vector-borne (particularly malaria) and communicable diseases (mainly HIV/AIDS). The OFDA/CRED International Disaster Database (EM-DAT 2003) show that from 1975 to 2002, epidemics accounted for 32% of the disaster occurrences in Africa, followed by flood (27%), drought (21%) and windstorm (9%). Other disasters were: insect infestation, famine, earthquake, landslide, wildfire, volcano, and, extreme temperature.

Over the years, as noted by Nuhu (2012), epidemics had killed more persons than other disaster agents in Nigeria. Epidemics of infectious disease are easily triggered when polluted floods water contaminate drinking water supplies or destroy sewerage systems. It is important to note that according to the 1948 Universal Declaration of Human Right, everyone has the right to a standard of living adequate for the health and well-being of himself and of his family. Today, available evidence shows that in spite of overall progress in health field, good housing and healthy living elude billions of people (Agbola, *et al* 2007). Hence, the great equation: "Medical Care Equal to Good Health" has been proved wrong. More often than not, availability of medical care does not necessarily boil down to better health care delivery. The best estimate is that the medical system (doctor, nurse, drug, equipment and hospital) affects about 10% of the usual indices for measuring health. These indices include: whether one lives at all (infant mortality), how well one lives (morbidity rate) and how long one lives (life expectancy). The remaining 90% is determined by factors over which the medical system has little or no control on. These factors include individual lifestyle, socio-economic conditions and physical environment.

As with other environmental hazards, the effective mitigation of diseases depend on replacing public apathy and emergency responses with a strategy aimed at long-term control and prevention. Such a strategy as noted by Smith (2004) has several key features that include surveillance, disease prevention, treatment and education. Table 7.13 indicates that only 5.2% (79) of the respondents, 4.1% (29) in LM and 6.1% (50)

had benefitted from health related policies, programmes and laws. A huge percentage of the respondents, represented by 94.8% (1449) disaggregated into 95.9% (677) in LM and 93.9% (772) in LS did not. Also, in terms of sanitation and other health regulations within individual households, 95.2% (1455) of the respondents, 94.1% (664) in LM and 96.2% (791) in LS were not aware of day-to-day personal hygiene principles that could positively enhanced healthy living as indicated in the Table.

Due to lack of information to proactively promote diseases surveillance, prevention, treatment and education, 72.9% (1114) of the respondents' households had suffered from one form of ailment or another. In listing the ailments; of the total number of households affected, 34.0% (379) had had cholera/diarrhoea, 37.4% (202) in LM and 30.9% (177) in LS; malaria accounted for 36.2% (403), 39.8% (216) in Lm and 32.7% (187) in LS; 22.8% (254) had typhoid break up into 18.4% (100) in Lm and 26.9% (154) in LS; measles (chicken and small pox) were represented by 7.0% (78) disaggregated into 4,4% (240 in LM and 9.5% (54) in LS. In furtherance to this, Table 7.13 highlights the rate and or frequency of occurrence of ailments. From the analysis, 4.9% (55) of the households interviewed, 5.0% (27) in LM and 4.9% (28) in LS experienced the ailment frequently; 61.5% (685) with 67.0% (363) in LM and 56.3% (322) in LS had it occasionally, while 33.6% (374) classified into 28.0% (152) in LM and 38.8% (222) in LS responded that the ailment did not have a definite pattern.

The high prevalence of diseases notwithstanding, the respondents gave reasons for the continuation of tenancy within the neighbourhoods to include: nearness to place of work represented by 5.6% (63) with 5.9% (32) in LM and 5.4% (31) in LS; cheaper rent accounted for 6.4% (71), 11.4% (62) in LM and 1.6% (9) in LS; family house and personal house were represented by 15.6% (173), 14.8% (80) in LM and 16.3% (93) in LS; no alternative accommodation accounted for 7.0% (78) with 5.4% (29) in LM and 8.5% (49) in LS while combination of all the listed reasons accounted for 65.4% (729) disaggregated into 62.5% (339) in LM and 68.2% (390) in LS as indicated in Table 7.13. The spread of disease in recent times has been facilitated by a general breakdown in public health operations and facilities. As noted by Arimah (2002), the implication of the pattern of development in the developing countries is hinged on assumed provision of basic infrastructural facilities and services. The pace of urbanization in these countries would pre-suppose an increase in the provision of infrastructures. This has not been the case as many cities lack the financial, political and institutional capacity to provide the most basic of the basic infrastructural facilities and services. The shortage is widely represented by inadequate supply of potable water, sanitation facilities and housing which contribute enormously to risk of ill health and degradation of the environment as shown in Table 7.13

Table 7.13 Perception of respondents on disease epidemics

Items	All respondents	Lagos mainland	Lagos suburb
Availability of health policies/laws			
Health related policy is available	79 (5.2)	29(4.1)	50(6.1)
Not available	1449(94.8)	677(95.9)	772(93.9)
Total	1528(100)	706(100)	822(100)
Sanitation or health regulations			
Regulation available	73(4.8)	42(5.9)	31(3.8)
Regulation not available	1455(95.2)	664(94.1)	791(96.2)
Total	1528(100)	706(100)	822(100)
Household members affected			
Affected by disease	1114(72.9)	542(76.4)	572(69.6)
Not affected by disease	414(27.1)	164(23.6)	250(30.4)
Total	1528(100)	706(100)	822(100)
List of diseases experienced			
Cholera/diarrhoea	379(34.0)	202(37.3)	177(21.5)
Malaria	403(36.2)	216(39.8)	187(22.7)
Typhoid	254(22.8)	100(18.5)	154(18.7)
Measles	78(7.0)	24(3.4)	54(6.6)
Total	1114(100)	542(100)	572(100)
Frequency of ailment occurrence			
Frequently	55(4.9)	27(3.8)	28(3.4)
Occasionally	685(61.5)	363(51.4)	322(39.2)
Does not follow a pattern	374(33.6)	152(44.8)	222(57.4)
Total	1114(100)	542(100)	572(100)
Reason for continuation tenancy			
Nearness to place of work	63(5.6)	32(6.1)	31(5.4)
Cheaper rent	71(6.4)	62(11.4)	9(1.6)
Family house	72(6.5)	40(7.4)	32(3.9)
Personal house	101(9.1)	39(7.2)	62(5.6)
No other alternative	78(7.0)	29(5.4)	49(8.6)
Others: religious, no alternative	729(65.4)	340(62.7)	389(68.0)
Total	1114(100)	542(100)	572(100)

Source: Field survey 2011

In the survey, as highlighted in Table 7.14, the reasons adduced to influence outbreak of diseases include: poor sanitation and blocking of drainage network represented by 27.0% (412), inadequate personal hygiene accounted for 4.3% (66), overcrowding was captured by 0.6% (9), poor general environmental conditions was seen by 27.4% (419) as causes of diseases while combinations of the listed caused were recorded by 40.7% (622) of the respondents. As opined by World Bank (2001), in African alone, malaria associated with standing water and clogged storm drains is responsible for about 800,000 deaths annually.

The conditions necessary for disease epidemics often exist before a pathogen is introduced into a suitable environment. A disease outbreak can be triggered by various events such as over-crowding and poor sanitation but the underlying pre-disposing factor is poverty (Smith 2004). Because the pre-conditions for disease epidemics abound in the study area, the respondents were asked to proffer prevention and mitigation strategies to combat future diseases outbreak. Their submission from Table 7.14 are given as improved personal hygiene was represented by 27.2% (416); improved sanitation accounted for 22.1% (337); reduction in the number of persons per room took 27.8% (425); frequent drainage clearing to enhance free flow of water also accounted for 12.7% (194). Other strategies which include combination of measures; adherence to planning law and building code; fumigation of disease vector breeding sites were recommended by 10.2% (156). It is important to note that for effective disease control, the government and the community has a lot to do. However, in the study area, only 7.9% (120) of the respondents had either heard or seen community and or government interventions to mitigate disease hazards through immunization, regular sanitation, enactment of health related environmental laws and establishment of diseases control agencies.

Table 7.14 Causes and measures to curb diseases outbreak

Items	All respondents	Lagos mainland	Lagos suburb
Main cause of disease outbreak			
Poor sanitation/blocked drains	412(27.0)	235(33.3)	177(21.5)
Inadequate hygiene conditions	66(4.3)	29(4.1)	37(4.5)
Overcrowding	9(0.6)	6(0.8)	3(0.4)
Environmental factors	419(27.4)	120(17.0)	299(36.4)
All of the listed causes	622(40.7)	316(44.8)	306(37.2)
Total	1528(100)	706(100)	822(100)
Strategies to mitigate outbreak			
Improved personal hygienic	416(27.2)	182(25.8)	234(28.5)
Improve sanitation	337(22.1)	163(23.0)	174(21.2)
Reduction in persons per room	425(27.8)	208(29.5)	217(26.4)
Frequent drainage clearance	194(12.7)	81(11.5)	113(13.7)
Adherence to planning laws	156(10.2)	72(10.2)	84(10.2)
Total	1528(100)	706(100)	822(100)
Measures to combat outbreak			
Immunization	4(0.3)	1(0.1)	3(0.4)
Regular sanitation	60(3.9)	23(3.3)	37(4.5)
Enactment of health related laws	1(0.1)	0(0.0)	1(0.1)
No response	1463(95.7)	682(96.6)	781(95.0)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

7.7 Hazards prevention and mitigation approaches

In the past, disasters were seen as “Act of God” (Zebrowski, 1997; Twigg, 2001; Smith, 2004). This perspective suggests that damaging events are divine punishment for moral misbehaviour, rather than the consequence of humans’ improper use and exploitation of the earth. This school of thought encouraged a general acceptance of disasters as external and inevitable events. However, by 1950 and till date, natural hazards analysis had undertaken a paradigm shift. Contemporary study sees disaster as physical phenomena linked to countless individuals’ decision to settle in and develop hazard-prone land. Thus, apparent paradox exists between relentless human progress and an increased feeling of insecurity. This is because economic development and environmental hazards are rooted in the same ongoing progress of change. As the world population grows, more people are exposed to hazard. As urbanization intensifies and spreads, more complex and expensive infrastructure can be damaged by extreme events. Also, as people and property become concentrated in large cities, the chance of very large-scale losses increases. These trends, underpinned by higher per-capital consumption, impose heavy burdens on precious natural assets, such as land, forest and water (Smith, 2004).

It is impossible to live in a hazard and or risk free environment. Therefore, in theory, the safest response to environmental disaster is to avoid all hazards. In practice, however, this is impossible largely due to the developmental pressure on land. From this development, as noted by Smith (2004), hazard reducing adjustments fall into three groups: Mitigation (modify the loss burden through disaster aid and insurance programme); protection (modify the event through structural measures in order to exert some control over the processes involved) and adaptation (modify human vulnerability). Adaptation, as non-structural response, promotes changes in human behaviour towards hazards and it also covers community preparedness programmes, forecasting and early warning schemes and land use planning. In Nigeria, a plethora of Ministries, Departments and Agencies (MDAs) are saddled with the responsibility of responding to disaster from the pre-disaster phase (risk assessment, prevention, mitigation, preparedness and emergency or contingency plans) to post-disaster phase (relief, rehabilitation, reconstruction and learning review). Table 7.15 highlights the institutional provision to reduce impact of disaster in Lagos State.

Inferring from Table 7.15, only 15.3% (234) of the respondents were aware of existing disaster management MDAs in the country while 84.7% (1294) were not aware of any. And of the total number of respondents that had heard about disaster management MDAs, 28.6% (67) gave the names of the MDAs as National Emergency Management Agency (NEMA), Nigerian Security and Civil Defense Corps (NSCDC) accounted for 0.4% (1), Federal Road Safety Corps (FRSC) was named by 9.8% (23), State Emergency Management Agencies (SEMAs) had 0.9% (2), Nigerian Red Cross Society (NRS) accounted for 15.4%, (36) while the remaining 44.9% (105) of the respondents could not name the responsible MDAs for emergency management in their localities. In addition, to the identification of MDAs with disaster management mandates, only 37.2% (87) of the respondents affirmed that the MDAs had done some activities (distribution of relief materials), relating to disaster management within their localities while 62.8% (147) submitted that the MDAs were largely inactive. The lack of visibility of most of the MDAs to disaster management is due largely to the failure on the part of the MDAs to build disaster management into their yearly budget. Thus, rather than been proactive in disaster management most of the MDAs are reactive, therefore, when disaster occurs there is less capacity, in terms of financial resource to respond speedily and adequately.

In terms of the MDAs efficiency and effectiveness in carrying out disaster management responsibility; 6.7% (102) of the respondents adjudged the MDAs as not efficient, 4.5% (69) submitted that they were fairly efficient; efficient and very efficient were represented by 3.5% (53) and 0.7% (10) respectively while 84.7% of the respondents were indifferent to the efficiency level of the MDAs. Furthermore, adjudging from Table 7.15 respondents' account of intervention from the MDAs during and after disasters; of the total number of persons affected, 66.3% (189) had received relief interventions while 33.7% (96) had not. The intervention received, as submitted by the respondents, were from individuals and community association 29.6% (56), NGOs 11.1% (21), Federal Government through NEMA 27.0% (51), State Government through LASEMA 22.2% (42), Local Governments 9.0% (17) and 1.1% (2) from foreign governments and international organizations.

From the analysis, it could be deduced that the local community's interventions in all disaster are always higher than other sources of intervention. This trend could only change when the host government declares a state of emergency as a result of disaster to pave way for foreign interventions. Foreign interventions are always huge and in most instances higher than what could be provided by the host community and government as corroborated by the India ocean tsunami of 2005 and the earthquake disaster in Haiti in 2010 with the resulting international assistance. The respondents concluded that, to reduce hazards and disasters in their localities individuals and community organization as represented by 56.9% (868) had to play important role; those that believed it was government responsibility were represented by 37.6% (575), NGOs accounted for 5.0% (77) while international organizations accounted for 0.5% (2).

Table 7.15 Institutionalisation of disaster management

Items	All respondents	Lagos mainland	Lagos suburb
Disasters management agency			
Aware of management agencies	234(15.3)	114(16.1)	120(14.6)
Not aware of any	1294(84.7)	592(83.9)	702(85.4)
Total	1528(100)	706(100)	822(100)
Name of the agency			
NEMA	67(28.6)	38(33.3)	29(24.2)
NSCDC	1(0.4)	0(0)	1(0.8)
FRSC	23(9.8)	8(7.0)	15(12.5)
LASEMA	2(0.9)	1(0.9)	1(0.8)
Nigerian Red Cross Society	36(15.4)	12(10.5)	24(20.0)
Could not Name Them	105(44.9)	55(48.2)	50(41.7)
Total	234(100)	114(100)	120(100)
disasters managed			
Agencies have intervened	87(37.2)	54(47.4)	33(27.5)
Agencies have not intervened	147(62.8)	60(52.6)	87(72.5)
Total	234(100)	114(100)	120(100)
Efficient/effective of agency			
Very efficient	10(0.7)	4(0.6)	6(0.7)
Average efficiency	69(4.5)	35(5)	34(4.1)
Efficient	53(3.5)	23(3.3)	30(3.6)
Not efficient	102(6.7)	52(7.4)	50(6.1)
Indifference	1294(84.7)	592(83.9)	702(85.4)
Total	1528(100)	706(100)	822(100)
Types of response			
Distribution of relief materials	163(66.3)	75(65.8)	88(73.3)
No support	71(33.7)	39(34.2)	32(26.7)
Total	234(100)	114(100)	120(100)
List of organization			
Individuals/residents and CBOs	56(23.9)	27(23.7)	19(15.8)
NGOs	21(8.8)	12(10.5)	9(7.5)
Federal Government of Nigeria	75(32.1)	31(27.2)	44(36.6)
State Government	63(26.9)	22(19.3)	41(34.2)
L.G.A	17(7.3)	12(10.5)	5(4.2)
International Organization	2(0.9)	0(0)	2(1.7)
Total	234(100)	114(100)	120(100)
Stakeholders in prevention			
Individuals	782(51.1)	364(51.6)	418(50.9)
Community organization	88(5.8)	41(5.8)	47(5.7)
Government disaster agencies	575(37.6)	237(33.6)	338(41.1)
NGOs	77(5.0)	63(8.9)	14(1.7)
International organization	6(0.5)	1(0.1)	5(0.6)
Total	1528(100)	706(100)	822(100)

Source: Field survey, 2011.

7.8 Conclusion

The chapter highlighted vulnerability to flood, fire outbreak, building collapse and disease epidemic. Gleaning from the analysis, it was observed that all residential neighbourhoods are vulnerable to disasters but the degree differs Thus It is important to note that vulnerability to disaster is a function of capacity to anticipate, cope with, resist and recover from the impact of hazard. Consequently households with means of production (land, capital and labour) and specialized skills as characterized by low density neighbourhoods are the most resilient when disaster strikes. Also, the Chapter revealed that out of 32 cases of fire outbreaks recorded from 2008 high density neighbourhoods accounted for 81.3% the medium density neighbourhoods represented 15.6% while the low density neighbourhood only recorded. For building collapse incidence from 1970s to 2012, 132 cases have been recorded. Out of the recorded cases, 62.3% occurred in low income neighbourhood, 29.2% occurred in medium income neighbourhoods while 8.5% occurred in high income district.

The third hypothesis was analysed using analysis of variance (ANOVA) technique. The hypothesis states as follows: occurrence of disasters differs significantly between residential neighbourhoods. The calculated F for fire outbreak and building collapse were 77.29 and 17.88 respectively. Consequently, the hypothesis which states that occurrence of disasters differs significantly between residential neighbourhoods is accepted.

It is impossible to live in a hazard and or disaster free environment due to the developmental pressure on land. Therefore, the next chapter documents the plans, programmes and activities of the institutionalized disaster management agencies in Nigeria and Lagos State with a view to examine their effectiveness in disaster management in the study area.

CHAPTER EIGHT

DISASTER MANAGEMENT INSTITUTIONS IN LAGOS STATE

8.1 Introduction

Prior to the establishment of the National Emergency Management Agency, institutional response to disaster in Nigeria dated back to 1906 when the Fire Brigade (now Federal Fire Services) was established. The Fire Brigade functions were beyond fire-fighting to saving of lives, property and provision of humanitarian services during emergencies. Between 1972 and 1973, Nigeria experienced a devastating drought with socio-economic consequences including loss of lives and property worth millions of Naira. This made it important for the Government to consider a response body to take care of disaster issues. Thus, the National Emergency Relief Agency (NERA) was established by Act 48 of 1976. NERA was charged with the task of collecting and distributing relief materials to persons affected by disaster. However, the function of NERA with regards to Disaster Management was very limited due to its scope.

To address the narrow scope of NERA, in November 1997, a national workshop was organized involving major stakeholders in disaster management in Nigeria including oil companies, construction companies, Government and non-governmental organizations and representatives of the United Nations Development Programme (UNDP). A communiqué issued at the end of the workshop triggered a paradigm shift that stressed the need for restructuring NERA from purely relief activities to total management of disasters in the country. The acceptance of this recommendation led to the establishment of the National Emergency Management Agency by the Federal Government in 1999 to manage disaster in all ramifications in Nigeria.

The focus of this section is to x-ray disaster management institutions in Nigeria and Lagos State using Disaster Risk Reduction (DRR) and Capacity Assessment (CA). The DRR and CA are adopted to identify high points, gaps and challenges the nation and Lagos State is facing preventing, mitigating and reducing in natural and man-induced disasters. The assessment is entrenched in the Hyogo Framework for Action (HFA) 2005 – 2015, could be seen as opportunity to clearly identify existing capacities both at national and state levels, to understand desired capacities, and to propose recommendations on how they can be further developed and strengthened for effective and proactive disaster management in Lagos State.

8.2 Institutional framework

The significance of institutional framework in projecting into the future in disaster abatement is crucial. The federal government has established several ministries, agencies and parastatals with specific purpose in addition to the existing disaster networks like non-governmental organisations, private concern and international bodies. However, one of the key successes made by the Federal Government of Nigeria and Lagos State Government to address disaster management issues in the country and at the State level is the creation of NEMA and Lagos State Emergency Management Agency (LASEMA). NEMA was established by Act 12 as amended by Act 50 of 1999. Currently, with a staff strength of 496 (2012 nominal-roll), NEMA is saddled with the mandate of managing, coordinating and formulating policies in all related activities of disaster management. NEMA also coordinates plans and programmes of relevant stakeholders for efficient and effective response to disasters as well as promoting research and development activities as they relate to disaster management in Nigeria. NEMA is funded statutorily by the Federal Government, in addition, to the mandatory release of 20% of Ecology Fund to the Agency yearly. The Ecology Fund is statutorily constituted as 1% of the national budget. The same funding arrangement is domesticated at the States level

Although, LASEMA came into existence in February 2007 but the legal framework establishing LASEMA was signed into Law on 22nd July, 2008 to perform the activities of NEMA for effective disaster management at the State. LASEMA is expected by law, to supervise the functions of the Local Emergency Management Committee (LEMC) where they exist. However, according to the interview conducted, the Executive Secretary/Director General Lagos State Emergency Management Agency, Dr. Femi Oke-Osanyintolu, observed that it has been disheartening to note that contrary to the stipulation of LASEMA Established Act, none of the 18 Federal Government recognised LGAs and the Development Areas created by the State Government has established LEMC as at 2013. Consequently, by default, the emergency management at the LGAs is still being undertaking by LASEMA thereby stretching the limited capacity of the Agency to mitigate and respond efficiently to disasters.

Disaster Management is the coordination and integration of all activities necessary to build, sustain and improve the capability to prepare for, protect against, respond to and recover from threatening or actual natural or human-induced disasters. It is a multi-jurisdictional, multi-sectoral, multi-disciplinary and multi-resource initiative as shown in Figure 8.1. Disaster Management is also the coordination and integration of all activities necessary to build, sustain and improve the capability for disaster prevention, mitigation, preparedness, response and recovery. (NEMA, 2012a)

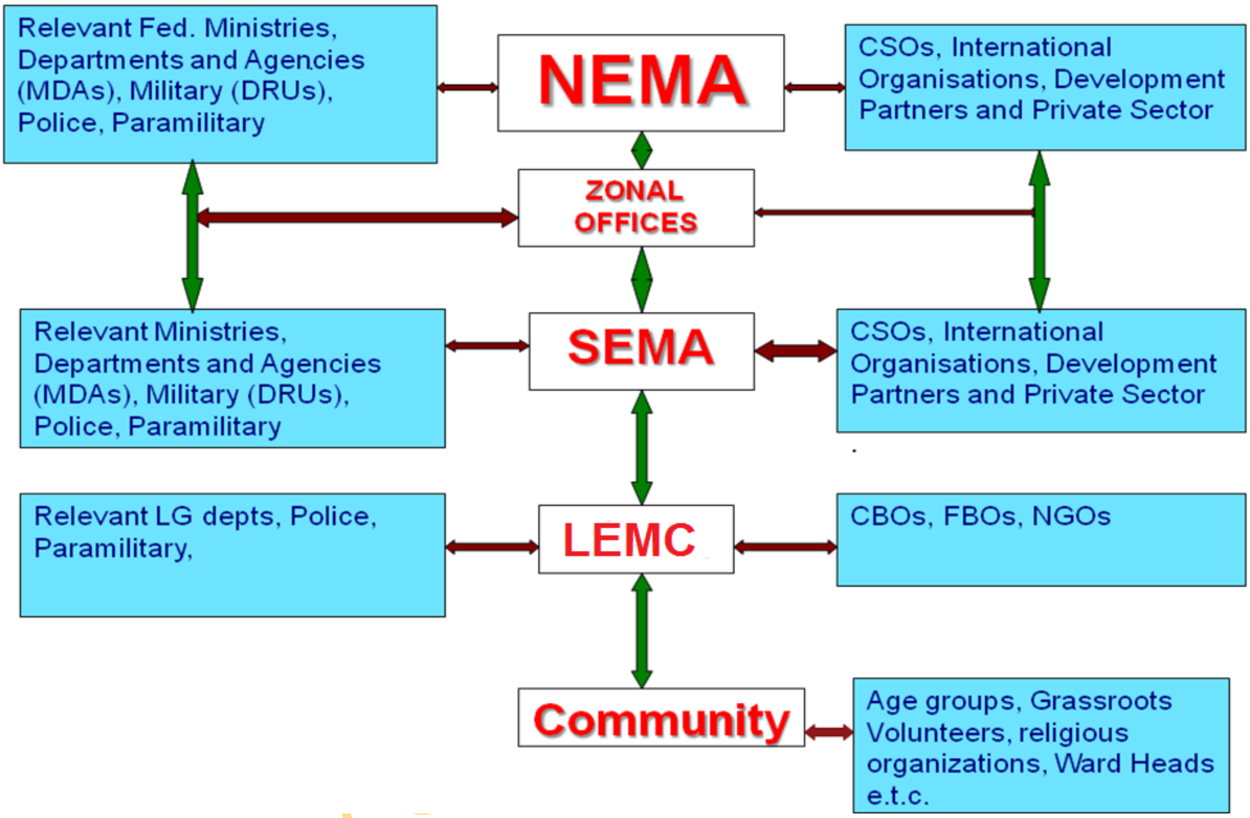

Figure 8.1 Disaster management coordination systems in Nigeria

Source: NEMA: National Disaster Management Framework (2012b)

8.3 The agencies and disaster management

Disaster management being a multi-jurisdictional, multi-stake holding, multi-disciplinary, multi- resource endeavour, requires elaborate policy, procedures, systems and guidelines to ensure seamless coordination and collaboration. The Agency deriving its legitimacy from its enabling law, in collaboration with relevant stakeholders, has developed policies, procedures and systems for disaster management in Nigeria, in line with global best practices.

Since the Hyogo Conference in 2005, the Agency as part of her mandate to manage disasters has been in the fore front in integrating the principle of disaster risk reduction into the developmental agenda of Nigeria. In addition to this, series of initiatives had been proposed that focus on the need for pre-disaster analysis. In Nigeria, pilot programmes for VCA in Kaduna, Benue, Adamawa, Akwa Ibom, Imo, Lagos States and Abuja were done to determine how these States could limit the damage occasioned by disaster by preparing and be forewarned. Plan is underway to conduct VCA in the remaining 30 states of the federation. The study allows the Agency across the country and by extension in Lagos State to:

i. Assess and address major risks affecting communities.
ii. Determine people's vulnerability to those risks, their capacity to cope and recover from a disaster.
iii. help the communities to understand the hazards they face;
iv. Assist them in taking the necessary measures to improve the situation, based on their own skills, knowledge and initiatives.
v. Enable the people to prepare for hazards and prevent them from turning into disasters.

It is from this development that NEMA in conjunction with SEMAs collaborates with the Federal Ministry of Environment and Nigeria Meteorological Agency (NIMET) to integrated Disaster Risk Reduction and Climate Change adaptation as early warning mechanism. Early warning system is the provision of timely and effective information that allows individuals exposed to disaster to take action to avoid or reduce risk and prepare for effective response. Early warning systems include a chain of concerns, namely: understanding and mapping the hazard (VCA), monitoring and forecasting impending events (Early Warning), processing and disseminating understandable warnings to political authorities and the population (Public Awareness), and undertaking appropriate and timely actions in response to the warnings (Contingency Planning) (ISDR, 2002).

Early warning systems such as the NIMET seasonal rainfall predictions and daily weather forecasts empower individuals and communities threatened by hazards to act in sufficient time and in an appropriate manner to reduce the possibility of personal injury, loss of life, damage to property and the environment, and loss of livelihoods. Early warning is more than just a prediction it should be should be a prompt attention and response to information given. From the interview conducted, NEMA and LASEMA have been collaborating with all stakeholders in Disaster Management with the view to developing proper early warning mechanism for certain confirmed hazards such as epidemics, flood, drought and road accident as contained in the National Disaster Management Framework and the National Contingency Plan. Also, in the face of onslaught from climate change related extreme events, the use of NIMET weather forecast for early warning and early action is no longer an option but a compelling necessity. Yearly after the release of rainfall prediction and pattern by NIMET, NEMA and LASEMA have always been holding meeting with stakeholders' to deliberate on the effects of the forecast on human settlements and the general environment. This is done to obtain a consensus warning message for responsible agencies, bodies and communities at risk in line with the paradigm shift from disaster response to disaster mitigation and preparedness.

It is important to note that disaster mitigation policies and measures will not stop a disaster especially a natural one from occurring and persisting. What mitigation policies and measures seek to do is to reduce vulnerability to, or increase resilience to, the effects of the inevitable disasters to which a community is vulnerable. The goal of emergency preparedness programmes is to achieve a satisfactory level of readiness to respond to any emergency situation through programmes that strengthen the technical and managerial capacity of governments, organizations, and communities.

At the preparedness phase, NEMA and LASEMA have developed plans to save lives, minimize disaster damage, and enhance disaster response operations. Preparedness measures that have been developed include: Contingency Plans, Simulation, Evacuations Plans and Training, Capacity Building and development, Geographic

Information System (GIS), Emergency Personnel/Contact Lists, Public Information/Education, and Volunteerism.

The National Contingency Plan (NCP) has been developed in collaboration with SEMAs, the UN Bodies, Ministries, Department and Agencies (MDAs) and other critical stakeholders in disaster management to provide a basis for coordination of humanitarian minimum response in the event of a major/catastrophic disaster for an initial 10 (ten) days by the Federal Government of Nigeria to be coordinated by NEMA and SEMA at national and state level respectively. The document adopts the multi-risk approach and identified flood, crises, epidemic, drought and collapse of artificial and natural impoundments for water, as probable disasters that can cause high level impact and displacement of persons. A population of 10,000 was used as the benchmark for planning assumptions. The geographical area covered the whole country based on identified hazards. Meteorological predictions, monitoring of dams and rivers, as well as, socio and ethno-religious activities by relevant agencies were used as the basis for Early Warnings and triggers for the probability of occurrence of the identified disasters.

The multi hazard scenario approach has been adopted to ensure the accommodation of forecasted hazards, as well as those that have not been forecasted, bearing in mind the recent global happenings, climate change and climate variability and other uncertainties that determine the occurrence of disasters and their impacts. While some of the effects of climate change are apparent as witnessed by extreme weather changes, it has been difficult to adequately model the complete range of changes to accurately anticipate its impacts for Nigeria. Though National and Regional weather agencies predicts that weather changes such as high temperatures and irregular rainfall patterns are likely, it should be anticipated, that the effects would vary from region to region. The multi-hazard contingency plan, therefore, is a first step towards mitigating the impact of quick onset disasters when the level of forecast cannot be ascertained. Furthermore, a multi-hazard contingency plan creates the platform to bring several humanitarian players together as a framework for developing contingency arrangements for disaster response. Relevant stakeholders can also use the National Contingency Plan as justification for organisational preparedness using the roles that have been assigned to them in the plan as shown in Table 8.1

Table 8.1 Established clusters and designated lead agencies/organizations for NCP

	Cluster	Lead Ministries/Agencies	Lead UN Agency
1	Camp Coordination and Camp Management.	NEMA/SEMA	UNHCR
2	Food and Nutrition.	FMoAgric/SMoAgric/SEMA	WFP/FAO
3	Health and Sexual Reproductive Health/HIV AIDS.	FMoH/SMoH/NACA/SACA/LACA	WHO/UNFPA/ UNAIDS
4	Protection. Security.	NHRC/MWASD/ Law Enforcement Agencies	UNICEF/UNHCR UNDSS
5	Basic Education.	FMoEdu/SMoEdu/SUBEC	UNICEF and SC
6	Water and Sanitation.	FMoWR/SMoWR/RUWASA	UNICEF
7	Emergency Shelter and NFI.	NEMA/SEMA	IFRC and IOM
8	Logistics and Telecommunication.	NEMA/SEMA/FMoIC/SMoIC/ NCC/State Mass Transit	WFP/UNDP

Source: NEMA, 2011b

For smooth inter-agency operations during emergency, the simulation of existing plans, procedures, programmes to bring together relevant networks is apt.. This will go a long way to spell out specific roles, enhance efficiency and better use of resources both human and material and to determine the efficiency or otherwise of the plan for possible review. Thus, simulation is a useful way of helping teams come together to develop and test plans. Quarterly, NEMA in collaboration with Military, SEMA and other stakeholders has been stimulating disaster response drill at the Military Training School, Jaji, Kaduna State, to effectively manage disaster occurrence. Also, NEMA has been organizing simulation exercises for its Emergency Response Teams (ERT) in conjunction with other stakeholders for disaster such as: fire, crisis, road crashes and air accidents and boat mishaps. The March 2010 Nigerian Air Force plane with registration Number NAF: 950GG222-8 Series simulation exercise that turned to real life crash in Port Harcourt is a reference point on the drive of NEMA to use simulation to ascertaining its level of preparedness and that of other relevant stakeholders involved in disaster management.

NEMA at the national scale is fully aware of the usefulness of training and human resources development that in 2009 Memorandum of Understanding (MOU) was signed with six Nigerian Universities (University of Ibadan; University of Nigeria, Nsukka; University of Port Harcourt; Federal University of Technology Minna; Ahmadu Bello University, Zaria; and University of Maiduguri) in the Six Geo-Political Zone to train and award postgraduate degree in Disaster Risk Reduction and Development Studies. The programme is focused mainly in developing the capacity off NEMA and SEMA staff for efficient and effective disaster management across the country. The sum of 15million Naira ($100,000.00) is earmarked as annual grant from the Agency to each of the Universities for the next three years. Already, 10million Naira ($67,000) was released to each university for the programme take off. The programme has started in all the Universities with an overarching objective of building capacity nationally for disaster management due to observed lacuna in this area of human endeavour in Nigeria.

Effective disaster management depends on the informed participation of all stakeholders. The exchange of information and easily accessible communication practices play key roles in disaster abatement. Data is crucial for ongoing research, national planning and monitoring vulnerability. The widespread and consistent availability of current and accurate data is fundamental to all aspects of disaster management. Increased public awareness about hazard is an indispensable element in any comprehensive strategy for disaster risk reduction and mitigation process.

The responsibility of the Agency, SEMAs and the Six Zonal Offices located in Lagos, Maiduguri, Jos, Enugu, Kaduna and Port Harcourt including the Abuja Operations Office is to promote public awareness of natural and man-induced/technological disasters on a continuous for effective disaster management. The Emergency management agencies must involve local communities in the dissemination process of information. In this regard, considerable scope should be created to inform and advise the public about hazards and the risks they pose. Within this development, risk reductive measures are most successful when they involve the direct participation of the people most likely to be exposed to hazard; local leaders including men and women drawn from political, social and economic sectors need to be given primary responsibility to protection of their own community (Okech 2007; Fagbemi 2011).

It is crucial for people to understand that they have a responsibility towards their own survivals and not simply wait for government to find and provide solution. In addition, there is a need for more frequent and better-informed media coverage about disaster mitigation before a disaster occurs. Disaster mitigation programmes of the Agency are always attended by large retinue of media representatives to ensuring a well-informed and concerned media. Desirably, it is vital that the Agency and journalist interact regularly before a disaster occurs in order to lay the groundwork for effective working relationship during and in the aftermath of a disaster.

Disaster response is the sum total of actions taken by people and institutions in the face of disaster. These actions commence with the warning of an oncoming threatening event or with the event itself if it occurs without warning. The aim of emergency response is to provide immediate assistance to maintain life, improve health, and to support the morale of the affected population. Such assistance may range from providing specific but limited aid, such as assisting Internally Displaced Persons (IDPs) and refugees with transportation, temporary shelter, and food and non-food items (NFI), to establishing semi-permanent settlement in camps and other locations. It also may involve initial repairs to damaged infrastructure. The focus in the response phase is on meeting the basic needs of the people until more permanent and sustainable solutions can be found.

One of the focal equipment for response in Nigeria is satellite technology called the COSPAS-SARSAT located at the Headquarters of the NEMA, in Abuja. The COSPAS-SARSAT System provides distress alert and location information to search and rescue services anywhere in the world for maritime, aviation and land users in distress. The system was originally designed to operate with satellite in low-attitude earth orbit and it has been in operation since 1982 and improved upon in 1998 with geostationary satellites (GEOSAR). Thus, with an accurate Doppler positioning, beacons identification, and global coverage, it has the unique advantage of providing an independent Doppler location capability and a complete coverage of the globe.

This hi-tech system cum facility is a satellite system installed in March 2001 by the Agency to provide distress alert and locational data to assist search and rescue operations using spacecraft and ground facilities to detect and locate the signal of distress beacons operating on 121.5 and 406.0 Megahertz. Therefore, when there is a distress alert from the beacon located on a ship or aircraft, the satellite system transmits the signal to the geo-stationary terminals on the earth from where the data is processed and transmitted to the appropriate mission control centre (MCC). The MCC in turn alerts the nearest Reaction Coordinating Centre (RCC) or Disaster Reaction Unit (DRU) whether the Army, Air Force or Navy for appropriate and immediate action. Tables 6.2, 6.3 and 6.4 represent the location of Nigerian Army, Navy and Air Force DRUs controlling formations respectively

COSPAS-SARSAT System has been used to identify crash locations of a number of airlines and helicopters such as the Pan Africa Airline helicopter crash as Escravos, Delta State on 26th July, 2004; the Nigerian Air Force Fighter Plane crash at Yar Kanya, Kano State on 28th January, 2005; Bellview Airline crash at Lisa Village, Ogun State on 22nd October, 2005; Basita Sugar Company Helicopter crash at Ikonifin, Ejigbo LGA, Osun State and the Naval Helicopter crash at Okoroba Village, Bayelsa State on 15th December, 2012

Table 8.2 Nigerian Army Disaster Reaction Units: Areas of responsibility

DRU	State covered	Unit location	Controlling formations
26 Bn	Sokoto and Zamfara	Sokoto	HQ 1 Bde
1Bn	Kebbi	Birin Kebbi	HQ 1 Bde
212 Bn	Borno and Yobe	Maiduguri	HQ 21 Armd Ede
29 Bn	Kaduna	Kaduna	HQ 1 Div
82 Bn	Plateau and Nasarawa	Jos	HQ 3 Div
AHQ Gar	FCT	Abuja	AHQ GAR
5 Bn	Kano and Jigawa	Kano	HQ 3 Bde
35 Bn	Katsina	Katsina	HQ 3 Bde
211 Bn	Bauchi	Bauchi	HQ 33 Bde
301 FAR(GS)	Gombe	Gombe	HQ 301 FAR (GS)
313 AR	Niger	Minna	HQ 31 FAD
222 Bn	Kwara	Ilorin	HQ 22 Armd Bde
19 Bn	Ondo and Ekiti	Okitipupa	HQ 4 Bde
321 FAR	Ogun	Abeokuta	HQ 32 FAB
322 FAR	Edo	Benin	HQ 32 FAB
93 Bn	Delta	Warri	HQ 4 Bde
103 Bn	Enugu	Enugu	HQ 82 Div
24 SER	Ebonyi	Abakaliki	HQ 82 Div
72 Bn	Benue	Markurdi	HQ 82 Div
342 FAR	Imo and Abia	Owerri	HQ 34 FAB
2 Bn	Rivers	Port Harcourt	HQ 2 Bde
73 Bn	Bayelsa	Elele	HQ 2 Bde
146 Bn	Cross River	Calabar	HQ 13 Bde
6 Bn	Akwa-Ibom	Abak	HQ 2 Bde
232 Bn	Adamawa	Yola	HQ 23 Armd Bde
20 Mech Bn	Taraba	Serti	HQ 23 Armd Bde
65 Bn	Lagos	Bonny Camp	HQ 2 Div
81 Bn	Oyo	Ibadan	HQ 2 Div
221 Bn	Kogi	Kainji	HQ 22 Armd Bde
12 FER	Osun	Ijebu Ode	HQ 2 Div
221 Bn	Anambra	Onitsha	HQ 22 Armd Bde

Source: NEMA 2012

Table 8.3 Nigerian Navy and Air Force Disaster Reaction Units: Areas of responsibility

Geographical Zone	State Covered	Controlling Military Units
Nigerian Navy		
Lagos	Lagos, Ogun	NNS Olokun
Delta	Delta	Egwa-Ama (FOB)
Calabar	Cross River, Akwa Ibom	NNS Victory
Port Harcourt	Bayelsa and Rivers	NNS Pathfinder
Port Harcourt	Rivers	NW FOB Bonney
Warri	Ondo, Delta	NNS Umalokun
Akwa Ibom	Akwa Ibom	Ibaka (FOB)
Ondo	Ondo	Igbokoda (FOB)
Lagos	NAS	Ojo
Delta	Delta	Escrcavos (FOB)
Nigerian Air Force		
Lagos	Lagos, Ogun and Ekiti	88 MAG Ikeja
P/Harcout	Rivers, Bayelsa and Ebony	97 SOG, P/Harcourt
Benin	Edo, Delta, Ondo	81 AMG, NAF, Benin
Makurdi	Benue, Taraba	TAC(ADG), NAF, Kaduna
Kaduna	Kaduna, Katsina	301 FTS, NAF, Kaduna
Kainji	Sokoto, Kebbi and Zamfara	99 AWS-NAF Kainji
Kano	Kano, Jigawa	303 FTS, NAF Kano
Yola	Adamawa, Gombe	75 STG NAF, Yola
Maiduguri	Borno, Yobe	204 WG Maiduguri
Ibadan	Oyo, Osun	NAF DET Ibadan
Ilorin	Kwara, Kogi	227 WG Ilorin
Calabar	Cross River, Akwa Ibom	NAF DET Calabar
Minna	Niger	NAFDET Minna
Enugu	Enugu, Imo and Abia	305 FTS Enugu
Jos	Plateau, Bauchi	303 NAF STN Jos
Abuja	FCT, Nassarawa	NAF Camp Abuja

Source: NEMA 2012

8.4 Direct distribution of relief materials

Today, distribution of relief material to people affected by disaster is the most visible aspect of the Agency. The Agency has seven warehouses strategically located in the Six Geo-Political Zone and Abuja that stock pilled relief materials for immediate distribution to affected persons in their homes or at Internally Displaced Persons (IDPs) camps. Figures 8.2, 8.3 and 8.4 show the distribution of relief materials to persons affected by disaster in 2012. Appendix III shows the comprehensive data for relief intervention in the country from 2010 to 2012.

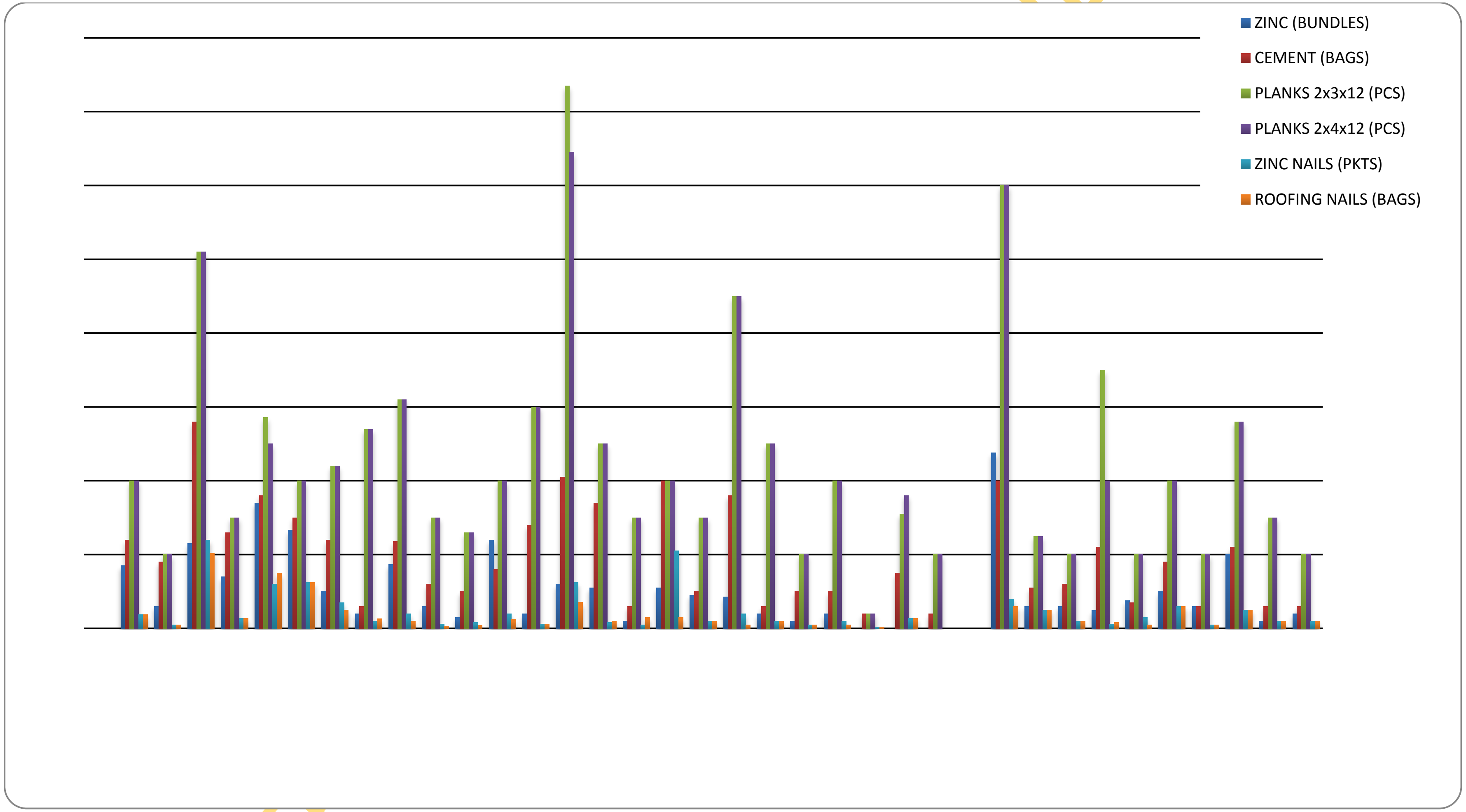

Figure 8.2 Distributions of building materials as relief interventions to states, 2012
Source: Compilations from NEMA's yearly relief interventions to state, 2012

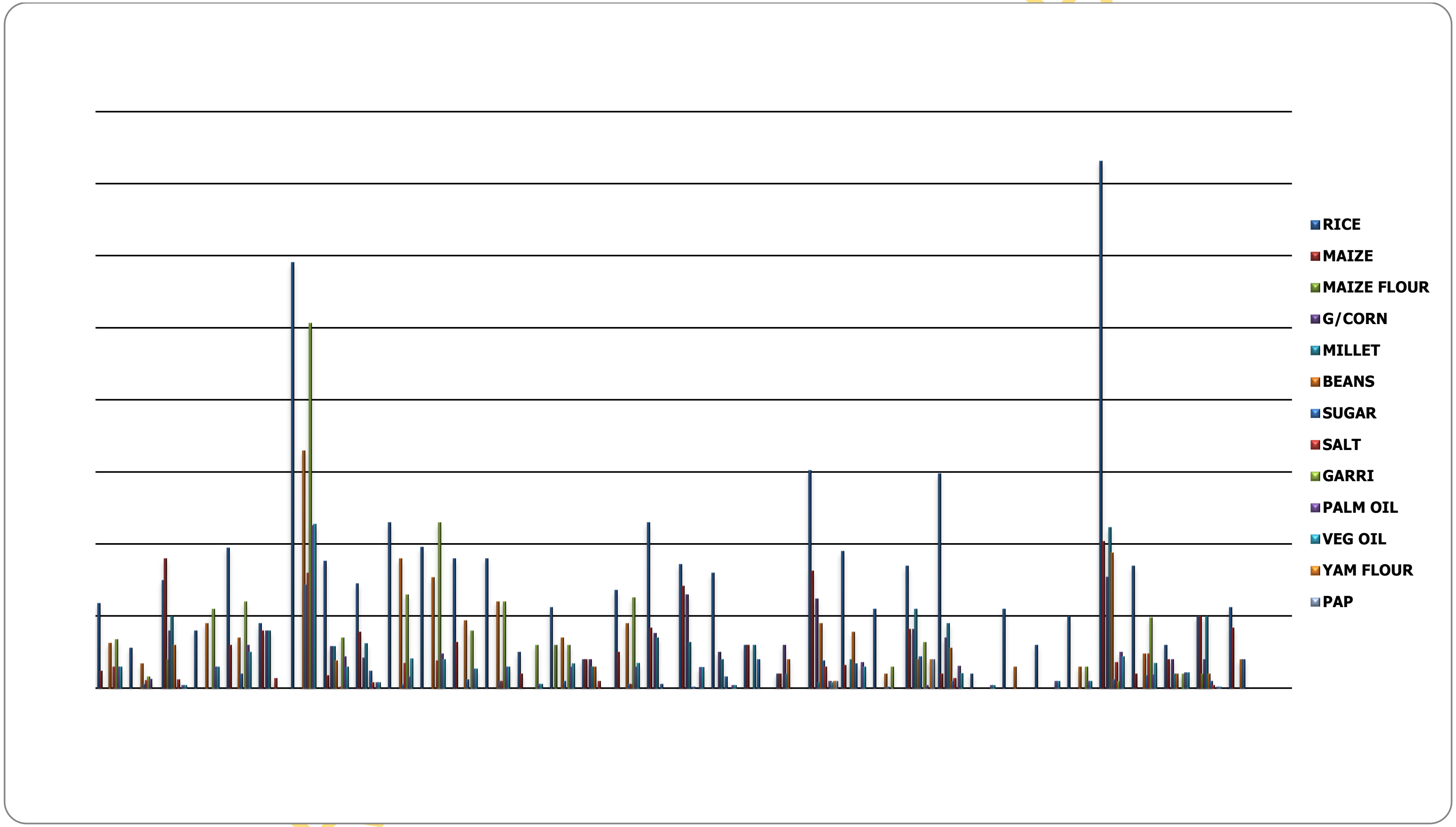

Figure 8.3 Distributions of raw food as relief interventions to states, 2012
Source: Compilations from NEMA's yearly relief interventions to state, 2012

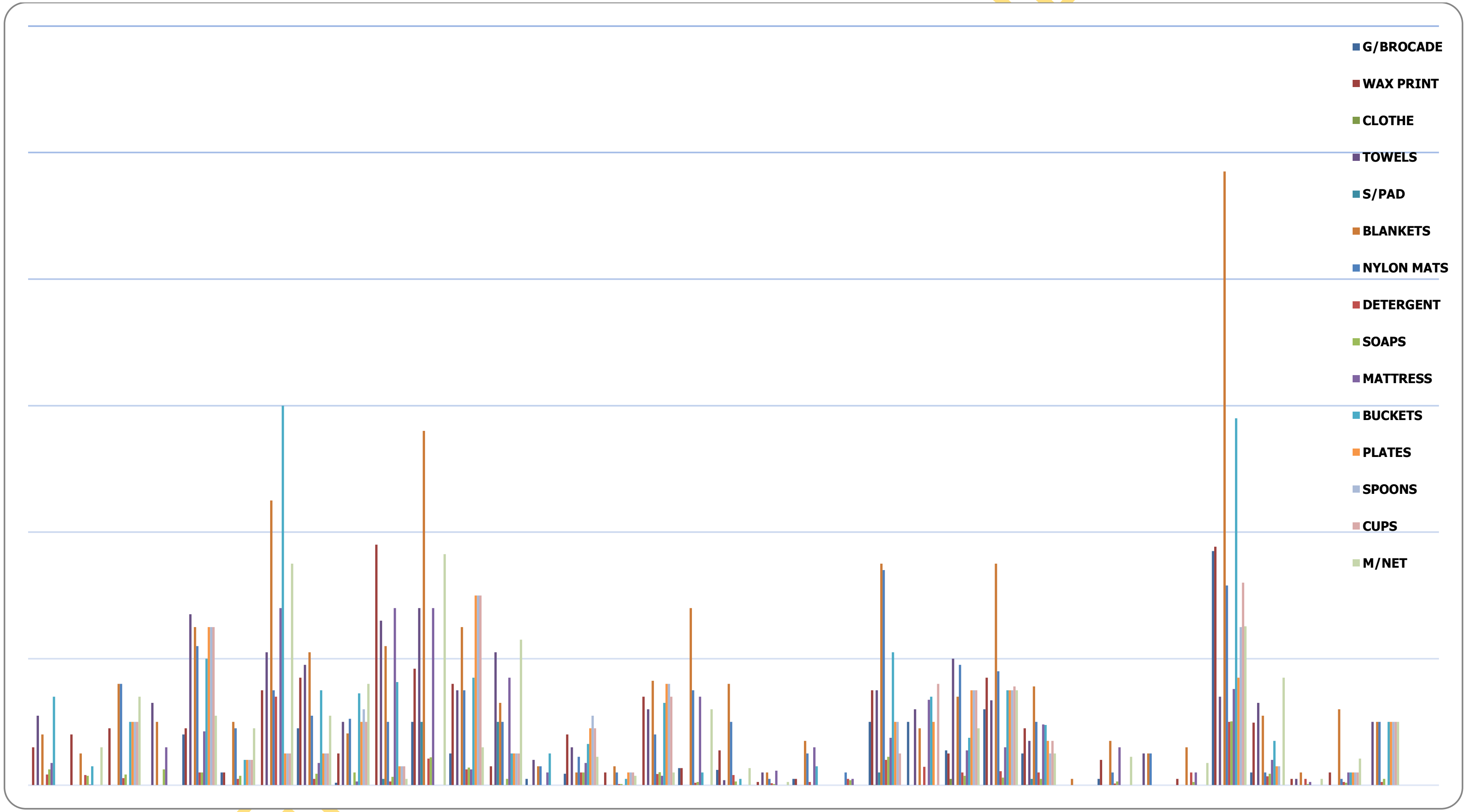

Figure 8.4 Distributions of household materials as relief interventions to states, 2012
Source: Compilations from NEMA's yearly relief interventions to state, 2012

8.5 Identified capacities and gaps at national and state level

Since its establishment, NEMA has been putting a lot of effort into supporting various States across the country to set-up disaster management institutional frameworks. Through the Agency's Seven Zonal Offices located in the six Geopolitical zones and FCT (Lagos, Enugu, Port Harcourt, Kaduna, Jos, Maiduguri and Abuja), NEMA has been advocating and providing support to many States to facilitate the establishment of State Emergency Management Agencies (SEMAs). The NEMA Act mandated all states to establish State Emergency Management Agencies while local governments are to establish Local Emergency Management Committees. The assessment of the activities of established SEMAs from NEMA has shown that the Lagos State Emergency Management Agency has the highest capacity to mitigate, prepare and respond to emergency in the country.

With the establishment of NEMA and LASEMA, it was obvious from the interviews conducted that there is no concrete disaster management legislation at the State level. Given the effort made at the federal level through NEMA, disaster management is yet to be seen as a national priority and decision makers lack or have limited knowledge of disaster reduction issues. Despite the establishment of LASEMA at the State level disaster management has not been integrated and factored into the day to day activities of the State.

In terms of budget, the Federal Government allocates one percent (1%) of its national budget (GDP) to the Ecological Fund and twenty (20%) of this is allocated to NEMA. The remaining 80% of the Ecological Fund are utilized by the Federal Ministries, Department and Agencies (MDAs) such as Environment, Health and others that contribute to disaster risk reduction and mitigation, as well as States and Local Governments. However, in case of a disaster, if more funds are needed based on an assessment by NEMA, the Office of the Vice President (Chairman of NEMA Board of Governing Council) could approve further expenditure from the Environment Fund. For possible assistance from international communities, the National Planning Commission facilitates the resource mobilization with international partners. Similarly at the State level, when there is an emergency, SEMA sends its assessment to the Board of the Ministry of Economic Planning which decides on funding.

The budget allocation is relatively small to meet the ever increasing demand of disaster management and disaster risk reduction. More of the statutory allocation to disaster institutions at the Federal and State level from the Ecological Fund is more applied towards disaster response than prevention and mitigation of hazards and risks. Hence, the most visible activity of disaster management in the country is the distribution of relief materials to people affected by disaster rather than disaster prevention and mitigation component of the disaster management cycle (*Appendix III*). It has been argued by the Director General/Executive Secretary of LASEMA that a number of prevention and mitigation activities have been carried out which include drainage clearance, sensitization campaign awareness creation among others in collaboration with disaster management institutions in Lagos State. However, the perennial flood disaster, fire out break and frequent building collapse in the State underscored the significant of prevention and mitigation programmes.

Also, at the state level, there is knowledge and awareness about responding to emergency but efforts to instigate proactive prevention and mitigation measures are very limited. This is due to unavailable resources and lack of understanding of the issues. The interviews conducted highlighted that very few individuals were familiar with the concept of reducing disaster risk and disaster management. Due to this lack of knowledge, disaster management is not explicitly mentioned in Lagos State charters, and usually disaster management issues are passed on to SEMA. Therefore, the Lagos State MDAs rarely ask for disaster prevention and recovery funding as part of their regular budget allocations through the Ministry of Economic Planning. From the interview conducted it was observed that employees of LASEMA and the State Ministries are yet to undergo comprehensive training on disaster management except for the quarterly simulation exercise organized by NEMA in conjunction with the Nigerian Military.

The lateral and vertical relationship between and among MDAs as expected in disaster management parlance, as shown in Figure 6.1, is lacking in Lagos State. In other words, there is no formal platform or coordination mechanism between stakeholders engaging in activities and programmes related to disaster management issues at the state level. There is no evidence of horizontal interaction between MDAs, as disaster management issues are not on the agenda of their meetings. The only disaster related issues at such meetings are focused on response after the occurrence of disasters.

Organizations external to the state governments indicated that the state government bureaucracy is one of the main challenges hindering the successful implementation of disaster risk reduction measures. Furthermore, lack of guidance and clear mandates on disaster management and disaster risk reduction related methodologies and tools were also highlighted as significant weaknesses.

The country has never been engaged in comprehensive risk identification or risk assessment activities. There are some scattered efforts carried out by various institutions (universities, research institutions) but not in a coordinated approach for common interest. Although the Lagos SEMA indicated that a comprehensive Vulnerability and Capacity Assessment/Analysis (VCA) was undertaken for Lagos State in 2009, with support from NEMA, UNICEF and WHO; there is no continuous execution of state-based comprehensive risk assessments and little recognition of the importance of risk mapping. The State MDAs interviewed do not conduct structured assessments of hazards, vulnerability or capacity. They are not aware of risk assessments that may have been conducted by outside organizations due to inadequate vertical and horizontal coordination.

Other factors hampering coordinated response is the general lack of a common, toll free emergency number and the lack of standard operating procedures that are known within each organisation as well as among the various responders. Currently, most responders rely solely on GSM communication for alerts, with different numbers for each GSM operator, and GSM is also used for interagency communication without access to radio communication. At the peak of disaster, experience has shown that the GSM, as means of communication, during disaster is not effective largely due to congestion of the network. However, progress is being made towards installing common, toll free emergency numbers and establishing joint call centres. For example, two emergency numbers as well as toll free numbers for disaster reporting is in place in Lagos and NEMA is currently working on setting up a nationwide call centre. The latter is yet to become operational and its capacity cannot be assessed.

Many examples from Lagos State level demonstrate scattered capacities in risk assessment. For example, many local governments in Lagos State have resident engineers tasked with monitoring the drainage and runoff situation, and report systematically to local government authorities as early warning in order to take appropriate measures. Also, the report of a joint project called *"Reducing the impact of flooding in Lagos, Nigeria"* conducted by the Nigerian Institute for Oceanography and Marine Research, Lagos State Ministry of Environment and Physical Planning (Department of Drainage), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Coastal Regions and Small Islands (CSI) platform addressed the problem of flooding in Lagos.

The project was aimed at determining the causes of flooding and the implications of tidal and sea level changes as well as societal impact on the efficiency of drainage channels to discharge flood waters. The report of the project released in August 2000, highlighted two factors responsible for the problems of drainage blockage and flooding as: engineering problems, whereby some of the canals have reverse flows due to sea level rise. The other factor is attitudinal, evident in the dumping of refuse in canals and other drain channels by Lagos inhabitants. The study revealed several additional problems such as clogging of the drainage channels by domestic waste and blocking of some channels by buildings, low gradient of the channels and variable channel width from head to outfall, collapsed drainage channel walls, reverse gradients in most channels. Therefore, when flash flood from heavy rains coincide with high tides and blocked drainage flood waters flow back into the channels through the outlets causing excessive flooding.

Although the results from the report were submitted to the Lagos State Ministry of Environment and Physical Planning and several recommendations were made including rerouting, repairing, fencing and screening of several channels, construction of new channels, increasing beach height, and a public awareness campaign to discourage dumping of solid refuse in the drainage channels, only few steps(structurally and non-structurally) such as canel screening, enforcement of environmental edicts have been undertaken by the State and Local Government to combat the menace of flood.

The status of hydrometeorology data collection and monitoring for disaster early warning is grossly inadequate in Lagos State and by extension in the country. The information management of existing risks and data is not systematic. Historical information on disaster incidents and losses are recorded in decentralized ways. Records of previous disaster events are not stored in a database by coordinating government body such as NEMA and SEMAs. On the existing data aggregation or analysis is not done, and detailed hazard maps do not exist. Baseline data on disaster incidents and vulnerability are not available to measure improvement. For example, the Lagos Fire Service investigates the cause of each fire, but no statistics are tallied. While the State ministries are working diligently to assess new building projects and deal with existing problems, historical statistics on high-risk buildings or neighbourhoods are not available.

In Lagos State, physical planning, building codes and a number of legal and policy provisions to support and ensure proper land use and physical planning have been put in place and are being implemented. These included: the Land Use Act of 1978; Urban Development Policy of 1992; Urban and Regional Planning Act 1992 as well as the Housing and Urban Development Policy of 2002. In addition, control measures have been introduced to improve land use planning and development. To combat the urban disaster risk of building collapse, the Lagos Physical Planning Development Authority monitors and inspects buildings on an ongoing basis, and passes this information onto the Ministry of Physical Planning and Urban Development. It is, however, unclear how often buildings are inspected. Also, the Lagos State Ministry of Water Resources routinely monitors and tests surface water at the source in order to evaluate possible danger to the public. These tests have not resulted in flood early warning dissemination to the public to avert the yearly flood disaster.

8.6 The Lagos State Fire Services

In terms of fire service, despite the strategic importance of Fire Service as lead agency in terms of fire outbreak, flood and building collapse the situation of the Nigerian Fire Service including that of Lagos State is alarming and degraded to a level that requires a comprehensive study. It was observed from the study that, in general, the Fire Service does not have sufficient means to carry out its tasks properly and respond to the needs of the population. Between 2008 and 2012, with the establishment of LASEMA, it was on record that the Lagos State fire-fighters carried out 109 operations with 32 of them on fire incidents. This shows the importance of Fire Service in ensuring sustainable disaster management.

The structures of fire-fighters, despite a clear desire to move forward, as clearly stated by laws, the Service does not have the minimum requirement to carry out their tasks.

Therefore, they are not able to respond to emergencies or to exceptional situations, like some recurring floods, urban fires and market fires. This situation is compounded by the lack of adequate training of the fire fighters and the deficiencies in the training field. There is currently no training programme for Fire Fighters in Lagos States. The standard operational procedures, and other instructional materials required to educate fire fighters in prevention and preparedness are insufficient. The continuing professional education programme normally intended to develop reflexes and make the fire fighter operational is very limited. In general, training devices are inefficient and poorly adapted, and the quality of initial training is very low. Hence, the transmission of knowledge and culture, specific to the job of fire fighter, is too poor to develop a good quality service.

The level of basic technical equipment for Fire fighters is dramatically low; this include lack of vehicles, equipment and materials; poor maintenance culture, lack of water supply system for the urban fire defence. Beyond the current risks, it is clear that the Fire fighters do not have enough specialized equipment as breathing apparatus, bunker gear, rescue material. To respond to the specific risks they need appropriate vehicles and special materials as aerial ladders, foam tender, water supply trucks which are lacking. These significant deficiencies have real impact on the success of response operations.

Nigerians are known for fire-brigade service approach to things, but unfortunately the fire service is not working well. For it to function effectively, the Federal and States Fires Services need general overhauling, re-engineering and re-packaging to win the confidence of the public to which they are responsible. Moreover, importance of the tasks performed by the Fire Services are not sufficiently known, understood and integrated by other partner services, the highest administrative authorities and the politicians. Therefore, with few exceptions, the fire response capacity is inadequate and virtually not inexistence in some Local Government Areas. There is a common need for maintenance and procurement of equipment. The number of Fire fighters does not match the needs and size of populations to be covered. Fire fighters are employed but not provided with adequate training. The command and control system and the operational management are still very limited. There is no hazmat, decontamination or containment response capacity.

The highlighted lacunas, notwithstanding, the emergency management authorities in Lagos State are increasingly aware of the importance of the role of a Fire Service at State and Local Government levels. Also, efforts to improve local fire fighting capacity are being undertaken at Federal and Lagos State level as shown by the newly procured specialised vehicles and other technical equipment by the Lagos State Government. There is an increased public awareness in collaboration with media houses and other critical stakeholders through initiatives in fire prevention in schools, markets, motor parks and other areas sensitive to fire outbreak.

8.7 Disaster management stakeholders in Lagos State

Compared to other State of the Federation as noted by NEMA; LASEMA has done a lot in prevention and response to disaster situation in the State. Disaster management is a daring task that requires a lot of efforts from all stakeholders to improve on the existing status. In achieving this, the State as highlighted in the preceding sections has the following under listed strengths:

i. Focal Institutions (LASEMA)
ii. Relevant MDAs
iii. National and International NGOs (Nigerian Red Cross Society, Oxfam, Farmer Early Warning System Network (FEWSNET), Save the Children, Catholic Relief Agency,
iv. United Nations System
v. Development Partners (Japan International Cooperation Agency, USAID, DFID)
vi. Media (Print and Electronic)
vii. Community Groups (CBOs, CDAs CDCs)

8.8 Challenges to disaster management

The strengths highlighted in the previous section, notwithstanding, both the National and State Agencies are bedevilled with a plethora of challenges which can be summarised to include the following: confused and poor coordination; lack of collaboration; response rather than mitigation focused; poor communication horizontally and vertically between and among stakeholders; weak public education and advocacy; ineffective response; disconnect between jurisdictions (turf protection); lack of accompanying plans, procedures and systems at state, local government and community levels; poor risk transfer mechanism: insurance and reinsurance policy;

weak emergency services – weakness of fire services, absence of ambulance service, poorly equipped police, poorly equipped hospitals; low technical/manpower capacity in government MDAs; poor funding of disaster management activities in relevant MDAs; poor/lack of data management; poor funding of SEMAs; LEMC, the local government emergency management apparatus not in existence in all the LGA's of the State; poor/absence of technical/manpower capacity at all levels of governance; virtually nothing concrete on disaster management at the Local Government Level.

8.9 Conclusion

Institutionalization of response to disaster in Nigeria dated back to 1906 when the Fire Brigade (now Federal Fire Services) was established. This chapter focused attention on the National Emergency Management Agency (NEMA) and the Lagos State Emergency Management Agency (LASEMA) NEMA and LASEMA were established by Act 12 as amended by Act 50 of 1999 and LASEMA Act of establishment 2008. NEMA and LASEMA are funded statutorily by the Federal and State Governments, in addition, to the mandatory release of 20% of Ecology Fund to the Agency yearly. The Ecology Fund is statutorily constituted as 1% of the national budget. The same funding arrangement is domesticated at the States level

The Agencies have developed plans and programmes to aid disaster management in the country but the impact of such plans and programmes were not felt due to poor coordination; poor horizontally and vertically communication between and among Stakeholders; weak emergency; low technical/manpower capacity; and poor funding.

CHAPTER NINE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

9.1 Introduction

The extent and impact of potential disasters are changing exponentially. Therefore, the world is increasingly characterised by uncertainty, complexity and rapid change. Although causal factors and consequences are increasing globally, human vulnerability is intensifying in distinctly different ways at local and regional levels. The scale of crisis impacts is also intensifying with more and more disasters undermining economic and political systems, destroying infrastructures and eroding the fabrics for future development. The aim of this research is to examine the evolving urban dynamics process and associated vulnerability to hazards and disasters in Lagos State. The nature and intensity of natural and human-induced disasters impact on the environment have multifarious effects on the inhabitants. The extent to which the study area will be inhabitable and resilient to disaster will no doubt depend on the evolving urban dynamics process triggered and implemented covertly or overtly in the 1970 to early 1980.

9.2 Summary of findings

The study revealed that Lagos State is losing population exactly in areas where real estate investment is growing significantly (Torres, *et al* 2007). Population growth, from all indications, is happening in areas vulnerable to disasters and with low investment in real estate. For example, in 1911, the highbrow district of Lagos State comprises Lagos Island, Ikoyi and Victoria Island accommodated 76.8% of the State’s total population. Today, as a result of urban dynamics process occasioned by the provision of low cost housing, the urban fringe accounted for 73.9% of Lagos State population. The massive population shift notwithstanding, as noted by Alabi 2011, the spatial distribution of organized private sector housing estates indicated that significant number of the estates are located in areas that lost a significant share of their population as evidence in the1991 and 2006 census figures.

The finding of this study discovered that contrary to the benefits expected from the housing-for-all policy of the second republic administration, the demographic growth associated with provision of affordable housing resulted into expansion of existing poor and informal housing in most parts of Lagos State. Additionally, the benefits accruing from the economic expansion of the second republic era to drive developmental agenda were truncated by the oil glut of early 1980s and further sapped by the Structural Adjustment Programme (SAP) of late 1980s. Therefore, there is a visible delay in responding to the housing and infrastructural needs of the growing population and the expanding Lagos city frontier.

The research into urban dynamics has shown that depressed areas in cities are triggered by low-income housing rather than commonly presumed housing shortage. The low income targeted housing and pro-poor urban policy without corresponding progressive economic development have combined to give incentives to overstretch the existing facilities and services, increase in-migration of unskilled workers and expansion of informal settlements to accommodate the migrants. The association between low income housing and urban dynamics was analysed using chi square (χ^2) two-sample test. The calculated $\chi^2$48.4 at 8 degree of freedom is significant at 95% confidence level (0.5 level). Therefore, the hypothesis which states that urban dynamics in the study area, is significantly influenced by the availability of low income housing is accepted.

The low-income groups, by default, always use available housing at higher population densities (Alfeld 1995 and Ramroth 2007). Deducing from the response from the Field Survey, 88.6% of the respondents submitted that 4 – 6 persons were living in a room. This negates the Millennium Development Goals 7 Target 11 recommendation of 2 -3 person for ideal number of persons per room to avoid overcrowding. Housing at higher population density as noted by Myers (2010), accommodates more low-income urban population which, in the long run will have direct deleterious effects on economic growth, industrialization and sustainable development. The ever increasing population in the urban low income residential neighbourhood further aggravated the existing vulnerability components of the low income high density urban settlements. This is because the urban poor are affected by the "double vulnerability" namely: disaster and poverty (Agbola, 2011). Therefore, they are disproportionately affected in terms of their exposure to risks and in terms of the limited resources at their disposal to respond to such risks (Jabeen, *et al* 2010).

This assertion was corroborated by available data on the number of building collapse and fire outbreak used in analyzing the hypothesis which states that occurrence of disasters differs significantly between residential neighbourhoods. The result of the ANOVA shows that F value of 77.29 and 17.88 are significant for fire outbreak and building collapse respectively at 0.05 level. The study noted that the vulnerability is greater in high density residential neighbourhood than low density district. This was logically analysed using the Post Hoc Analysis (least significant differences). The difference between the means of low and medium densities, low and high densities and medium and high densities residential neighbourhoods are greater than the least significant differences. From the analysis, the study consented that the difference in mean ranks in the residential neighbourhoods differs significantly in virtue at 5% level.

Vulnerability to hazards is a function of several factors which include socio-economic indices, housing characteristics and availability of infrastructural facilities and services and the attendance urban dynamics process. The result of the logistic regression analysis revealed that the model's fit is significant at 0.05 confidence level and on the average, 88% of the model is correctly classified (predicted). In disaggregating some of the results of the regression analysis, the study revealed that the probability of flooding increases significantly by 53% for primary education and reduces for those with secondary education certificate by 76% compared to those with tertiary qualification. Also, probability for fire outbreak and building collapse decreases with education attainment. For instance, it is shown that those with no education are about 3 times more likely to experience building collapse than those in the base category (tertiary); in other words, people without education are 300% likely to reside in building that will collapse. Equally, evaluating the impact of income on vulnerability to disaster, it is observed that as income increases probability for flood reduces by 57% and the odd for disease outbreak reduces by 31%.

Availability of functional and adequate drainage network contributes to outcome and impact of disaster. From the logistic regression analysis, taking non-availability of drainage as base, free flowing drainage reduces the probability of flood significance by 63%. Blocked drainage also reduces the likelihood of flood significantly by 42% compared to where there is no drainage. However, blocked drainage also significantly increases the occurrence of disease outbreak by 2% in relationship to the base category. Furthermore, evaluating the result of setback to water bodies, it can be deduced that as set back increases (in metre) the probability of a building being flooded decreases significantly by 40%.

Another implication of the analysis is that generally, all residential neighbourhoods are vulnerable to disasters in the study area but the degree differs. For instance, people living in low density area are as vulnerable to hazard as those living in high density areas. This is mainly due to the attraction of water bodies for human settlement and the significant contribution of water as a major causal factor in other hazards such as disease outbreak, flooding, building collapse, erosion, and general land degradation. It is important to note that vulnerability to disaster is a function of capacity to anticipate, cope with, resist and recover from the impact of hazard. Consequently households with means of production (land, capital and labour) and specialized skills as characterized by low density neighbourhoods are the most resilient when disaster strikes. In addition to this, as noted by Smith (2004), access to early warning information and the availability of a social network to mobilize support, especially government support, is also important in vulnerability analysis. However, the poor and those otherwise disadvantaged by age, gender, ethnicity, employment opportunity or health status are comparatively defenceless and highly vulnerable to hazards.

Using Geographic Information Systems to analyse the land use and land cover change from 1984 to 2010, the study has shown that about 8% and 45% of water and vegetation respectively have been converted to urban land use. Also, the study revealed that within 32 years, the study area has changed from vegetation - having the greatest percentage of the total land use at 46.5% in 1984 - to urban at 51.2% in 2010. The simulation of flood risk at 1 metre by the study indicated that in 1984 most areas at risk were under vegetation. However, by 2010 Kosofe, Surulere, Ikorodu and Ajeromi-Ifelodun were the most flood prone Local Government Areas. It is instructive to note that the sum total of the four Local Government Areas population **(**2,671244**)** is more than the entire population of Bayelsa State (1,704515**)**. Simulation of 2 metres of flood water, similar to the impact of 2012 nationwide flood disaster, indicated that in the study area, Kosofe, Ikorodu, Shomolu. Lagos Mainland, Surulere, Ajeromi – Ifelodun and a larger part of Mushin, Oshodi – Isolo and Alimosho would be submerged.

Currently, there is a wide spread awareness of risk in the environment and the growing recognition that the toll exerted by disaster is unacceptable. It will be defeatist not to bring hazard awareness into development planning because continuing disaster losses simply reinforce poverty and vulnerability. It is from this backdrop that the National Emergency Management Agency (NEMA) was established by Act 12 as amended by Act 50 of 1999. The Agency is saddled with the mandate of managing, coordinating and formulating policies in all related activities of disaster management. Also, in Lagos State Emergency Management Agency (LASEMA) was established to domesticate the activities of NEMA for effective disaster management in Lagos State.

The establishment of disaster management organs notwithstanding, the National and the State Agencies are bedeviled with a plethora of challenges which include the followings: confused and poor coordination; response rather than mitigation focused; poor communication horizontally and vertically between and among stakeholders; weak public education and advocacy; ineffective response; disconnect between jurisdictions (turf protection); lack of accompanying plans, procedures and systems at state, local government and community levels; poor risk transfer mechanism: insurance and reinsurance policy; weak emergency services – weakness of Fire Services, absence of ambulance service, poorly equipped Police and National Security and Civil Defense Corps (NSCDC), poorly equipped hospitals; low technical/manpower capacity in Government MDAs; poor funding of Disaster Management activities in relevant MDAs; poor/lack of data management; poor funding of SEMAs; LEMC, the Local Government Emergency apparatus not in existence in all the LGA’s of the State; poor/absence of technical/manpower capacity at all levels of governance and virtually nothing concrete on disaster management at the Local Government Level.

9.3 Theoretical and practical implications of the study

The intuitively obvious "solutions" to social problems, as shown by the housing provision programme of 1970s to 1980s, are apt to fall into one of several traps set by the character of complex systems. First, an attempt to relieve one set of symptoms (inadequate housing for the low income households) may also create a new mode of system behaviour that also has unpleasant consequences. Second, the attempt to produce short-term improvement often sets the stage for a long-term degradation. Third, the local goals of a part of a system often conflict with the objectives of the larger system. Fourth, people are often led to intervene at points in a system where little leverage exists and where effort and money have but slight effect. Thus, as noted by Alfeld (1995) and Forester (2009), a control of growth and migration has been exerted at all times, but it has often been guided by short-term considerations, with unexpected and undesirable long-term results. The issue is not one of control or no control. The issue is the kind of control and toward what end. For instance, if a sufficient number of cities find new ways of controlling their own destinies in spite of national policy and what other cities do, then pressures to work toward the long-term well-being of the country will be quickly generated. This in the long haul will establish equilibrium with cities' natural surroundings and maintain a viable and proper internal balance of population and industry.

As migration is increasing, the poor families, who should not be blamed for moving to these least-structured suburbs, are the first to be affected by the degradation of the environment (Figure 2.1; page 20). This is not only through their exposure to environmental hazards and vectors of contagious diseases but also because their places of residence are less protected in terms of facilities and/or construction patterns that could avoid such hazards thereby validating the tenets of urban dynamics as shown in Figure 9.1. Therefore, the most significant issue here is how to change such unfortunate trends. The idea that restrictions on land use alone could cope with such problems is quite naïve. So far Town Planners have not been able to properly regulate the illegal settlements in Lagos State. The 2012 flood disaster in Nigeria, occasioned by release of excess water from Lagdo Dam in Cameroon and the unusual increased precipitation across the country indicated that disasters can be amplified by demographic and socio-economic factors. The devastating results of the flood disaster – and, to be sure, any disaster – were a result of the intersection of poverty, decades of neglect and years of ineffective planning regulation, exacerbated by the climate change and climate variability impact. Economic, cultural and social capital, as well as human ecological trends, held equal hands in placing some population groups at greater risk.

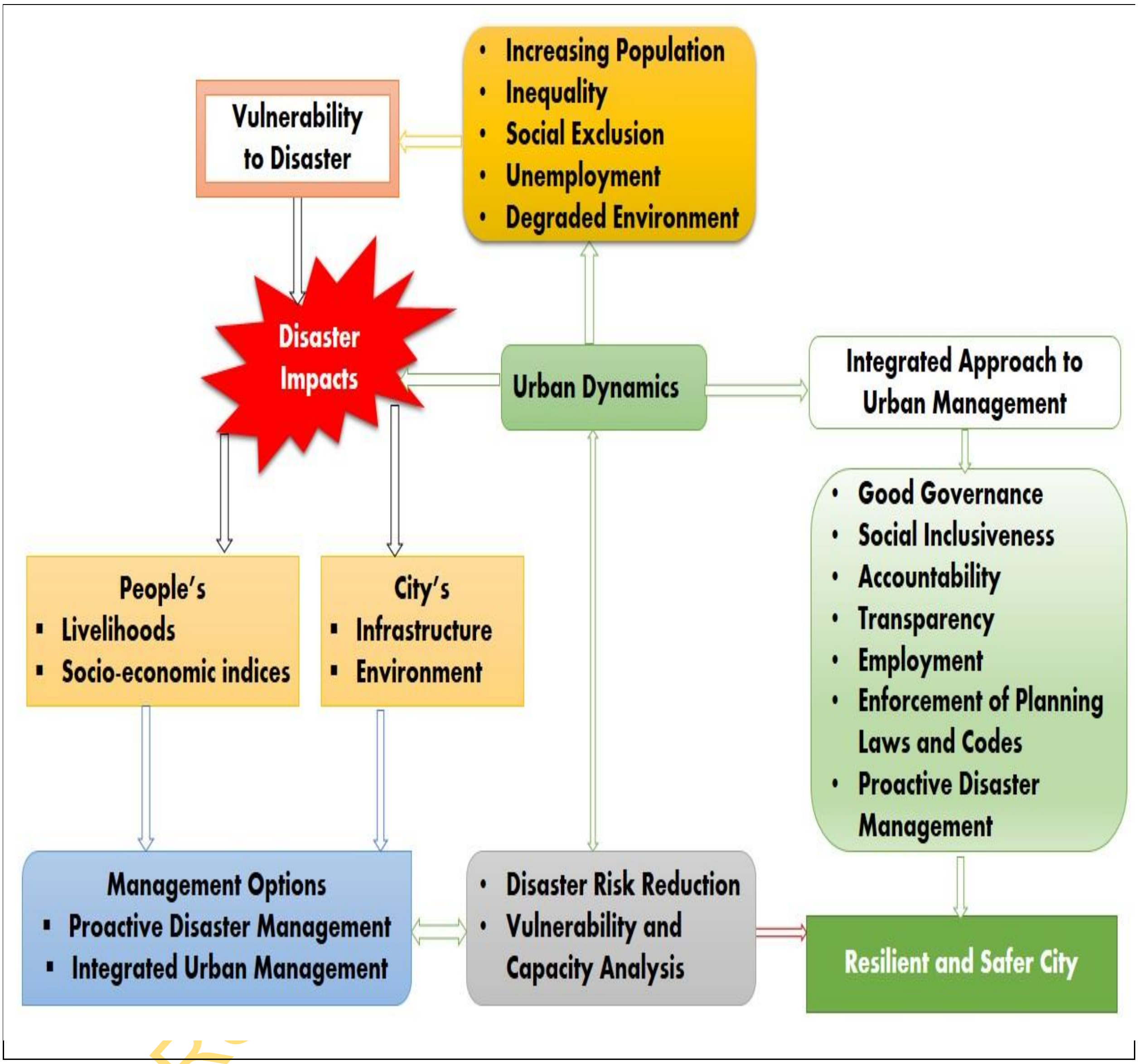

Figure 9.1 Integrated urban management strategy to reduce vulnerability

Source: Author, 2014

Theoretically, however, the problem is much more complex and, at times, vulnerability resulted from a multiple forms of social capital deficiency. As urbanization is driving the need for new industrial and commercial sectors, people were forced to live in hazard prone areas. More importantly, it is often the poor who live in such regions, making the problem as much an issue of human ecology as economic capital. It is also important to note that it is only in rare cases that a single dimension of the social structure is responsible for vulnerability. In the context of disasters, social forces are multidimensional. The complexities of these interactions must be taken into account in future studies.

Vulnerability is a multifaceted phenomenon. As such, solutions, too, must be multifaceted, addressing the range of social, cultural, demographic and economic conditions – often interacting in complex ways – that culminate in population vulnerability. Population changes also require the frequent and thoughtful revision of existing policies, plans, urban and disaster management options. Therefore, emergency managers, planners, and other policymakers (NEMA, LASEMA, Fire Service, Nigeria Police Force, NSCDC) should strive to develop effective disaster policy, the policy's fingers should also centre on the socio-economic and demographic characteristics (social inclusiveness) of the communities that required policy interventions. Failing to do so will undoubtedly have significant and long-term deleterious public health effects as well as devastating livelihood, social and economic consequences for the populations that are vulnerable to disasters and are living in high risk areas.

As noted by (Donner and Rodríguez 2008), individual preparedness and response to disasters is generally influenced by factors that have little to do with the hazard agent or the disaster event itself, such as social class, education, gender, race/ethnicity, cultural background and language proficiency, among others. It is important to note that population growth, composition, distribution and economic variability, the major factors influencing urban dynamics, are the primary driving forces in the context of exposure to disasters and disaster vulnerability. As such, social science disaster researchers and other academia need to pay closer attention to population and economic shifts and their implications for disaster risk and vulnerability analysis as a paradigm shift in disaster management.

9.4 Disaster management strategies and facilitators

Strategies to manage disaster risk and vulnerability must begin by identifying the hazards and areas in the community that are particularly vulnerable. Uncoordinated planning in Lagos brought about chaotic growth and the generation of irregular proliferation of informal settlement. Immediate demands for services (streets, sidewalks, transport, water, electricity, drainage) are not met by the city's managers and policy markers thereby heightening the existing vulnerability indices of the inhabitants (Martínez-Viveros and López-Caloca 2010). Fortunately, planning driven by science and technology has been adopted as management tools to reduce or at least manage uncertainty through simulation of disaster scenarios to determine expected and estimated impact. These estimations can steer the processes of planning and it is within this framework that GIS exists. Application of GIS to aid urban planning, especially in the area of flood plain management, should be given required attention by urban managers and policy maker in the hope of fashioning sustainable development path for the State. The federal government, Nigerian Institute of Town Planners (NITP) and Town Planner Registration Council (TOPREC) should drive the process of actualizing this strategy.

In recent decades, urban communities have adopted more regulatory rather than structural approaches to disaster mitigation. This involved the employment of land use management to restrict further encroachment to vulnerable land especially flood plain development. Flood plain mapping, which include water depth, flow velocity and flood duration, an important planning tool, has not been systematically done in the study area. In addition to this, flood plain buy-back has been used by Governments' Agencies to purchase flood prone property with the overarching motive of promoting public safety. Other benefits of this strategy include the conversion of flood plains for urban agriculture, parkland preservation of wetland habitats and the improvement of waterfront access. The flood plain buy-back strategy according to Smith (2004), is a cost effective use of public funds because in return for the one-off purchase cost, the property becomes ineligible for any future assistance following disaster. The state government should take the lead and facilitate the process

There is also need to review the 1992 and 1999 as amended Urban and Regional Planning Law to reflect the prevailing circumstances in Nigeria. Innovative urban planning for rapidly expanding cities has shown the need for flexibility in applying planning regulations, but also there is a greater need to apply planning guidance quickly as cities grow. However, as necessary as legislative reform is, on its own term it is not a sufficient tool for increasing functionality, equity and participation. Legislation can set standards and boundaries for action, for example, by defining development control, building codes or training requirements and basic responsibilities for key actors in disaster management. But legislation on its own cannot induce people to follow these rules. Legislation has its strength in societies where most activities take place in the formal sector and are visible to administrative oversight. In many disaster prone environment and locations, monitoring and enforcement - and even widespread knowledge - of legislation is not achievable in the short- to medium-term because of financial and human resource constraints. Fortunately, the principles of equity and participation in disaster management are not solely dependent on legislative reform. The strategies to be adopted should describe ways in which inclusive decision-making could be encouraged to integrate the knowledge and views of all stakeholders in development and disaster management. The federal and state government should support the process

Another proactive disaster management strategy is insurance. For instance, in the developed world, insurance is an important loss-sharing strategy to cushion the adverse effects of disaster. A property or business insurance arises when a risk is perceived and the owner pays a fee (premium), usually on an annual basis, to buy a contract (insurance policy) that transfers the risk to a financial partner (insurer). The insurer guarantees to meet specified costs in the event of damage through disaster to the property. By this means, the policy holder is able to spread the cost of a potentially unaffordable disaster over many years. Insurance mechanism is still weak in the developing country, especially in Nigeria, where poverty and other socio-economic disadvantage indices prevent the individual from taking insurance policy and the insurer is not predisposed to encourage individuals to insure their property due largely to premium default. Further studies should be done to ensure that property insurance is adopted as viable option in disaster management is Nigeria as the norm in the developed countries. The insurance companies facilitate this process while the federal and state government should provide the enabling environment for the implementation of the strategy

Efficient infrastructure contributes to efficient economies. It is upon functional basic infrastructure that economy viability depends (Smith, 1997). Provision of basic infrastructural facilities and services is apt and could be seen as practical planning intervention to prevent and mitigate Lagos State from disaster vulnerability. For instance, adequate supply of power and electricity can influence the urban morphology of the State. With electricity to support the powering of lifts and escalators in place, the urban managers and policy makers can advocate for vertical expansion of Lagos State rather than adopting the prevailing lateral expansion. This practical strategy had been adopted in most developed cities of the world that had similar terrains and land inadequacy to accommodate the increasing population like Lagos State. The federal and state government should provide the needed infrastructural facilities and services to support the workability of the strategy

Disaster abatement and management must be the responsibility of government. However, its success also depends on widespread decision-making and the participation of many other stakeholders (Figure 9.2). Policy direction and legal foundations assure legitimacy but it is the political motivated professional and human resource available that are true measures of success. Furthermore, comprehensive disaster risk reduction covers a wide range of discipline, sectors and institution, calling for diverse and expanded forms of partnership. The achievements from networking and partnership coupled with information management can be far more powerful than individual or specialist contributions. With the improvement in global communication; creating networks between government agencies, the public, the private sector and professional bodies is technically easy; however, these networks can only be successful if participants display the same commitment to share available information and experience openly. The major challenges are to stimulate networks of shared commitment and partnership at local, national, regional and international levels across professional interest. A need for cohesion in achieving these partnerships is a challenge to be addressed and facilitated by disaster management MDAs in Lagos State and by extension in the country.

Priority must be given to education in disaster management. Various and complex dimension of disaster risk within a community need to be taught, continuously reinforced through structured educational programme and professional training. Similarly, the increased public awareness about hazards and inherent vulnerability is a vital element in any comprehensive strategy for disaster risk reduction. Thus, public awareness campaigns should be conducted in school, through the media, public official, professional and commercial channels. It has been documented (Okech, 2007), that disaster abatement measures are most successful when they involve the direct participation of the people most likely to be exposed to hazard; local leaders, including women and men drawn from political, social and economic sectors in vulnerable areas need to assume primary responsibility for the protection of their community. The government (federal, state and local), the communities and individuals have major role to play in facilitating inclusive and participatory disaster management strategies

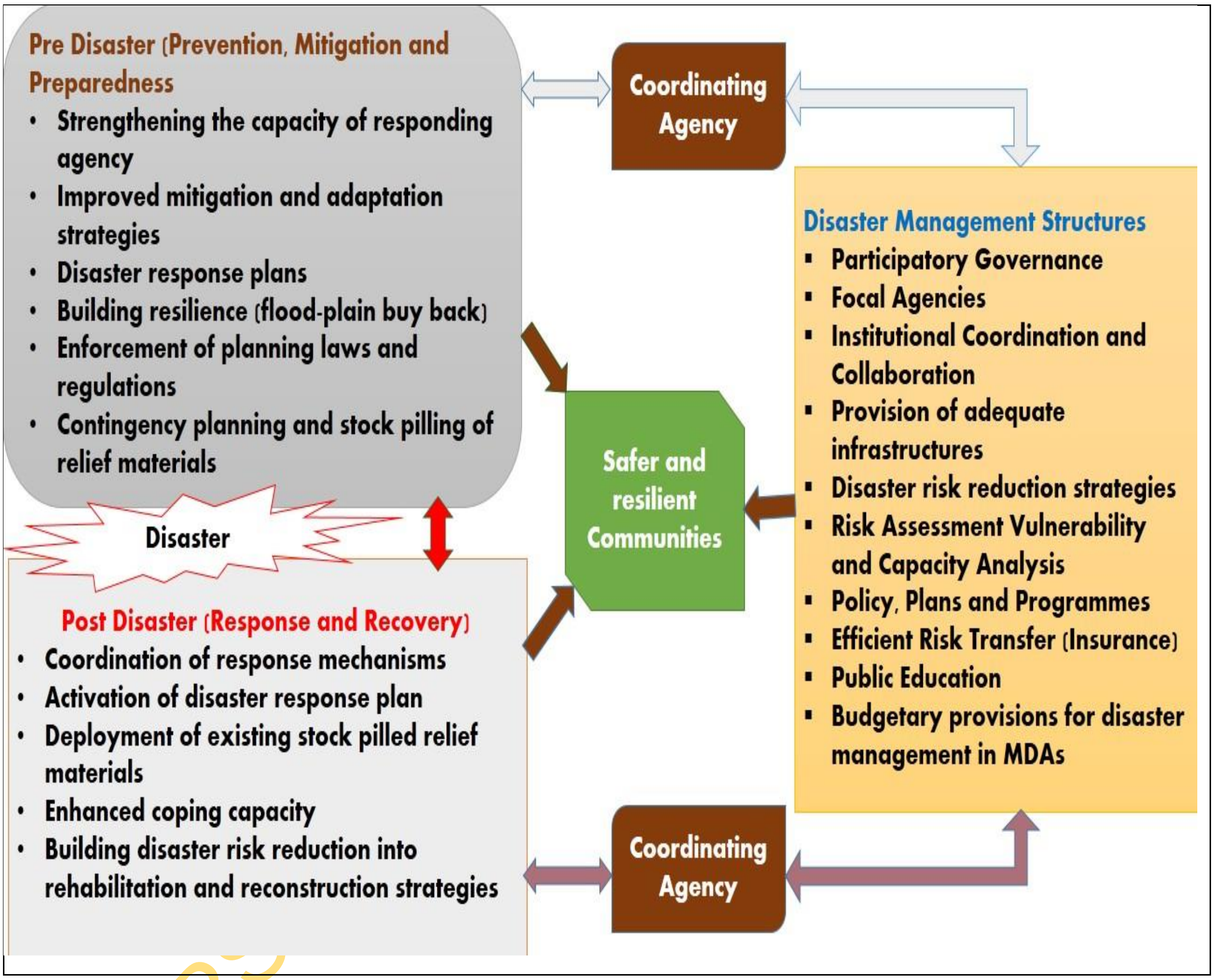

Figure 9.2 Disaster management strategies for safer community development

Source: Author, 2014

The integration of disaster management with environmental policy and land use planning is crucial to disaster pre-emptiveness and management. The planning agencies and the National Emergency Management Agency (NEMA) should be fully aware of the challenges posed by the spate of urban planlessness and vulnerability inherent in it. Consequently, NEMA at the national level and LASEMA at the state level should recognize Ministry of Housing and Urban Development as important collaborator and work together to develop plan and action for disaster management. Also, as a necessity and point of duty, NEMA and LASEMA should be represented in the Development Control Department of Planning Authority to enable the disaster management agencies to effectively discourage the erection of structures in areas vulnerable to disasters and for it to be proactive in disaster mitigation and management. Desirably, there is the need for NEMA to develop a National Comprehensive Mitigation Plan that is crucial and a fundamental component in emergency management. The importance of continuity in disaster management strategies is very critical, as gains obtained in the short-run can easily be lost by the failure to follow through with needed action by key actors. It is, therefore, pertinent to evolve feasible disaster mitigation strategies that will stand the test of time. This should be facilitated by federal and state MDAs in active collaboration with NEMA and LASEMA

9.5 Areas of future research

In addition to future areas of further study stated earlier (complexity of interaction in vulnerability analysis, population and economic shift and insurance), that people (poor and rich) are living in disaster prone areas has been studied and documented by various scholars in Lagos State and Nigeria at large. However, it is important to note that giving the current trend of development coupled with economic challenges people will continue to reside in vulnerable areas. It is from this development that future research should focus on coping (adaptation) and mitigation strategies adopted by people to respond and recover from disasters in order to build the communities resilience. Similarly, disaster management stands on five interconnected pedestals (prevention, mitigation, preparedness, response and recovery), however, in Lagos State, response pedestal is the most visible. At this stage of disaster management, relief materials are giving to persons affected by disaster as knee-jerk palliative measure to cushion the impact of the disasters at the detriment of other stages of disaster management. For disaster management to be more enduring there is need to look, especially into, the non-structural prevention and mitigation components of disaster management by enforcing the existing planning laws and regulations, due largely to obvious shortcoming of structural measures that are rigid and very expensive to implement.

9.6 Conclusion

In most cases, it is difficult to establish the consequences of urban change (dynamic) on inhabitants of a given environment because cause and effect relationship which is a function of environmental, economic, political and social disposition of the people between different phenomena are often too complex to ascertain. However, what is certain from this study is that urban growth and expansion is permeating the urban morphology and form of Lagos State. For example, due to population increase and the resultant quest to accommodate the population, there is enormous pressure to reclaim and convert the available vegetation and water body to land for residential purposes. The conversion, in the absence of proactive urban land use and disaster management strategies, exposes people to disasters.

It is important to note that due to its geographical location and socio-economic indices of Lagos State, nearly all residential neighbourhoods are vulnerable to disasters but coping capacity differs across the socio-economic ladder. The rich has higher capacity to anticipate, cope with, resist and recover from the impact of hazard coupled with availability of a social network to mobilize government support during emergency. The urban poor by virtue of housing choice and other poverty features are often defenseless and highly vulnerable to hazards leading to disasters. Therefore, to reduce the frequency and effects/impacts of natural and human-induced disasters on human and environment involve proactive strategies that will address and tackle development challenges that lead to the accumulation of hazard and human vulnerability.

Vulnerability to disaster prompts a questioning of the development paths that have been taken by cities that are at risk from disaster. Disasters destroy development gains, but development processes themselves play a role in driving disaster risk. Unless disaster risk considerations are factored into all developmental projects, efforts to increase social and economic development might inadvertently increase disaster risk as manifested in the Lagos State pro poor policy of late 1970s to early 1980s compounded by the Structural Adjustment Programme (SAP) of the late 1980s to early 1990s in Nigeria.

9.7 Contributions to knowledge

This study investigated the relationship between urban dynamics and vulnerability to disaster in Lagos state against the set objectives which included identification of the nature and contributing factors to urban dynamics and vulnerability to disasters in addition to land use and land cover change from 1984 – 2010 and simulate flood risk using Geographic Information System (GIS). The study also, examined the relationship between urban dynamics, socio-economic indices and vulnerability to disasters. The legislative and institutional policies enacted and programmes implemented to abate disasters by stakeholders in disaster management were discussed. Having satisfied the objectives of this study it is important to note that occurrence of disaster can significantly aid developmental process if effectively managed. However, in Lagos, the devastating effect of disasters is as a result of the intersection of: poverty, decades of neglect and years of ineffective planning regulation. This is compounded by climate change and climate variability effects in addition to socio-cultural capital and unsustainable human ecological trends and population growth that is not supported by sustainable and concrete economic growth that could translate to employment opportunities and economic empowerment. Due to financial constraint and severe competition for available resource by different sector of the urban sphere, it was observed that enduring disaster management strategy should adopt regulatory rather than structural approaches to aid disaster risk reduction. This involved the employment of land use planning and management technique to restrict further encroachment to vulnerable area especially flood plain encroachment. The study observed that flood plain mapping, which include water depth, flow velocity, flood duration and the simulation of the expected impact could be achieved by the application of GIS. This should be given required attention by urban managers and policy maker in the hope of fashioning a sustainable development path for Nigerian cities.

References

Abin, J. D. and Wahab Bolanle. 2013. "Actor collaboration in disaster risk reduction in Nigeria." in Wahab Bolanle, Atebije N. and Yunusa Ibrahim (eds) *Disaster risk management in Nigerian rural and urban settlements.* Abuja: The Nigerian Institute of Town Planners (NITP) and Town Planners Registration Council of Nigeria (TOPREC) pp 89 - 125

Adetunji, A.M. 2006. *ESM 102: The Nigerian environment.* Lagos: National Open University of Nigeria.

Advanced Purification Engineering Corp. (APEC) 2013. *How far should private water wells be sited from septic tanks and field lines?* Retrieved on 30th March, 2013 from http://www.freedrinkingwater.com/water_quality/quality2/j8-08-private-water-wellssited-from-septic-tanks-fieldlines-page2.htm

Agbola, 'Tunde. 2005a. "Urbanisation, physical development and urban development in West Africa". Paper presented at the agenda setting workshop of the Commonwealth Association of Planners (CAP) 2006 World Planners Congress, held between 14th and 15th November, 2005 at the Millennium Hotel, Sokode Crescent, Wuse, Zone 5, Abuja.

Agbola, 'Tunde. 2005b. "The opportunities and challenges of the Millennium Development Goals (MDGs) for Lagos Mega city". Paper presented at the 2005 World Habitat Day held at the Lagos State Secretariat, Alausa, Ikeja, Lagos State.

Agbola, 'Tunde. 2006. "Sustainable urbanisation and the new urban planning: the dilemma of new opportunities and the challenges for Nigeria's technocratic planners." Paper presented at the 2nd annual postgraduate lecture series of the Department of Urban and Regional Planning, Rufus Giwa Polytechnic, Owo, Ondo State on the 27th June, 2006.

Agbola, 'Tunde and Kasim, F. F. 2007. "Conceptual and theoretical issues in housing" in Agbola, 'Tunde, Egunjobi, 'Layi and Olatubara, C. O. (eds.) *Housing development and management: A book of readings.* Ibadan: Department of Urban and Regional Planning, University of Ibadan pp 15 – 69

Agbola, 'Tunde and Kasim, F. F. 2009. "Unbundling the potential of waste for urban agriculture." Paper presented at the inaugural lecture series of the alumni association of Federal University of Technology Akure, Ibadan chapter at the University of Ibadan Post-Graduate School Board Room.

Agbola, 'Tunde Nwokoro, E. and Kasim, F. F. 2007 "Housing and Health" in Agbola, 'Tunde, Egunjobi, 'Layi and Olatubara, C. O. (eds.) *Housing Development and Management: A Book of Readings.* Ibadan: Department of Urban and Regional Planning, University of Ibadan pp 391 – 435

Agbola, 'Tunde 2011, "Climate change and poverty in Nigeria," *Regional development dialogue*, Vol. 32, (1): 54-81

Agekameh, D. 2002. "From neglect to disaster", *Tell news magazine* February 11, 2002 pp 24 – 28.

Aguirre, B. 2002. "Can sustainable development sustain us?" *International journal of mass emergencies and disasters*. Vol. 20: 11-126

Alabi A. M. 2011 "The impact of gatekeepers and urban managers on the geography of housing production in peri-urban interface of metropolitan Lagos, Nigeria." A thesis submitted to the Department of Geography, Faculty of the Social Sciences in partial fulfillment of the requirements for the degree of doctor of philosophy, University of Ibadan, Ibadan

Alfeld, L. E. 1995. "Urban dynamics-the first fifty years." *System dynamics review* Vol. 11(3): 199-217

Alfeld, L. E., and Graham, A. K. 1976. *Introduction to urban dynamics*. Waltham, MA: Pegasus Communications.

Anderson, M. B. 2000. *The impacts of natural disasters on the poor: A background note.*Washington, DC,: The World Bank.

Anderson, M. B., and Woodrow, P. J. 1989. *Rising from the ashes; development strategies in times of disaster*. Boulder: Westview Press.

Angel, S., Sheppard S. C, and Civco D. L. 2005. *The dynamics of global expansion*. Washington D. C. Transport and Urban Development Department; The World Bank

Arimah, B.C. 2002. "The effect of deficient infrastructure on health outcomes in cities of developing countries", in Schulz, V. (ed.) *Urbanization and the transition to sustainability*, International Human Dimensions Programme on Global Environmental Change (IHDP), Proceeding No.6.

Arnstein, S. R. 1969 "A ladder of citizen participation," *Journal of American Institute of Planners*, Vol. 35 (4): 216-224.

Australian Development Gateway. 2007. *Risk assessment and management*. Melbourne: Australian Government AusAID

Awake! 2005. "Natural disasters: Are they getting worse?" *Awake*! Vol. 86 (14): 3-11

Awake! 2007. "Is god responsible for natural disasters"? Awake! Vol. 88 (9): 1-9

Ayedun, C. A., Durodola, O. D. and Akinjare, O. A. 2012. "An empirical ascertainment of the causes of building failure and collapse in Nigeria" *Mediterranean journal of social sciences* Vol. 3 (1): 313 - 322

Ayoade, J.O. 1997. "Man's impact on climate: real or imagined", in Osuntokun, A. (ed.) *Dimensions of environmental problems in Nigeria*. Ibadan: Davidson Press, pp.36-48.

Blaikie, P., Cannon, T., Davis, I., and Wisner, B. 1994. *Natural hazards, people's vulnerability and disasters*. London: Routledge.

Blong, R. J. 1992. "Some perspective on geological hazards" in McCall, G. J. H, Laming, D. J. C. and Scott S. C. (eds), *Geohazards: Natural and man-made*. London: Chapman and Hall, pp 209 – 216.

Brehm, J and Wicklund, R. 1976. *Perspective on cognitive dissonance.* New Jersey: Hillsdale.

Brockerhoff, M. 2000. "An urbanising world". *Population bulletin.* Vol. 55 (3) Retrieved on 30th July, 2007 from Bulletin2/An_Urbanising_World.htm

Brocklehurst,C. 2011. "UNICEF speaks from WASH 2011 international conference". A keynote speaker at the WASH 2011 conference in Brisbane. http://www.watercentre.org/news/clarissa-brocklehurst-unicef-speaks-from-wash-2011

Buffett Centre. 2010. *Research alliance to combat HIV/AIDS (REACH) Lagos state site, cross sectional study*. Illinois, Roberta Buffett Centre for International and Comparative Studies, Northwestern University.

Burgess, R. 2000, "The compact city debate: A global perspective", in Jenks M and Burgess R, (eds) *Compact cities: Sustainable urban forms for developing countries*. London and New York: Spon Press. pp 9 - 24

Canadian Red Cross. 2005. *Facts and figures: A decade of disasters*. Toronto: Canadian Red Cross.

Center for Democracy and Governance, 2000. *Decentralisation and democratic local governance programming handbook: Technical publication series*. Washington DC: US Agency for International Development.

Centres for Disease Control and Prevention 2009. *Well siting and potential contaminations*. Retrieved on 30th March, 2013 from http://www.cdc.gov/healthywater/drinking/private/wells/location.html

Centre for Research on the Epidemiology of Disaster [CRED] 2003. *Measuring disasters: Challenges, opportunities and ethic: Emergency database*. Brussels: Centre for Research on the Epidemiology of Disaster, School of Public Health, Catholic University of Louvain.

Chanson, H. 2011. "The 2010–2011 floods in Queensland (Australia): Photographic observations, comments and personal experience". *Hydraulic model report number. CH82/11*. Brisbane: The University of Queensland, School of Civil Engineering

Ceylan A., Alan, I. and Ugurlu, A. 2007. *Causes and effects of flood hazards in Turkey*. Retrieved on 7th September, 2007 from www.dsi.gov.tr.

Charveriat, C. 2001. "Natural disasters in latin america and the caribbean: an overview of risk." *Inter-American development bank, working paper number 434.* Washington DC: Inter-American Development Bank.

Cherpital, D. 2002. *World disaster report: International Federation of Red Cross and Red Crescent Society*. Retrieved on 11th March, 2004 from www.redcross.org

Cova T J, Church R L. 1997. Modeling community evacuation using GIS. *International journal of geographical information science* 11: 763–84

Cuny, F. C. 1983. *Disaster and development*. New York: Oxford University Press.

Curtis A. and Mills J.W. 2010. *GIS, Human geography and disasters*, Cognella, University Readers, Inc. USA

Dada, F.A.O., Jibrin G.M. and Ijeoma A. 2010. *Nigeria social atlas.* Malaysia: Macmillan Publishers Ltd.

Davis, M. 2004. "Planet of slums." *New left review*. Vol. 26: 5-34.

de Jong, P. 2002. *Sustainable development planning for eight Puerto Rico municipalities.* Retrieved on 21st December, 2007 from http://www.urscorp.com

Dogan, M. and Kasarda, J. D. 1988. "Introduction" in Dogan, M. and Kasarda, J. D (eds) *The metropolis era: a world of giant cities –volume I*. New York: Sage Publications Inc. pp 1-8.

Dolfman, M. L. Wasser, S. F. and Bergman B. 2007. "The effects of hurricane Katrina on the New Orleans economy" *Monthly labor review* Vol. 130 (6): 3 - 18.

Donner, W. and Rodríguez, H. 2008. "Population composition, migration and inequality: the influence of demographic changes on disaster risk and vulnerability" *Social forces*, Vol. 87 (2): 1089-1114

Drakakis-Smith, D. 2000. *Third world cities*. London: Routledge.

Dyson, M. 2006. *Come hell or high water: Hurricane Katrina and the colour of disaster*. New York: Basic Civitas.

Egunjobi, 'Layi and Alabi M. 2007. "Housing facilities supply and management." in Agbola, 'Tunde, Egunjobi, 'Layi and Olatubara, C. O. (eds.) *Housing development and management: a book of readings.* Ibadan: Department of Urban and Regional Planning, University of Ibadan pp 350 - 390

Eko Atlantic Project. 2010. *The opportunity of Eko Atlantic City*. Retrieved on 15th January, 2014 from www.ekoatlantic.com/about-us/

EM-DAT 2003: *The OFDA/CRED international disaster database*, Universite Catholique de Louvain, Brussels, Belgium.

Enzler, S.M. 2006. *Floods, flood protection and innovations: LENNTECH flood*. Retrieved on 6th September, 2007 from www.lenntech.com/flood

Eslinger, S. 2001. *Community vulnerability assessment methodology – North Hanover county, North Carolina.* Charleston; National Oceanic and Atmospheric Association (NOAA) United States Department of Commerce.

Global Land Cover Facility 2011. *Earth science data interface*. Retrieved on 10th November, 2011 fromhttp://glcf.umd.edu/data/

Falade, J. B. 2003. "The urban and regional planning process: The old order and the new paradigm". A paper presented at the mandatory continuing professional development programme (MCPDP), Calabar, The Nigerian Institute of Town Planners.

Fagbemi, K 2011. "Community participation in disaster risk reduction and climate change adaptation." Paper presented at the regional workshop organized by National Emergency Management Agency (NEMA) on climate change adaptation and disaster risk reduction, Shukura Coral Hotel, Sokoto, 14-16 June, 2011

Falobi, F. 2009. "Nigeria: tackling disaster at grassroots in lagos" *Daily independent newspaper*, Retrieved on 13th December, 2011 from http://www.dailysunnewspapers.ng

Federal Government of Nigeria [FGN]. 1997. *National housing policy*. Lagos: Federal Government Press

Federal Housing Authority (FHA) 2010. *Past project: schedule of FHA completed housing projects.* Retrieved on 10th September, 2012 from www.fha.gov.ng/index.php/past

Federal Republic of Nigeria .2007. *Official gazette*: *legal notice on publication of the details of the breakdown of the national and state totals 2006 census.* Lagos; Federal Government Printer.

Federal Road Safety Corps (FRSC) 2011. "The nature and causal factors of road crashes in Nigeria" Paper presented at the Nigerian public opinion interactive forum on state of emergency management in Nigeria managers preparedness, response and awareness held on the 12th December 2011 at Nigerian public opinion premises, 4 Lugard Street, Garki Area 11.

Forrester, Jay W. 1969. *Urban dynamics*. Portland, Oregon: Productivity Press

Forrester, Jay W. 1971. "Counterintuitive behavior of social systems" Paper presented as the testimony for the subcommittee on urban growth of the committee on banking and currency, U.S. House of Representatives.

Forrester, Jay W. 1975. *Collected papers of Jay W. Forrester*. Waltham, MA: Pegasus Communications.

Forrester Jay W. 2009. *Some basic concepts in system dynamics*. Harvard; Sloan School of Management Massachusetts Institute of Technology

Frances, C. and Hanlon, J. 2001. *Mozambique and the great flood of 2000.* Oxford: The International African Institute in Association with James Currey and Indiana University Press.

Guha-Sapir, D., Hoyois. P. and Below R. 2013. *Annual disaster statistical review 2012. The numbers and trends.* Brussels; Centre for Research on the Epidemiology of Disasters (CRED) Institute of Health and Society (IRSS) Université Catholique de Louvain – Brussels, Belgium

Hanley, M. 2006. *Malnutrition in Haiti: its economic causes and effects.* Retrieved on 16th July, 2006 from www.worldfoodprize.org

Herrmann, T. M., Ronneberg, E., Brewster, M. and Dengo, M. 2004. *Social and economic aspects of disaster reduction, vulnerability and risk management in small island development state.* Retrieved on 27th July, 2006 from http://www.sidsnet.org/docshare/other/20041110110335_know-risk-chapter_DESA.pdf

Hewitt, K 1983. "The idea of calamity in a technocratic age" in Hewitt, K. (ed) *Interpretation of calamity from the viewpoint of human ecology*. Boston; Allen and Union, pp 1 – 6.

Holy Bible. 2010. *The Dake annotated reference Bible King James Version*: *Genesis chapters 6 and 7.* Lawrenceville Georgia: Dake Publishing Inc. pp 9 - 12

Hoyois, P., Below, R., Scheuren, J. M. and Guha-Sapir, D. 2007. *Annual disaster statistical review: numbers and trends 2006.* Brussels: Centre for Research on the Epidemiology of Disasters [CRED] School of Public Health, Catholic University of Louvain, Brussels.

Ifatimehin, O.O., Musa, S.D. and Adeyemi J. O., 2009. An analysis of the changing land use and its impact on the environment Anyigba town, Nigeria. *Journal of sustainable development in Africa,* Vol. 10(4): 357-364

Ijewere, E. 2003. "Strategies for effective participation of the private sector organisations, NGOs and communities in disaster management"; *Response: a quarterly publication of the National Emergency Management Agency* Vol. 1 (3): 28 – 30.

International Federation of Red Cross and Red Crescent Societies [IFRCRCS]. 2001. *World disaster report*: Geneva: IFRCRCS.

International Federation of Red Cross and Red Crescent Societies [IFRCRCS]. 2002. *World disaster report*: Retrieved on 14th February, 2004 from http//www.redcross.org

International Human Dimensions Programme on Global Environmental Change [IHDP]. 2005. *Science, plan urbanisation and global environmental change: IHDP report number. 15*. Bonn: IHDP.

International Strategy for Disaster Reduction [ISDR] 2002. *Living with risk-a global review of disaster reduction initiative*. retrieved on 14th February, 2004 from www.unisdr.org

International Strategy for Disaster Reduction [ISDR] 2004. “Land use, disaster risks and rewards: a community leader’s guide”. *UN/ISDR Africa Educational Series*, Volume 2, Issue 3. Geneva: UN/ISDR

International Strategy for Disaster Reduction [ISDR]. 2006. *Reducing disaster risk: a challenge for development. millennium development goals and disaster risk reduction.* United Nations development programme bureau for crisis prevention and recovery. Retrieved on 27th July, 2007 fromhttp://www.unisdr.org/eng/mdgs-drr/undp.htm

Ishaya, S., Ifatimehin, O. O, and Abaje, I. B. 2009. “Mapping flood vulnerable areas in a developing urban centre of Nigeria” *Journal of sustainable development in Africa*. Vol. 11 (4): 180 - 194

Jabeen H., Johnson C. and Allen A. 2010. “Built-in resilience: learning from grassroots coping strategies for climate variability” *Journal of environment and urbanization* Vol. 22 (2): 415–431

Kadanoff, L. P. 1971. “From simulation model to public policy: an examination of Forrester's urban dynamics.” *Simulation* Vol. 16: 261 - 268

Kasim, F. F. 2004. Natural and man-made disasters in Nigeria: an appraisal of the National Emergency Management Agency (NEMA) activities. Unpublished master dissertation submitted to the Department of Urban and Regional Planning, University of Ibadan, Ibadan.

Kates R. W. and Kasperson, J. X. 1983. Comparative risk analysis of technological hazards (a review). *Proceedings of National Academy of Science, USA*80:7027-7038.

Khan,B., Iqbal,M J and Yosufzai, M. A. K. 2011 “Flood risk assessment of river indus of pakistan.” *Arab journal of geosciences* Vol. 4:115–122

Kistner, J. 2007. “Migrant children in the city: the suitcases support project for refugees children in inner city Johannesburg.” Paper presented at people building better cities and the third international conference of global studio, at Witwatersrand University, Johannesburg, June 25-28, 2007

Lagos State Bureau of Statistic. 2005. *Population.* Retrieved on 15th January, 2014 from www.lagosstate.gov.ng/pagelinks.php?p=6

Lagos State Bureau of Statistic. 2011. *2010 Housing population in Lagos State*. Ikeja, Lagos State Bureau of Statistic, Ministry of Economic Planning

Lavell, A. 1999. “The impact of disasters on development gains: clarity or controversy.” paper presented at the IDNDR programme forum, Geneva, 5 - 9th July, 1999.

Kofi Annan 1999. UN Secretary-General: "Introduction to Secretary-General's annual report on the work of the organization of United Nations, 1999". *Document A/54/1*. New York. UN

Mabogunje, A. L. 2003. "Land management in Nigeria: issues, opportunities and threats in Omirin, M., Nubi, T., Gbenga and Fawehinmi S (eds) *Land management and property tax reform in Nigeria.* Lagos: Department of Estate Management, University of Lagos

Mabogunje, A.L., Hardoy, J.E. and Mistra, P.R. 1978. *Shelter provision in developing countries*; Surrey: The Gresham Press.

Makoka, D. and Kaplan, M. 2005. *Poverty and vulnerability: term paper interdisciplinary course international doctoral studies programme*. Bonn; Centre for Development Research, University of Bonn

Martine, G. and Guzman, J.M. 1997. *Population, poverty and vulnerability: mitigating the effects of natural disaster*. Rome: Food and Agriculture Organisation of the United Nation (FAO).

Martínez-Viveros, E and López-Caloca, F. P. 2010. "A cybercartographic tool for supporting disaster prevention planning processes and emergency management in Mexico City" in Showalter, S. and Lu Y. (eds.), *Geospatial techniques in urban hazard and disaster analysis, geotechnologies and the environment*, Springer Science+Business Media B.V.: 255 – 271

McCall, G. J. H. 1992. "Natural and man-made hazards: their increasing importance in the end of 20th century world" in McCall G.J.H., Laming D. J. C. and Scott S. C. (eds) *Geohazards: natural and man-made.* London: Chapman and Hall pp 1- 4.

McEntire, D. 2005. "What should we call what we do: comprehensive vulnerability management" *8th annual emergency management higher education conference*. Emmetsburg: National Emergency Training Center. Maryland June 7-9,

McGuire, B. 2000. *Global natural catastrophes: prospects for the next millennium*. London: Benfield Greig Hazard Research Centre.

McKinnon, R. C. 2000. *Cause, effect and control of accidental loss with accident investigation kit*. Boca Raton: Lewis Publisher.

Mitchell, J K. 1999. "Natural disasters in the context of mega-cities" in Mitchell, J K. (ed.) *Crucibles of hazards: megacities and disasters in transition*. Tokyo: UN University Press.

Moody, H. T. 1970. "Urban dynamics: a review of Forrester's model of an urban area" *Economic geography*, Vol. 46 (4) pp. 620-626

Morgan, D. L. 1998. *Focus group discussion as qualitative research*. California: Thousand Oaks Sage Publication

Mulwanda, M., 1992. “Active participants or passive observers?” *Urban studies.* Vol. 29 (1): 89-97.

Munich Re. 2004. *Munich Reinsurance Company report on the 125th year of business 1st January to 31st December 2004*. Retrieved on 25th May, 2007 from http://www.munichre.com/publications/302-04338_en.pdf

Myers G. A. 2010. “Seven themes in African urban dynamics” *discussion paper 50*. Uppsala; The Nordic Africa Institute.

Nanto, D. K., Cooper W. H. and Donnelly J. M. 2011. “*Japan’s 2011 earthquake and tsunami: economic effects and implications for the United States*.” Washington DC. Congressional Research Service

National Emergency Management Agency. [NEMA]. 2003. *Nigeria disaster preparedness: its vision and objectives: report of the national workshop on risk vulnerability poverty and social protection in Nigeria*. Abuja; NEMA

NEMA 2011. *Vulnerability and capacity analysis (VCA) Report*. Abuja. NEMA

NEMA 2012a. *National contingency plan*. Abuja: NEMA

NEMA 2012b. *National disaster management framework.* Abuja: NEMA

NEMA 2012c. *Memorandum of understanding with the Nigerian defence headquarters on disaster response units (DRU).* Abuja: NEMA

Nuhu, A. 2012. “NEMA and disaster management in Nigeria”. Paper presented to students of the defence intelligence officers course 06 2012 at the conference room of the National Emergency Management Agency (NEMA) Headquarters, Abuja, 23rd February 2012

New York State Office of Mental Health 2001. *Crisis counseling guide: defining disaster* Retrieved on 11th March, 2008 from www.omh.state.ny.us

Nigerian Environmental Study/Action Team [NEST] 1991. *Nigerian threatened environment*. Ibadan: Intec Publisher.

Norimichi, T., Shuji, Y and Toshisada K. 1991. *Natural disasters and development*. Tokyo: International Development Centre of Japan.

Nwaka, G. I. 2005. *The urban informal sector in Nigeria: towards economic development, environmental health and social harmony*. Prague: Institute for Global urban development.

Ologunorisa, E. T. 2004. “An assessment of flood vulnerability zones in the Niger Delta, Nigeria.” *International journal of environmental studies* Vol. 61 (1): pp 31 - 38

Ologunorisa E.T. and Abawua M. J. 2005. Flood risk assessment (a review). *Journal of applied science and environmental management.* Vol. 9 (1): pp. 57 – 63.

Ojo E. O. 2001. “Istanbul + 5: the habitat agenda and relevance to disaster management.” *Response; a quarterly publication of the National Emergency Management Agency* Vol. 1 (1): 18-19.

Ojo E. O. 2013. “Global overview of disasters: nature, causes, impacts and management measures.” in Wahab Bolanle, Atebije N. and Yunusa Ibrahim (eds) *Disaster risk management in Nigerian rural and urban settlements.* Abuja: The Nigerian Institute of Town Planners (NITP) and Town Planners Registration Council of Nigeria (TOPREC) pp 39 - 65

Okech, R. N. 2007. “Local community and management of heritage sites: case study of Lamu old town.” *Anatolia: an international journal of tourism and hospitality research* Vol.18 (2): 189-202

Olatubara, C. O. 2002. “Housing policy and its impact on the populace: the elusive solutions to housing problem.” Paper presented at the continuing professional development workshop on housing policy and its impact on the populace, organised by the Nigerian Institution of Estate Surveyors and Valuers, Ogun State branch at Cultural Centre, Kuto, Abeokuta.

Olatubara, C. O. 2007. “Fundamentals of housing” in Agbola, ‘Tunde, Egunjobi, ‘Layi and Olatubara, C. O. (eds.) *Housing development and management: a book of readings*. Ibadan: Department of Urban and Regional Planning, University of Ibadan

Olorunfemi, F. B. 2009. “Urban vulnerability and adaptation to climate change: key issues and challenges in Nigeria” *Urban Global Environmental Change (UGEC) Viewpoints.* Retrieved on 31st May, 2013 fromhttp://ugec.org/docs/UGECviewpointsIssues2.pdf

Oni, O. A. 2010. “Analysis of incidences of collapsed buildings in Lagos metropolis, Nigeria”. *International journal of strategic property management* Vol. 14: 332-346

Osuntokun, A. 1997. “Political culture and urban development in Nigeria. An historical overview” in Osuntokun, A. (ed) *Dimension of environmental problem in Nigeria.* Ibadan: Davidson Press Publisher. 1-11.

Oxfam International. 2010. *Haiti earthquake 2010.* Retrieved on 1st October, 2012 from http://www.oxfam.org/haitiquake

Palestine Red Crescent Society. 2000. *Vulnerability and capacity assessment: a participatory action research study of the vulnerability and capacity of the Palestinian society in disaster preparedness.* Retrieved on 18th October, 2007 from http://www.unicef.org/evaldatabase/file/OCT_00-801.pdf

Pantelic J., Srdanovic, B. and Greene, M. 2005. “Post-modern urbanization and the vulnerability of the poor.” Paper presented at the third urban research symposium: land development, urban policy and poverty reduction: The World Bank and Institute of Applied Economic Research (IPEA), Brasilia, DF Brazil, April 4-6, 2005.

Pantoja, E. 2002. "Micro-finance and disaster risk management: experiences and lessons learned." *Mimeo*. Washington DC: The World Bank.

Pelling, M. 2003. *The vulnerability of cities: natural disaster and social resilience*. London: Earthscan.

Pieterse, E. 2000. *Participatory urban governance: practical approaches, regional trends and Urban Management Programme (UMP) experiences*. Nairobi: UN-Habitat.

Pine, J. C. 2003. *The contributions of management theory and practice to emergency management***.** Retrieved on 4th October, 2007 from http://www.risk.lsu.edu

Piper, C. 2006. *Risk assessment and management: disaster risk management cycle diagram*. Retrieved on 7th November, 2007 from http://www.developmentgateway.com.au/jahia/lsp/link.jsp?idLink=305

Population Reference Bureau. 2001. *2001 world population data sheet*. Washington D. C. Population Reference Bureau.

Population Reference Bureau. 2005. *2005 world population data sheet.* Washington D. C. Population Reference Bureau.

Population Media Centre. 2009. *Population: an underlying theme in addressing some of the world's most challenging problems* Retrieved on 13th January 2012 from www.populationmedia.org/issues/population/?gclid=CPy9v9Cnia4CFUcTfA

Potts, D. 2012. Whatever happened to Africa's urbanisation? Africa Research Institute.

Quarantelli, E L. 2005. "A social science research agenda for the disasters of the 21st century: theoretical, methodological and empirical issues and their professional implementation," in Perry R. W. and Quarantelli E. L. (Eds) *What is a disaster? New answers to old questions*, Philadelphia: Xlibris, 325–96.

Rakodi, C. 1999. "An overview of the research issues." *urban governance and poverty theme paper No. 4* Birmingham: Birmingham University

Ramroth, W. G. 2007. *Planning for disaster: how natural and man-made disasters shape the built environment.* New York: Kaplan Publishing

Ravallion, M. 2001. *On the urbanisation of poverty*. Washington D. C.World Bank.

Robertson, R. 1992. *Globalisation: social theory and global culture*. London: Sage.

Sanderson, D., 2000. "Cities, disasters and livelihoods." *Environment and urbanization.* Vol. 12 (2): 93-102.

Sharma, K., Khan, S. and Warmock, K. 2000. *Governing our cities: will people power work?* London; The Panos Institute.

Simone, A. 2002. *Principles and realities of urban governance in Africa.* Nairobi: UN-Habitat

Smith, K. 1996. *Environmental hazards*. London: Routledge..

Smith, S. 1997. "Urban consolidation: current developments". *Briefing paper No 23/97*. NSW Parliamentary Library Research Service

Smith, K. 2004. *Environmental hazards assessing risk and reducing disaster*. London: Routledge

Smith D. 2005. "In the eyes of the beholder? Making sense of the system(s) of disaster(s)" in Perry, R. W. and Quarantelli E. L. (eds) *What is a disaster? New answers to old questions* Philadelphia, Pennsylvania: Xlibris Corporation pp 201 - 236

Smith, T. 2008. *The role of ward committees in enhancing participatory local governance and development in South Africa: evidence from six ward committee case studies.* Cape Town: Community Law Centre.

Stephenson, R. S. 1994. *Disaster assessment: disaster management training programme.* Madison; University of Wisconsin Disaster Management Centre and UNDP

Strange, H. K. 2006. "Clinton says climate change greatest threat". *United Press International.* Monday 16th May 2006. Retrieved on 22nd May, 2006 from www.upi.com

Taylor, P. 2000. "UNCHS (Habitat) – The global campaign for good urban governance. *Environment and urbanisation,* Vol. 12 (1): 197-202

The Presidency. 2001. *National disaster response plan*. Abuja: National Emergency Management Agency [NEMA].

The Punch Newspaper. 2007. "Sudden sea level surges threatened one billion study." *The Punch newspaper*. Monday, April 23, 2007, page 36.

Thompson, P. 1995. *Introduction to natural disaster response*. Madison: Disaster Management Centre Department of Engineering and Professional Development, University of Wisconsin.

Tibaijuka, A. K. 2002. "Forward" in Simone, A (ed). *Principles and realities of urban governance in Africa.* Nairobi: UN-Habitat.

Tibaijuka, A. K. 2006. *Housing and urbanisation issues in africa*. Washington D. C. Fannie Mae Foundation, Inc.

Torres H., Alves H., and Aparecida de Oliveira M. 2007. "Sao Paulo peri-urban dynamics: some social causes and environmental consequences." *Environmental and urbanisation,* Vol. 19(1): 207 - 223

Turner, B. L., Kasperson, R. E., Matson, P. A., McCarthy, J. J., Corell, R. W., Christensen, L., Eckley, N., Kasperson, J. X., Luers, A., Martello, M. L., Polsky, C. Pulsipher, A. and Schiller, A. 2003. "A framework for vulnerability analysis in sustainability science", *Proceedings of the national academy of science* Vol. 100 (3): 8074−8079.

Twigg, J. 1998. *Disasters, development and vulnerability.* Retrieved on 27th July 2006 from http://www.benfieldhrc.org/activities/misc_papers/DEVRISK/INTRO.HTM

Twigg, J. 2001. *Corporate social responsibility and disaster reduction: a global overview*. London: Benfield Hazard Research Centre.

UN-Habitat. 1996. *An urbanising world: global report on human settlements 1996*. Oxford: UN Habitat

UN-Habitat. 2001a. *Tools to support participatory urban decision making*. Nairobi; UN-Habitat.

UN-Habitat. 2001b. *Assessment of vulnerability to flood impacts and damages: disaster management programme*. Nairobi; UH-Habitat

UN-Habitat and Department for International Development [DFID]. 2002. *Sustainable urbanisation: bridging the green and brown agendas*. London: Development Planning Unit, University College London.

UN-Habitat. 2002a. *Cities as symbol of hope: the habitat and istanbul + 5 process.* Retrieved on 7th May, 2006 from www.earthsummit2002.org

UN-Habitat, 2002b. *Global campaign on urban governance: concept paper*. Nairobi: UN Habitat.

UN-Habitat. 2003a. *The challenges of slums: global report on human settlements 2003*. London: Earthscan Publication.

UN-Habitat. 2003b. *Slums of the world: the face of urban poverty in the new millennium?* Nairobi: UH-Habitat.

UN-Habitat. 2005. *Urbanisation challenges in sub- sahara africa*. Nairobi: UN-Habitat.

UN-Habitat. 2007. *Enhancing urban safety and security: global report on human settlements 2007*. London: Earthscan Publication.

United Nations [UN], Population Division. 2003. *World population prospects: the 2002 revision highlights*. New York: United Nations [UN], Population Division.

United Nations Development Programme [UNDP]. 2004. *Reducing disaster risk: a challenge for development a global report.* New York, United Nations Development Programme Bureau for Crisis Prevention and Recovery

United Nations Population Fund (UNFPA). 2007. *State of world population 2007: unleashing the potential of urban growth*. New York; UNFPA

United Nations Population Fund [UNFPA] 2011. *State of world population 2011: people and possibilities in a world of 7 billion*. New York: UNFPA

United Nations Organisation [UN] 1990. *Human development report*. Oxford: Oxford University Press.

United Nations Organisation [UN] 1996. *World urbanisation prospects: the 1996 revision annex tables*. New York: UN

Van Western C.J. and Hosfstee, F. 2000. "The role of remote sensing and GIS in risk mapping and damage assessment for disasters in urban areas." *Fernerkundung und Naturkatastrophen* 7: 442 – 450

Veenhuizen, R. van 2006. "Introduction, cities farming for the future" in Veenhuizen, R van (ed) *Cities farming for the future, urban agriculture for green and productive cities.*Ottawa: RUAF Foundation, International Institute of Rural Reconstruction, International Development Centre: pp 1 - 17

Velasquez, G., Uitto J., Wisner B., Takahashi S. 1999. "a new approach to disaster mitigation and planning in mega-cities". In: Inoguchi, T. (ed.) *Cities and the environment*. Tokyo: The United Nations University Press pp. 161-184.

Wahab Bolanle. 2013. "Disaster risk management in Nigerian human settlements." in Wahab Bolanle, Atebije N. and Yunusa Ibrahim (eds) *Disaster risk management in Nigerian rural and urban settlements.* abuja: The Nigerian Institute of Town Planners (NITP) and Town Planners Registration Council of Nigeria (TOPREC): 89 - 125

Warfield, C. 2005. *The disaster management cycle*. Retrieved on 31st January, 2012 from http://www.gdrc.org/uem/disasters/1-dm_cycle.html

Watts, M. J., and Bohle, H. G. 1993. "The space of vulnerability: the causal structure of hunger and famine". *Progress in human geography*. Vol. 17 (1): 43-67.

White, R., Engelen, G., Uljee, I., Lavalle, C., Erlich, D. 1999: "Developing an urban land use simulator for European cities," *Proceedings of the 5th EC-GIS workshop,* European Communities, Italy, pp. 179-190, 1999.

Wilcox, D. 2004. *The guide to effective participation.* Retrieved on 27th July, 2007 from http://www.partnerships.org.uk/guide/ideas.htm

Wisner, B. 2001a. "Risk and the neo-liberal state: why Post-Mitch lessons didn't reduce El-Salvador's Earthquake Losses," *Disasters*. Vol. 25 (3): 251-268.

Wisner, B. 2001b *'Vulnerability' in disaster theory and practice: from soup to taxonomy, then to analysis and finally tool*. International work-conference. Wageningen; Disaster Studies and Research Centre, Wageningen University.

Wisner, B. 2001c. "Disasters: what the United Nations and its world can do." *United Nations Chronicle.* Vol. 37 (4): 6-9.

Wisner, B. 2003. "Disaster risk reduction in megacities: making the most of human and social capital" in Kreimer, A. et al. (eds.) *Building safer cities: the future of disaster risk.* Washington D C: The World Bank.

Wisner, B., Blaikie, P., Cannon, T. and Davis, I. 2003. *At risk: natural hazards, people's vulnerability and disasters***.** New York: Routledge.

World Bank. 1999. *World development report 1999/2000: entering the 21 century* New York: Oxford University Press.

World Bank 2001. Indoor air pollution: energy and health for the poor; *Newsletter issue No. 3.* Washington D C World Bank

World Bank. 2005. *2004 Floods in Bangladesh: damage and needs assessment and proposed recovery program*. Washington D C: The World Bank.

Wu, S., Yarnal B. and Fisher A. 2002. "Vulnerability of coastal communities to sea-level rise: a case study of Cape May County, New Jersey, USA." *Climate research* Vol. 22: 255–270,

Yodmani,S. 2001. "Disaster risk management and vulnerability reduction: protecting the poor" Paper presented at the Asia and Pacific forum on poverty organized by the Asian Development Bank

Zebrowski, E. 1997. *Peril of a restless planet*. Cambridge: Cambridge University Press.

Appendix I

Household Questionnaire (Type A)

Dear Respondents,

This questionnaire is designed as part of PhD research instrument to seek information on Urban Dynamics and Vulnerability to Disasters in Metropolitan Lagos. Your honest response will be highly appreciated. Instruction: Please provide or tick the options in the column that suits your condition

A. Socio–Economic Characteristics

1 Geographical Location

(i) Name of Locality ……………………….. [ii] Ward……………………………

[iii] Street Name…………………………[iv] House Identification Number…………

[v] Density of the area (a) High density (b) Medium density (c) Low density

2 For how long you been living in this area ………………………………………

3 Age of respondent ………………………………………………………………

4 Gender: Male………………….................. Female………………………………

5 Religion …………………………………………………………………………

6 Ethnicity…………………………………………………………………………

7 Marital Status: (a) Single (b) Married (c) Widower (d) Divorced (e) Separated

8 Number of person(s) in the household ……………………………………………

9 Highest Level of Education qualification (a) None (b) Primary /Adult Education (c) Secondary Education (d) Post Secondary Education (e) Others Specify……………

10 Occupation (a) Unemployed (b) Trading/Business (c) Artisan (d) Farming (f) Civil Servant (g) Professional (h) Retired (i) other (specify)……………………

11 Income per month ………………………………………………………………

B. Housing and Household Characteristics

12 Age of building …………………………………………………………………

13 Type of house tenure (a) Owner-Occupier (b) Rented (c) Institutional Property (d) Family House (e) Squatter (f) Others Specify ………………………………

14 Types of dwelling unit (a) Rooming Apartment (b) Flat (c) Duplex (d) Compound

15 Total number of rooms in the building……………………………………………

16 Total number of household in the building ………………………………………

17 Average number of people per room………………………………………………

18 Distance of building (in metres) to the adjacent structure on the (a) Right ……… (b) Left …………….......... (c) Rear …………………… (d) Front ………………

19 Material used for wall (a) Block (b) Mud (c) Plank and Iron Sheets (d) Stone (e) Burnt Brick (f) Others (Specify)……………………………………………

20 Is the wall plastered? ....

21 Roof material (a) Interlocking Tile (b) Corrugated Iron Sheet (c) Thatched Roof (d) Reinforced Concrete Block (e) Others (Specify)………………...……………

22 Door and window material (a) Modern Frame and Wooden Panel (b)Wooden Frame and Glass/ Louvres (c) Metal Frame and Glass Panel/Louvres (d) Aluminum Doors and Window (e) Metal Sheet (f) Others (Specify)……………

23 Height of building (a) High-Rise Building (No of floors)…… (b) Storey Building (c) Bungalow (d) Others (Specify)…………………………

24 Drainage channel for water flow around building (a) Available (b) Not Available

25 If available, in what condition (a) Free and Flowing (b) Blocked (c) Others (specify)……..

26 Setback of property from water bodies (streams, rivers, ponds) (a) 0-10m (b) 11-20m (c) 21-30M (d) 31-40m (e) 41-50m (f) Above 50m

27 Physical condition of the building (a) Good (b) Needs Minor Repair (c) Major Repair (d) Others (specify)……………………………………………………….…

C. Housing Facilities, Convenience and Sanitation

28 Source of water for domestic use: (a) Tap/Piped Water (b) Well/Borehole (c) Stream / Pond (d) Street Hawkers (e) Others (specify)……………………………

29 Distance to source of water (a) Within the compound (b) Outside Neighbourhood (c) Within the Neighbourhood (d) Others (specify)……………

30 Distance of well or other sources of water to soak-away or refuse dump etc. (a) 0-10m (b) 11-20m (c) 21-30m (d) 31-40m (e) 41-50m (f) Above 50m

31 Location of well or other sources of water in relation to soak away or refuse dump (a) Up Hill (b) down Hill (c) Same Level (d) Others (Specify)……………………………………

32 Toilet facility (a) Water Closet (Separated) (b) Water Closet (Shared) (c) Pit Latrine (d) Pail Latrine (e) Bush (f) None (g) Other (Specify) ………………

33 Number of person(s) per toilet facility (a) 1-2 (b) 3-4 (c) 5-6 (d) 7-8 (e) above 9

34 Kitchen facility (a) Open Space (b) In Built, Within the House (c) In Built, Within the House but Shared (d) None (e) Other (Specify) ………………………

35 What are the types of waste generated in the house ………………………………

36 Method of waste collection (a) Government Agency (b) Organized Private Collector (c) Local Cart Pushers (d) Other (Specify)……………………………

37 Frequency of collection: (a) Daily (b) Twice a Week (c) Every Other Day (d) Weekly (e) Other (Specify)………………………………………………… …….

38 If waste are not collected by: government agency; organized private collector and or local cart pushers, how do you dispose waste (a) Communal Dumps (b) In the Bush/Open Space (c) Dump in Water Drainage/Channel or Stream (d) Burnt in a Communal Open Space (e) Road Side or Medium (f) Other (Specify)…………

39 What are the effects of non collection of waste in your neighbourhold ………… …..……………………………………………………………………………………

40 Class or types of road servicing your locality: (a) Ring Road (Outer by-pass) (b) Primary Arterial Road (c) Secondary Arterial Road (d) Distributor Road (e) Service (Access) Road

41 Condition of road: (a) Good (b) Fair (c) Poor

42 What is/are the major means of transportation: (a) Walking (b) Okada (Motorcycle) (c) Car (Private) (d) Taxi (e) Bus (f) Other (Specify)………………

43 Do you have difficulty in accessing your locality: ……………………………

44 If yes, what is responsible for the inaccessibility: ………………………………

45 Situation of traffic congestion in the neighbourhood: (a) Frequently (b) Occasionally on Most Roads (c) Frequently on Few Roads (d) Occasionally on Few Roads (e) Does not Occur at All

D. Vulnerability and Disaster Related Information

46 Do you have information prohibiting living in any specific part of your locality …………………………………………………………………………………

47 If yes, from which agency or organization ………………………………………

48 What is your definition of a disaster...

49 Is your area vulnerable to any form hazard or disaster (a) Yes (b) No
50 If yes, list them ……………………………………………………………………
51 Have you ever experienced any form of hazards /disasters in your locality (a) Yes (b) No
52 If yes list them ……………………………………………………………

Information on Flood

53 Has your area/house experience flooding ever? (a) Yes (b) No
54 If yes, how often? (a) Every Time it Rains Heavily (b) Occasionally When it Rains Heavily (c) Anytime it Rains (d) Others (Specify) ………………………….
55 When was the last flood? ……………………………………………………
56 It lasted for how long …………………………………………………………
57 Personally, what was the experience of flood like ……………………………
58 What do you think caused the flood (a) Natural Causes (b) Human Induce Causes (c) Act of God (d) Other (Specify) ……………………………………….
59 If human induced, which of the following(s) is/are correct? (a) Location of Property in Hazard Prone Area (River Flood Plain) (b) Improper Planning or Design (c) Inadequacy of Flood related laws (d) Others (Specify)………………
60 Despite the occurrence of flood, give reason(s) why you still live in this house or locality (a) Nearness to Place of Work (b) Cheaper Rent (c) Family House (d) Personal House (e) Others (Specify) ………………………………………………
61 Has there been any measure by the community or government to combat flood in this locality? (a) Yes (b) No
62 If yes, by which agency and or community ………………………………….
63 Please list the measures…………………………………………………………
64 What can be done to prevent the reoccurrence of flood? (a) Cannot be Prevented (b) Property Relocation (c) Adequate Drainage Network (d) Better Planning and Management (e) Adherence to Building Set Back (f) Others (Specify) ………..

Information on Fire

65 Have you ever experienced or witnessed incidence of fire-outbreak before (a) Yes (b) No
66 If 'yes' when and where………………………...
67 Can you give a vivid recollection what you witnessed ..………………………
…………………………………………………………………………………
…………..…………………………………………………………………………
68 Were the adjacent buildings affected during the fire incident in the locality.……
69 When last did any fire-outbreak occur ……………………………………………
70 From your experience, what was the frequency of occurrence over the years (a) Once (b) Twice (c) More than Twice (d) Others (Specify)……………………..
71 What do you think was the cause of the fire-out breaks? (a) Human Mistakes (b) Natural Occurrence (c) Others (Specify)……...……………………………
72 If fire-outbreak is caused by human activities and or mistake, which of the following is/are the predominant causes? (a) Careless Handling of Fire or Electrical Appliances (b) Careless Handling of Combustible Materials (c) Sudden High Voltage by PHCN (d) Improper Planning or Design (e) Inappropriate Building Materials (f) Buildings in Close Proximity (g) Others (Specify)……….
73 What is the estimated distance of Federal Fire Services to your locality ………
74 What is the response time to your observed fire incident ……………………

75 Has there been any measures by the community or government to combat fire-outbreak in the locality (a) Yes (b) No
76 If yes, list the measures……………………..……………………………….....
…………………………………………………………………………………
77 Is your building vulnerable to fire hazard (a) Yes (b) No
78 If yes, and despite vulnerability to fire-outbreak give reason(s) for the continuation of tenancy (a) Nearness to Place of Work (b) Cheaper Rent (c) Family House (d) Personal House (e) Others (Specify) ...………………………
79 How can fire-outbreak be prevented from occurring in your environment (a) Careful Handling of Combustible Materials (b) Electrical Appliances Should be Switched of When not in Used (c) Using Fire-Resistant Building Material (d) Better Design of Infrastructure (e) Adherence to Building Code and Regulations (f) Others (Specify)……………….……..

Information on Building Collapse

80 Have you ever experienced or witnessed building collapse before (a) Yes (b) No
81 If 'yes' can you recollect the experience of what you witnessed………………
…………………………………………………………………………………
82 Is building collapse frequent in your locality (a) Yes (b) No
83 If yes, how frequent is the occurrence yearly (a) Once (b) Twice (c) More than Twice
84 What is responsible for building collapse (a) Natural Causes (b) Human Failure or Mistake (c) Age of the Building (d) Structural Defects (e) Substandard Building Materials Location of Building (f) Others (Specify) ……………………
85 Has there been any measure by the community or government to curb collapse of building in Lagos (a) Yes (b) No
86 If 'yes' what is/are the measure(s) ……………………………………………
87 What can be done to prevent future occurrence of building collapse be? (a) Use of Appropriate Building Materials (b) Employment of Qualify Professionals to Supervise the Project (c) Proper Design of Building (d) Demolition of Structural Inadequate Buildings (e) Others (Specify)……………………………………..

Information on Land Subsidence

88 Is any building affected by land-subsidence in your locality (a) Yes (b) No
89 If yes, where is/are the building(s) located …………………………………
90 What do you think is the cause of the land-subsidence? (a) Natural Causes (b) Human Mistake (c) Incessant Bore Hole for Water (d) Structural Defects (e) Nature of Soil (f) Others (Specify)…………………..
91 If land-subsidence is caused by human mistake, which of the following actions influenced it? (a) Sinking of Bore Hole (b) Improper Planning or Design (c) Structurally Defective Building (d) Others (Specify)…………………………
92 What can be done to avert land subsidence (a) Abolition of Bore Hole (b) Provision of Piped Borne Water Network in the Neighbourhood (c) Proper Planning (d) Construction of Structurally Sound Buildings (e) Others (Specify)…………………………………
93 Has there been any measure by the community or government to combat land subsidence in your locality (a) Yes (b) No
94 If yes what is/are the measure(s)…………………………………………………
…..………………………………………………………………………………

Information on Diseases Outbreak

95 Do you know about any health related policies, programmes or law in Lagos state (a) Yes (b) No

96 If yes, are you aware of any sanitation or health regulations affecting your household…..

97 List the diseases that are link to poor environmental conditions…………………

98 Have you and any household member suffered from any of the diseases listed (a) Yes (b) No

99 If 'yes' which of the diseases listed (a) Cholera (b) Malaria (c) Typhoid Fever (d) Measles (e) Others (Specify)………...…………………………… ….

100 How often is the occurrence of the ailment (a) Frequently (b) Occasionally

101 When last did the household experience the ailment ……………………………

102 Despite the ailment give reason for your continuation of tenancy in the present housing unit (a) Nearness to place of work (b) Cheaper Rent (c) Family House (d) Personal House (e) No Other Alternative (f) Others (Specify)……………………….

103 What do you think was the cause of the disease outbreak (a) Poor Sanitation and Inadequate Hygiene Conditions (b) Overcrowding (c) Environmental Factors (d) Others (Specify)……...................………………………………………………………

104 What can be done to militate future diseases outbreak in your vicinity (a) Improved Personal Hygienic Condition (b) Improve Sanitation (c) Decongestion of Dwelling (d) Frequent Drainage Clearance (e) Others (Specify)………………..……………..

105 Has there been any measure by the community or government to combat outbreak of disease in your locality (a) Yes (b) No

106 If yes what is/are the measure(s)………………………………………….………

E Disaster Mitigation Measures

107 Do you know of any disasters management agency in Nigeria? (a) Yes (b) No

108 If yes what is the name of the agency?..

109 Has the agency done anything relating to disasters prevention and or management within your locality before? (a) Yes (b) No

110 If yes, list what the agency had done……………………………………………

111 In your own assessment, how efficient/effective is the agency in carrying out her responsibility? (a) Not Efficient (b) Averagely efficient (c) Efficient (d) Very Efficient

112 From the disaster or hazard events you had witnessed or affected, did the affected populace receive help from any organization (a) Yes (b) No

113 If yes, from which organization (a) Individual/Residents Association (b) NGO/Philanthropist Organization (c) Community (d) L.G.A. (e) State Government (f) Federal Government (g) International Organization/Foreign Government (h) Others (Specify)………………………..

114 Who do you think will help in militating or reduce the danger of hazard /disaster in your locality (a) Individuals (b) Community Organizations (c) Government Disaster Agencies (d) NGOs (e) International Organization (f) Others (specify)…..

115 Personally, what can be done to improve on disaster management in your neighbourhood……………………………………………………………………… ………………………………………………………………………………………

Thank you

Interview Guide for the National and State Emergency Management Agency Official(s)

(Type B Questionnaire)

Dear Respondents,
This questionnaire is designed as part of PhD research instrument to seek information on Urban Dynamics and Vulnerability to Disasters in Metropolitan Lagos. Your honest response will be highly appreciated. Instruction: Please provide or tick the options in the column that suits your condition

General Information of Responsible Officer

1. Age ……………………………………
2. Gender ……………………
3. Marital Status …………………………..
4. Religion ……………………
5. Grade Level / Position Held ……………..
6. Monthly income …………
7. Highest Level of Education……….........
8. Ethnic Group ………………

Section A: General and Statutory Obligation of the Agency

8. Location of the Agency …………………………………………
9. When was the Agency established?...
10. Please provide the Agency’s organogram in the space provided…………………
11. What are the statutory obligations of the Agency……………………………
12. Is there any policy framework put in place by the Agency to actualize the statutory obligations above……………………………………………………
13. If yes, please provide the policy ………………………………………………
    To what extent has the policy been implemented?...
14. Is the Agency enjoying government support to implement the policy?.................
15. If yes, how?..
16. What are the Agency’s sources of funding ……………………………………
17. What are the statutory allocations and expenditure profile of the agency since inception?

Year	Allocations	Expenditure

Section B Disaster Management and Mitigation

18. What is the Agency’s definition of a hazard/disaster?...
19. How are disasters categorized by the Agency?..
20. Give reasons for the categorization above……………………………………
21. How many of each category has the Agency managed since its inception? ....
22. Please give a time series view of each category handled………………………
23. Are there specific mitigating measures for each category of disaster?...................
24. If yes, what are the mitigating measures for each category?.................................

25. How effective are the mitigating measures adopted above to cater for the specific disaster…………………………………………………………………………

26. Is there contingency plan for disaster management in Nigeria? ………………

27. If yes, list the types of contingency plans used by the Agency since its inception. …………………………………………………………………………………

28. Is there contingency stock of relief material for disaster victims?..........................

29. On the average, how much is expended on each type of disaster per annum………………

30. Has the Agency done disaster simulation to determine the effectiveness of its contingency plan and policy?...

Section C: The Agency and Other Disaster Networks

31. Are there other networks (public, private and NGOs) affiliated to the Agency in disaster management in Nigeria……………………………………………………

32. Please list the networks……………………………………………………………

33. Are there specific types of disaster associated with each network?.......................

34. If yes, please list the types given to each network……………………………… …………………………………………………………………………………

35. How efficient is the Agency in coordinating the activities of other networks in pre-, during, and post-disaster phases……………………………………………

36. What are the policies put in place to ensure the effective coordination of other networks…………………………………………………………………………

37. What are the impediments militating against the Agency in achieving optimal coordination of other disaster networks?...

Section D Vulnerability Study

38. Has the Agency done vulnerability study and disaster mapping of the country….

39. If yes, when was the study and mapping carried out……………………………

40. What are the vulnerability status of the country before and after the study had been carried out………………………………………………………………

41. List the types of disasters that are associated with each geo-political zone in Nigeria...............…………………………………………………………………

42. For each zone, what categories of people are the most vulnerable to disasters?..... …………………………………………………………………………………

43. Is there any relationship between the socio-economic characteristics of the inhabitants of each identified vulnerable zone and disasters?...............................

44. If yes, what has the Agency done to palliate the effects of disasters in such environments?...

45. List the number of public enlightenment programmes and workshops that the Agency had done since its inception…………………………………………

46. Are there direct participation of the inhabitants of vulnerable areas to the management of disasters in their environments?..

Section E: Problems of the Agency

47. What are the problems of the Agency in mitigating disaster in Nigeria since its inception?...

48. What can be done to solve the stated problems?..

49. In general, is the Agency effective to proactively and pre-emptively abate disasters in Nigeria…………………………………………………

50. How do you define efficiency in this regard?..

51. How is the agency well funded to achieve its mission…………………………

52. Is the funding from the ecological fund and other sources used for and or sufficient to meet the financial requirements of the Agency?................................

53. Does the Agency has adequate manpower (Professionals) to functionally militate and manage disasters?..

54. Please give an account of a typical day in a disaster response period………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………

55. State other relevant comments to this study. ……………………………………….
………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………

Thank you.

Interview Guide for other Disaster Management Networks (Fire Services, Red Cross, State and Federal Ministries Construction Companies) Officials (Type C Questionnaire)

Dear Respondents,
This questionnaire is designed as part of PhD research instrument to seek information on Urban Dynamics and Vulnerability to Disasters in Metropolitan Lagos. Your honest response will be highly appreciated. Instruction: Please provide or tick the options in the column that suits your condition

Socio – Economic Characteristics

1. Age ……..............................………………..
2. Gender ...………………….
3. Marital Status …………………………..
4. Religion ……………………
5. Grade Level / Position Held ……………
6. Monthly income …………
7. Highest Level of Education……….........
8 Ethnic Group ………………

Section A: General Information

8. Location of the Network ………………………………………………………………
9. When was the network established ……………………………………………………
10. Type of network: Public ……………Private……………….NGO…..................
11. Please provide the network organogram in the space provided
12. What are the statutory obligations of the network……………………………………
………………………………………………………………………………………
………………………………………………………………………………………
13. Is there any framework adopted by the network to actualize her statutory obligations……………………………………………………………………………
14. If yes, list the framework…………………………………………………………….
………………………………………………………………………………………
15. Is the network affiliated to any other international organizations?.........................
16. If yes, name the organizations……………………………………
17. Is the network aware of the activities of the National Emergency Management Agency (NEMA) in Nigeria………………………………………….......................
18. Sources of finance to the network ……………………………………………

Section B Disasters Management and Mitigation

19. What is the network's definition of a typical disaster?..
………………………………………………………………………………………
What are the types of disaster handled by the network?..
………………………………………………………………………………………

20. Does the network has contingency plan for disaster mitigation…………………

21. If yes, list the contingency plan…………………………………………………

………………………………………………………………………………………

22. Are the local inhabitants of vulnerable areas and NEMA/SEMA involved in drawing up the plan………………………………………………………

23. Has the network given relief materials to disaster victims before?..........................

24. If yes, is it given through NEMA/SEMA or directly by the network to the victims?..

25. What types of materials and how are these disbursed to victims?...........................

………………………………………………………………………………………

What can be done to improve the effectiveness of NEMA/SEMA and other disaster networks in managing disaster in Nigeria?..

………………………………………………………………………………………

………………………………………………………………………………………

26. In general what can be done to proactively and pre-emptively abate disaster in the country …..……………………………………………………………………....

27. What are the shortcomings of the network in mitigating disasters in Nigeria?........................…...………………………………………………………

……………………………………………...………………………………………

Section C Relationship Between Disaster Networks and the Agency

28. Does the network react to disasters on humanitarian ground or strictly by NEMA/SEMA's invitation?...

29. Is the network associated with some specific disaster response?...........................

30. If yes, list such disasters response……………………………………………..

31. Are there specific disaster mandate given to the network by NEMA/SEMA in managing disaster in Nigeria……………………………………………………....

32. If yes, what are the mandates…………………………………………………..

……………………………………………………………………………………..

33. How many disasters have the network responded to under the supervision of NEMA……………………………………………………………………………

34. Please give a time-series view of disasters handled on your own or in conjunction with NEMA since the inception of the Agency…………………………………

………………………………………………………………………………………

…...

35. Is there a cordial relationship between NEMA and other network during disaster phases (Pre-, during- and post – disaster)………………………………………

……………………………………………………………………………………

36. Please give an insight into the significant of NEMA as the institution legally responsible for disasters management and coordination of other networks in Nigeria since its inception …………………………………………………………..

37. State other relevant comments to this study.………………………………….

Thank You

Appendix II

Building collapse and suspected causes of collapse in Lagos State 1978 - 2013

No	Location of buildings	Location of collapse	Year of incident	Building types	Suspected causes of collapse
1	74, western Avenue	Surulere	1978	Residential	Structural Defects
2	38 Lewis Street. Lagos Island	Lagos Island	1983	Residential	Structural Defects
3	31, Legeda Street, Iponri, Lagos	Lagos Mainland	1983	Residential	Structural Defects
4	27, Ojuelegba Road	Surulere	1983	Residential	Structural Defects
5	67, Beecroft Island	Lagos Island	1984	Residential	Structural Defects
6	160, Western Avenue, Iponri	Surulere	1985	Residential	Structural Defects
7	30, Ojuna Road, Lagos Island	Lagos Island	1985	Residential	Structural Defects
8	64, Ojuelegba Road	Surulere	1985	Residential	Structural Defects
9	92, Allen Avenue, Ikeja	Ikeja	1985	Residential	Structural Defects
10	112, Bereka Lane, Off Tokunbo street, Lagos	Lagos Island	1985	Residential	Structural Defects
11	66, Adeniji Adele, Lagos	Lagos Island	1985	Residential	Structural Defects
12	102, Ojuelegba Junction, Ayilara	Surulere	1985	Residential	Structural Defects
13	86, Western Avenue, Iponri	Surulere	1986	Residential	Structural Defects
14	44, Usabi, Maryland	Ikeja	1986	Residential	Structural Defects
15	112, Orile Iganmu Odunade Bus-stop	Ajeromi Ifelodun	1986	Residential	Structural Defects
16	32, Berkley Lane Lagos Island	Lagos Island	1986	Residential	Structural Defects
17	41, Idunsagbe Lane, Lagos Island	Lagos Island	1986	Residential	Structural Defects
18	115, Agege Way, Lagos	Agege	1987	Residential	Structural Defects
19	92, Ikorodu Road, Ketu, Lagos	Kosofe	1987	Commercial	Structural Defects
20	63, Akinade Village, Ikeja	Ikeja	1987	Residential	Structural Defects
21	104, Ipetu St. Ikorodu	Ikorodu	1987	Residential	Structural Defects
22	20, Idusagbe Lagos Island	Lagos Island	1987	Residential	Structural Defects
23	94, Idumagbo Area Lagos Island	Lagos Island	1987	Residential	Structural Defects
24	160, Agege Motor Way, Lagos	Agege	1987	Residential	Structural Defects
25	77, Adeniji Adele Lagos Island	Lagos Island	1989	Residential	Structural Defects
26	38, Akinwumi Street, Mende Maryland.	Ikeja	1989	Commercial (Hotel)	Structural Defects
27	77, Idumota lane,Lagos Island	Lagos Island	1989	Commercial (Hotel)	Structural Defects
28	99, Beecroft Lane, Lagos Island	Lagos Island	1989	Institutional (School)	Structural Defects
29	176, Idi-Oro Mushin	Mushin	1990	Residential	Structural Defects

30	201, Idumota Lane Lagos Island	Lagos Island	1990	Residential	Structural Defects
31	63, Idumagbo Lane, Lagos Island	Lagos Island	1990	Residential	Structural Defects
32	41, Mayosore Close Gbagada	Shomulu	1991	Residential	Structural Defects
33	Unilag Akoka	Shomulu	1991	Institutional (School)	Structural Defects
34	39, Hawley Road Sabo. Lagos	Shomulu	1992	Residential	Structural Defects
35	113,Oyadiran Estate Sabo, Lagos	Shomulu	1992	Residential	Structural Defects
36	24, Alfia St. Mushin, Lagos	Mushin	1992	Residential	Structural Defects
37	17, Adeniji Close, Bariga, Lagos	Shomulu	1993	Residential	Structural Defects
38	103, Airpot Road, Mafoluku Oshodi	Oshodi-Isolo	1994	Residential	Structural Defects
39	98, Okesuna Road, Oshodi	Oshodi-Isolo	1994	Commercial (Hotel)	Structural Failure
40	119, Idumagbo Area, Lagos Island	Lagos Island	1994	Residential	Structural Defects
41	Block 4, Jakande Estate, Aja Lagos	Eti-Osa	1994	Residential	Structural Defects
42	193 Airport Road, Oshodi	Oshodi-Isolo	1994	Residential	Structural Defects
43	78, Ayoade street, Ajao Estate Lagos	Oshodi-Isolo	1995	Residential	Structural Defects
44	87, Wale Ajose, Mende, Maryland	Ikeja	1995	Residential	Structural Defects
45	69, Maryland, Ikeja	Ikeja	1995	Residential	Structural Defects
46	67, WAEC Office Road, Ogba Ikeja, Lagos	Agege	1995	Religious	Structural Defects
47	176, Agege Motor Way, Lagos	Agege	1995	Residential	Structural Defects
48	161, Maryland, Ikorodu Road	Ikeja	1995	Residential	Structural Defects
49	17, Aleyinto street, Agege, Lagos	Agege	1995	Residential	Structural Defects
50	16, Gbolahan Street, Iponri Lagos	Surulere	1995	Commercial	Structural Defects
51	17, Iponri, Lagos	Lagos Mainland	1996	Residential	Structural Defects
52	112, Alapere Road, Ketu Lagos	Kosofe	1996	Institutional (School)	Structural Defects
53	20, Olowokere Str. Oshodi	Oshodi-Isolo	1996	Residential	Structural Defects
54	113, Mafoluku Street, Oshodi	Oshodi-Isolo	1998	Religious	Structural Defects
55	63, Igbobi College Way, Igbobi Lagos	Shomulu	1998	Residential	Structural Failure
56	41, Olowokere Oshodi	Oshodi-Isolo	1999	Religious	Structural Defects
57	38, Oke Igbala Street, Mushin	Mushin	1999	Residential	Structural Defects
58	104, Idusagbe Lane, Lagos	Lagos Island	1999	Residential	Structural Defects
59	78, Idumota Lane, Lagos Island	Lagos Island	1999	Residential	Structural Defects
60	43, Ikota Way, Ajah Lagos	Eti Osa	1999	Commercial	Structural Failure
61	St Denis Catholic Church, Akoka Road, Bariga	Shomulu	2000	Religious	Structural Failure
62	40, Sanni Street, Itire Lagos	Shomulu	2000	Residential	Structural Defects

63	38, Adeseun Str. Itire Lagos	Shomulu	2000	Residential	Structural Defects
64	56A, Adeniji Adele, Lagos	Lagos Island	2000	Residential	Structural Defects
65	State High School, Alimosho	Alimosho	2000	Institutional (School)	Structural Failure
66	14, Semi Sarumi Street, Itire	Surulere	2000	Residential	Structural Defects
67	Folami Primary School, Atunrase	Surulere	2000	Institutional (School)	Unreinforced Walls
68	10/12, Suenu Street, Lagos Island	Lagos Island	2000	Residential	Deterioration of Structural Slabs
69	Isako Village, Off Lekki-Epe Highway	Ibeju-Lekki	2000	Residential	Structural Failure
70	Karunwi Central Mosque, 24, Buhari Street	Mushin	2001	Religious	Structural Defects
71	15, Akewusola Street, Oworonsoki	Somolu	2001	Residential	Structural Failure
72	53, Igbosere Lagos Island	Lagos Island	2001	Residential	Structural Defects
73	26, Buari Street	Mushin	2001	Residential	Flood
74	46, Idusagba Lane, Lagos	Lagos Island	2001	Residential	Structural Defects
75	20, Otigba Street, Off Pepple Street, Ikeja	Ikeja	2002	Mixed Use	Structural Defects
76	3 Storey Building at Mosadolohun Street, Iba	Ojo	2002	Residential	Structural Failure
77	12, Fredrick faseun Avenue, Okota, Isolo	Oshodi-Isolo	2002	Residential	Structural Failure
78	18, Agege Road	Agege	2002	Commercial	Structural Defects
79	29, Allen Avenue Ikeja	Ikeja	2002	Commercial	Structural Failure
80	14, Ishiaka Street, Agege Motor Way, Agege	Agege	2002	Residential	Structural Defects
81	10, Jones Street, Ebute –Meta West	Lagos Mainland	2002	Residential	Structural Defects
82	8, Abeokuta Str, Ebute –Meta West	Lagos Mainland	2002	Residential	Structural Defects
83	49, Olonode Str, Yaba	Shomulu	2002	Residential	Structural Defects
84	50, Wiloughby Str, Ebute-Meta	Lagos Mainland	2003	Residential	Structural Defects
85	31, Tapa Street, Coker Road, Orile-Iganmu	Surulere	2003	Residential	Structural Failure During Construction
86	57, Bereka Lane, off Tokunbo Street, Lagos	Lagos Island	2003	Residential	Structural Defects
87	101, Adeniji Adele Way, Lagos	Lagos Island	2003	Residential	Structural Defects
88	31, Shakili Street, Off Ajisomo Street		2003		Structural Failure
89	61, Ojuelegba Road, Ojuelegba	Surulere	2003	Commercial	Construction Defects
90	28, Idumagbo Street	Lagos Island	2003	Commercial	Explosion from Storage of Pyrotechnic Devices Used for Fire Work
91	10 Pedro Street, Lagos Island	Lagos Island	2003	Residential	Impact of Explosion at 28, Idumagbo Building

92	22, Makurdi Street Ebute –Meta	Lagos Mainland	2004	Residential	Structural Defects
93	51, Ilasamaja Road, Mushin Lagos.	Mushin	2004	Residential	Sub-Standard Building Materials
94	10, Eliaqs Street, Lagos Island	Lagos Island	2004	Residential	Dilapidation/Lack of Maintenance
95	40, Market Street, Somolu	Shomulu	2005	Commercial	Structural Defects
96	73, Kodensoh/B. Anthony Way Ikeja	Ikeja	2005	Residential	Structural Defects
97	132, Adeniji Adele Way, Lagos	Lagos Island	2005	Residential	Structural Defects
98	6, Princess Street, Lagos	Lagos Island	2005	Residential	Sub-Standard Building Materials
99	40, Mende Road, Maryland, Ikeja	Ikeja	2005	Residential	Structural Defects
100	32, Okesuna Street, Lagos	Mushin	2005	Residential	Structural Defects
101	53, Cemetary Road Amukoko	Ajeromi Ifelodun	2006	Residential	Structural Defects
102	81, Ijora Way Ajegunle	Ajeromi Ifelodun	2006	Residential	Structural Defects
103	17, NIDB Building, Broad Street, Lagos	Lagos Island	2006	Institutional	Fire Incidence
104	71, Ibadan Str, Ebute-Metta West	Lagos Mainland	2006	Residential	Structural Defects
105	42, Ibadan Str, E-Metta West	Lagos Mainland	2006	Residential	Structural Defects
106	1, Muritala Muhammed International Airport Road, Oshodi	Oshodi-Isolo	2006	Residential	Structural Defects
107	6A Milverton Close, Ikoyi	Lagos Island	2006	Residential	Dilapidation
108	118, Ojuelegba Road,	Surulere	2006	Residential	Structural Defects
109	38, LASU-Iba Rd, Opp Rosellas	Alimosho	2006	Residential	Structural Defects
110	48, Adams street, Okota Lagos	Oshodi-Isolo	2006	Residential	Structural Defects
111	38, Idumagbo Avenue, Lagos	Lagos Island	2006	Commercial	Structural Defects
112	32B Edgerton Lane, Oke Arin	Lagos Island	2006	Mixed Use	Structural Defects
113	71, Fola Agoro Street, Lagos	Shomulu	2006	Residential	Structural Defects
114	8, Ashaka Street, Abule Nla, Ebute-Metta	Lagos Mainland	2006	Residential	Structural Defects
115	Ebute-Metta, Lagos	Lagos Mainland	2007	Residential	Unauthorized Conversion/Sub-Standard Materials
116	19, Ijaotun Street, Alapere Ketu	Kosofe	2008	Residential	Structural Defects
117	13, Ojuelegba Intersection	Shomulu	2008	Commercial	Structural Defects
118	14, Miltivek Road, Ajah Multi -millionaire Building	Etiosa	2008	Residential	Structural Defects/Overloading

119	24, Okepopo Area, Lagos	Lagos Island	2008	Residential	Structural Defects
120	17, Alasaro Central Mosque Mushin Olosa	Mushin	2008	Religious	Structural Defects
121	Under Construction Building at Ikeja behind Juli Pharmacy	Ikeja	2008	Mixed Use	Weak Structure and Sub-Standard Building Materials
122	42, Ojerinde Street, Mushin	Mushin	2009	Residential	Structural Defects
123	14, Fasasi Street, Ajegunle Apapa Lagos	Ajeromi Ifelodun	2009	Residential	Structural Defects
124	4, Goddy's Park Railway Terminus, Ido Lagos	Lagos Mainland	2009	Commercial	Dilapidation/Lack of Maintenance
125	4, Bada Street, Lagos	Lagos Island	2009	Residential	Weak Structure
126	Building Under Construction, Isopakodowo, Cairo Oshodi	Oshodi-Isolo	2010	Commercial	Sub-Standard Building Materials
127	Uncompleted Building at Adenike Street, Off New Market, Oniru Estate, Victoria Island	Eti-Osa	2010	Residential	Weak Structure and Sub-Standard Building Materials
128	24, Ali Street, Off Tinubu Street, Victoria Island	Eti-Osa	2010	Commercial	Structural Defects/Overloading
129	Mogaji Lane, Idunshagbe Street, Off John Street, Idumota	Lagos Island	2011	Residential	Overloading/Structural Defects
130	20, Doyin Street Omololu Street, Obanlearo, Alapere, Ketu	Kosofe	2011	Residential	Land Subsidence
131	12, Olanuji Street, Iju-Ishaga	Ifako-Ijaiye	2012	Residential	Dana Air Crash Impact
132	14, Popoola, Street, Iju-Ishaga	Ifako-Ijaiye	2012	Residential	Dana Air Crash Impact
133	No. 3 Anikantamo street, Lagos Island	Lagos Island	2012	Residential	Dilapidated Pillar/Structural Defects
134	Church Street, Jakande Estate, Oke-Afa, Isolo.	Oshodi-Isolo	2012	Residential	Weak Structure and Sub-Standard Materials
135	Layeni Primary School, Ajegunle.	Ajeromi Ifelodun	2013	Institutional (School)	Weakened Blocks
136	14, Bashiru Street, Ojodu Berger.	Ikeja	2013	Residential	Defective structural
137	29b, Oloto Street, Off Cemetery Road, Ebute Metta	Lagos Mainland	2013	Residential	Overloading and defective Structure
138	29, Onasanya Street, Off Ishaga Road, Surulere	Siurulere	2013	Residential	Structural degeneration

Sources: Lagos State Physical Development Planning Authority (LASPDA) (2010) and Ayedun, et al. (2012

Appendix III

NEMA Summary of Relief Materials Interventions to State Affected by Disasters 2010, 2011 and 2012

S/N	States	LGAs	TYPES OF DISASTERS	EFFECTS	MATERIALS GIVEN
1.	**Abia**	Amaekpu-Item community in Bende LGA	Windstorm	180 Houses and other Properties Destroyed.	(i) 300 bags of rice (ii) 300 bags of beans (iii) 300 bags of maize (iv) 600 bags of cement (v) 500 bundles of roofing sheets (vi) 2,000 pcs of 2x3x12 planks (vii) 2000 pcs of 2x4x12 planks (viii) 100 bags of roofing nails (ix) 100 packets of zinc nails (x) 350 pcs of bath towels (xi) 200 pcs of plastic buckets (xii) 350 pcs of wax prints (xiii) 200 pcs of mattresses
2.	**Adamawa**	Patara, Saminaka, Dadinkowa and Song wards of Bagani of Lamurde	Windstorm	1,562 families displaced and destructions of properties	(i) 1,200 bundles of roofing sheets (ii) 1,200 bags of cement (iii) 100 packets of zinc (iv) 100 bags of 3" nails (v) 1500 pieces of 2x3x12 planks (vi) 1500 pieces of 2x4x12 planks
3.	**Akwa-Ibom**	Idua and Eyo Abasi in Oron LGA	Communal crisis	429 families were displaced	(i) 800 bundles of roofing sheets (ii) 1,200 pieces of 2x3x12 planks (iii) 1,200 pieces of 2x4x12 planks (iv) 800 bags of cement (v) 100 packets of zinc (vi) 100 bags of 3" nails
4.	**Akwa-Ibom**	Itak Abasi community in Ibeno LGA	Ocean surge	Destruction of properties, 5000 persons affected and loss of 5 lives	(i) 50 pieces of sewing machines (butterfly) (ii) 50 pieces of grinding machines (Honda) (iii) 5 Almarine A19 Utility Canoes Powered by Yamaha 40HP (iv) 5 Almarine A19 Utility Canoes Powered by Yamaha 75HP (v) 100 bundles of stroke 45 deep fishing nets

					(vi) 100 bundles of stroke 9 deep fishing nets (vii) 500 bags of garri (viii) 200 cartons of 3-in-1 tea (ix) 100 cartons of bath soaps (x) 1500 pieces of bath towels (xi) 1000 pieces of blankets (xii) 2000 pieces of wax prints (xiii) 300 pieces of mattresses (xiv) 500 pieces of nylon mats (xv) 4 bales of used cloths (xvi) 400 pieces of cooking pots (xvii) 500 pieces of kegs (xviii) 400 pieces of kerosene stoves (xix) 1000 pieces of plastic cups (xx) 1000 pieces of plastic buckets (xxi) 1200 bags of cement (xxii) 790 bundles of roofing sheets (xxiii) 1500 bags of rice (xxiv) 500 bags of garri (xxv) 400 bags of beans (xxvi) 100 kegs of vegetable oil (xxvii) 100 kegs of palm oil (xxviii) 200 bags of salt (xxix) 200 bags of sugar
5.	**Akwa - Ibom**	Uyo, Itu and Etim-Ekpo LGAs	Heavy downpour	Affected 3 LGAs, displaced 1,105 persons, livestock and farm land affected with 168 houses destroyed.	(i) 400 bundles of roofing sheets (ii) 336 bags of cement (iii) 168 pieces of mattresses (iv) 376 pieces of blankets (v) 336 pieces of bath towel (vi) 100 cartons of bath soap (vii) 168 pieces of buckets (viii) 20 cartons of 3-in-1 tea (ix) 2,550 pieces of 2x3x12 planks (x) 2,550 pieces of 2x4x12 planks (xi) 1,200 pieces of plastic plates (xii) 1200 pieces of plastic cups (xiii) 200 bags of garri (xiv) 200 bags of beans

					(xv) 200 kegs of vegetable oil
6.	**Akwa-Ibom / Cross River**	Ntan Obu in Cross-River and Ikpanyah Ibiono in Akwa-Ibom LGAs	Communal clash	Loss of 3 lives, destruction of 800 houses and displacement of 3000 persons.	(i) 600 bags of cement (ii) 600 bundles of roofing sheets (iii) 100 packets of zinc nails (iv) 100 bags of 3" nails (v) 1200 pieces of 2x3x12 planks (vi) 1200 pieces of 2x4x12 planks (vii) 600 bags of rice (viii) 500 pieces of blankets (ix) 200 pieces of nylon mats (x) 500 pieces of plastic buckets (xi) 500 pieces of plastic plates (xii) 500 pieces of plastic spoons (xiii) 500 pieces of plastic cups (xiv) 200 cartons of detergent (xv) 500 bags of garri (xvi) 300 pieces of mattresses (xvii) 100 bundles of stroke 45 fishing nets (xviii) 100 bundles of stroke 9 fishing nets
7.	**Anambra**	Oyi, Ekwusigo and Ihiala LGAs	Flood/ Windstorm	1,010 Persons Displaced	(i) 1000 pcs of 2x3x12 planks (ii) 1000 pcs of 2x4x12 planks (iii) 250 bundles of roofing sheets (iv) 50 bags of roofing nails (v) 50 packets of zinc nails (vi) 300 bags of cement (vii) 150 bags of rice (viii) 100 bags of beans (ix) 150 bags of garri (x) 100 jerry cans of palm oil (xi) 100 jerry cans of v. Oil (xii) 200 pieces of mattresses (xiii) 1000 pcs of plastic buckets (xiv) 1000 pcs of wax prints (xv) 1000 pcs of bath towels (xvi) 1000 pcs of blankets (xvii) 50 bags of salt
8.	**Anambra**	Onitsha, Anambra East and West LGA	Flood disaster	Destruction of 25 residential houses and properties worth millions	(i) 300 bags of rice (ii) 300 bags of beans (iii) 300 bags of maize

				of naira.	(iv) 300 bags of garri (v) 100 kegs of vegetable oil (vi) 100 kegs of palm oil (vii) 1000 pieces of blankets (viii) 1000 pieces of bathing towel (ix) 1000 pieces of plastic buckets (x) 500pieces of wax print (xi) 100 carton of bath soap (xii) 300 pieces of mattresses (xiii) 50 cartons of detergent (xiv) 100 cartons of 3-in-1 tea (xv) 5 bales of second hand cloths (xvi) 600 bags of cement (xvii) 500 bundled of roofing sheets (xviii) 2500 pieces of 2x3x12 planks (xix) 2500 pieces of 2x4x12 planks (xx) 100 packets of zinc nails (xxi) 100 bags of 3" nails
9.	**Bauchi**	Das, Shira, Gaujuwa, Gamawa, Towa and Tafawa Balewa LGAs	Religious crisis	Displacement of 10,000 persons	(i) 2000 pieces of blankets (ii) 1000 pieces of nylon mats (iii) 100 cartons of toilet soap (iv) 100 cartons of detergent (v) 1000 pieces of plastic plates (vi) 1500 pieces of plastic cups (vii) 1200 pieces of plastic spoons (viii) 700 bags of rice (ix) 500 bags of millet (x) 400 bags of guinea corn (xi) 50 bags of salt (xii) 400 cartons of 3-in-1 tea (xiii) 3 bales of children's wear (xiv) 250 bags of maize (xv) 100 bags of garri (xvi) 100 kegs of palm oil (xvii) 100 kegs of vegetable oil
10.	**Bauchi**	Lere	Jos religious mayhem	10,000 IDPs	(i) 5,976 bags of cement (ii) 340 bundles of roofing sheets (iii) 4,080 pieces of 2x3x12 planks (iv) 4,080 pieces of 2x4x12 planks (v) 136 packets of zinc nails

					(vi) 34 bags of 3" roofing nails
11.	**Bayelsa**	Ekeki and Yenago LGA	Bakassi Returnees	2000 families displaced	(i) 50 sewing machines (Butterfly) (ii) 50 grinding machines (Honda) (iii) 50 standing hair dryers (Cerriotic) (iv) 100 barbing clippers (Whal) (v) 200 bundles of stroke 9 deep fishing nets (vi) 200 bundles of stroke 45 deep fishing nets (vii) 300 bags of garri (viii) 50 kegs of vegetable oil (ix) 50 kegs of palm oil (x) 50 bags of sugar (xi) 50 bags of salt (xii) 200 cartons of omo (xiii) 400 bags of rice (xiv) 300 bags of beans (xv) 150 cartons of soap
12.	**Bayelsa**	Sagbama, Kolokuma Opokuma, Yenegoa, Southern Ijaw, Brass, Ekeremor, Nembe and Ogbia LGAs	Flood disaster	Displacement of 70,000 persons	(i) 1800 bags of rice (ii) 1200 bags of garri (iii) 600 bags of beans (iv) 300 kegs of vegetable oil (v) 500 bags of salt (vi) 500 bags of sugar (vii) 300 kegs of palm oil (viii) 500 cartons of 3-in-1 tea (ix) 500 cartons of bath soap (x) 500 cartons of omo (xi) 1000 pieces of bath towels (xii) 2000 pieces of buckets (xiii) 2000 pieces of plates (xiv) 2000 pieces of spoons (xv) 2000 pieces of cups (xvi) 2000 pieces of blankets (xvii) 2000 pieces of mattresses (xviii) 2000 pieces of wax prints (xix) 2000 pieces of nylon mats (xx) 6 bales of 2nd hand cloths (xxi) 1500 pieces of cooking pots (xxii) 1000 pieces of water cans (xxiii) 1000 pieces of kerosene stoves (xxiv) 1000 bags of cements

					(xxv) 1000 bundles of roofing sheet (xxvi) 600 bags of roofing nails (xxvii) 1000 packets of zinc nails (xxviii) 5000 pieces of 2x3x12 planks (xxix) 5000 pieces of 2x3x12 planks
13.	**Benue**	Otukpo, Odugbo, and Kwade LGA	Flood/ Rainstorm	Displacement of People, Schools and Properties were Destroyed	(i) 600 bags of cement (ii) 500 bundles of roofing sheets (iii) 1000 pcs of 2x3x12 planks (iv) 1000 pcs of 2x4x12 planks (v) 50 bags of roofing nails (vi) 100 packets of zinc nails (vii) 500 pcs of blankets (viii) 500 pcs of bath towels (ix) 30 cartons of bath soap (x) 100 pcs of mattresses (xi) 500 pcs of nylon mats (xii) 500 pcs of plastic buckets (xiii) 500 pcs of plastic plates (xiv) 500 pcs of plastic cups (xv) 300 pcs of wax prints (xvi) 300 bags of rice (xvii) 150 bags of beans (xviii) 150 bags of maize (xix) 150 bags of millets (xx) 50 bags of salt (xxi) 50 bags of garri

14.	**Benue**	Vandeikys LGA	Rain/ Windstorm Disaster	Collapsed buildings and falling of economic trees, 119 People Displaced.	(i) 300 bags of cement (ii) 200 bundles of roofing sheets (iii) 500 pcs of 2x3x12 planks (iv) 500 pcs of 2x4x12 planks (v) 100 bags of roofing nails (vi) 100 packets of zinc nails (vii) 150 bags of rice (viii) 100 bags of beans (ix) 100 bags of millets (x) 100 bags of maize (xi) 50 bags of garri (xii) 150 pcs of mattresses (xiii) 150 pcs of plastic buckets (xiv) 150 pcs of plastic plates (xv) 150 pcs of plastic spoons (xvi) 150 pcs of plastic cups (xvii) 30 cartons of bath soap (xviii) 30 packets of bath towels (xix) 30 kegs of v/oil (xx) 30 kegs of palm oil (xxi) 180 pcs of wax prints
15.	**Borno**	Shettimah, Abogu village in Damba LGA	Civil disturbances	Loss of two (2) lives, destruction of 102 houses & displacement of about 1000 households	(i) 300 bags of cement (ii) 750 pieces of 2x3x12 planks (iii) 750 pieces of 2x4x12 planks (iv) 20 bags of 3 roofing nails (v) 20 packets of zinc nails (vi) 100 bags of maize (vii) 100 bags of guinea corn (viii) 100 bags of millet (ix) 200 bags of rice (x) 100 pieces of mattresses (xi) 300 bundles of roofing sheets

16.	**Borno**	Kala, Balge, Magulmeri LGA	Pest invasion and flood	Destruction of 200 houses and destruction of farm lands	(i) 100 bags of guinea corn (ii) 100 bags of maize (iii) 100 bags of beans (iv) 150 bags of rice (v) 50 kegs of vegetable oil (vi) 300 bags of cement (vii) 1200 pieces of 2x3x12 planks (viii) 1200 pieces of 2x4x12 planks (ix) 50 bags of 3 " nails (x) 300 bundles of roofing sheets
17.	**Cross River**	Agwagune and Boki LGAs	Flood, landslide, windstorm and fire	Displacement of 1132 persons, destruction of 383 houses	(i) 500 bundles of roofing sheets (ii) 150 bags of 3" nails (iii) 1500 pieces of 2x3x12 planks (iv) 1500 pieces of 2x4x12 planks (v) 150 packets of zinc nails (vi) 400 bags of rice (vii) 500 pieces of blankets (viii) 300 cartons of bath soap (ix) 1000 pieces of plastic buckets (x) 1000 pieces of plastic plates (xi) 1000 pieces of plastic spoons (xii) 200 cartons of omo (xiii) 200 pieces of iron beds (xiv) 600 bags of cement
18.	**Cross River**	Yala, Bekwarra, Obudu, Ogoja, Obaniku and Boki LGAs	Flood	Destruction of 1,005 houses and displacement of 1,885 persons	(i) 3000 pieces of 2x3x12 planks (ii) 3000 pieces of 2x4x12 planks (iii) 1200 bags of cement (iv) 100 bags of 3" nails (v) 100 packets of zinc nails (vi) 500 pieces of blankets (vii) 400 pieces of mattresses (viii) 1000 bundles of roofing sheets (ix) 500 pieces of spoons (x) 500 pieces of cups (xi) 500 pieces of plates (xii) 500 pieces of buckets (xiii) 200 pieces of iron beds (xiv) 100 cartons of omo (xv) 100 cartons of bath soaps (xvi) 500 pieces of nylon mats

					(xvii) 500 pieces of bath towels
19.	**Cross River**	Boki LGA	Communal clash	Loss of 30 lives and destruction of 343 houses	(i) 100 bags of rice (ii) 100 bags of beans (iii) 200 pieces of mattresses (iv) 100 cartons of bath soap (v) 100 cartons of detergent (vi) 500 pieces of bath towels (vii) 500 pieces of wax prints (viii) 500 pieces of plastic spoons (ix) 500 pieces of plastic plates (x) 250 pieces of nylon mats (xi) 100 pieces of plastic buckets (xii) 100 pieces of blankets
20.	**Delta**	Isoko north, Isoko south, Burutu, Bomadi LGA	Flood and windstorm	Destruction of 500 houses and displacement of 1225 persons	(i) 400 bundles of roofing sheets (ii) 100 packets of zinc nails (iii) 100 bags of 3" nails (iv) 1000 pieces of 2x3x12 planks (v) 1000 pieces of 2x4x12 planks (vi) 300 bags of cement (vii) 200 pieces of mattresses (viii) 300 pieces of blankets (ix) 500 pieces of wax prints (x) 500 pieces of bath towels (xi) 300 bags of rice (xii) 300 bags of garri (xiii) 150 bags of beans (xiv) 100 cartons of 3-in-1 tea (xv) 100 bags of sugar (xvi) 100 bags of salt (xvii) 50 jerry cans of palm oil (xviii) 600 pieces of plastic buckets
21.	**Ebonyi**	Ezza and Ezillo Ishielu LGA	Communal Clash	571 People Displaced, and Properties Destroyed.	(i) 300 bags of rice (ii) 300 bags of beans (iii) 300 bags of maize (iv) 400 bags of garri (v) 50 jerry cans of palm oil

					(vi) 50 jerry cans of v/oil (vii) 1,500 pcs of plastic plates (viii) 100 bags of salt (ix) 1,500 pcs of plastic cups (x) 1,500 pcs of plastic spoons (xi) 500 pcs of blankets (xii) 500 pcs of bath towels (xiii) 500 pcs of plastic buckets (xiv) 500 pcs of wax prints (xv) 50 cartons of omo detergent (xvi) 50 cartons of bath soap (xvii) 500 pcs of nylon mats (xviii) 200 pcs of mattresses
22.	**Ekiti**	Gbonyin, Ise Orun, Ado Ekiti, Ekole, Ekiti East, Ijero LGA	Flood		(i) 400 bundles of roofing sheets (ii) 100 packets of zinc nails (iii) 100 bags of 3'' nails (iv) 250 pieces of blankets (v) 1000 pieces of 2x3x12 planks (vi) 1000 pieces of 2x4x2 planks (vii) 250 pieces of mats (viii) 150 kegs of vegetable oil (ix) 2 bales of second hand clothes (x) 300 bags of rice
23.	**Ekiti**		Flood	A life was lost, buildings collapsed, about 500 persons displaced. Cash/food crops worth millions of naira were also lost	(i) Roofing sheets: 300 bundles (ii) 2x3x12 planks:200 pieces (iii) 2x4x12 planks: 200 pieces (iv) Cement:300 bags (v) Zinc nails: 20 packets (vi) 3" nails: 20 bags (vii) Rice: 150 bags (viii) 3-in-1 tea:50 cartons (ix) Blankets: 100 pieces (x) Wax prints: 100 pieces.
24.	**Enugu**	Agwu LGA	Windstorm	480 Houses affected and 231 Families Displaced.	(i) 2,000 pcs of 2x3x12 planks (ii) 2,000 pcs of 2x4x12 planks (iii) 300 bundles of roofing sheets (iv) 100 bags of roofing nails

					(v) 100 packets of zinc nails (vi) 600 bags of cement (vii) 200 bags of rice (viii) 150 bags of beans (ix) 50 jerry cans of v/oil (x) 50 jerry cans of palm oil (xi) 150 bags of maize
25.	**Enugu**	Udi LGA	Flood	Destruction of residential houses, farm lands and properties worth millions of naira. 2 lives lost and 1,253 people displaced.	(i) 200 bags of rice (ii) 150 bags of beans (iii) 150 bags of maize (iv) 150 bags of garri (v) 50 kegs of vegetable oil (vi) 50 kegs of palm oil (vii) 50 bags of salt (viii) 50 bags of granulated sugar (ix) 500 pcs of blankets (x) 500 pcs of bathing towels (xi) 500 pcs of plastic buckets (xii) 500 pcs of nylon mats (xiii) 50 cartons of bath soap (xiv) 50 cartons of omo detergent (xv) 50 cartons of 3-in-1 tea (xvi) 500 pcs of waxprints (xvii)500 pcs of mattresses
26.	**Gombe**	Denga-Gamawa, Garin Laman, Dumdadu LGA	Communal clash	Displacement of 870 persons and loss of properties	(i) 200 bags of rice (ii) 150 bags of guinea corn (iii) 100 bags of millet (iv) 200 bags of maize (v) 400 pieces of nylon mats (vi) 1500 pieces of blankets (vii) 50 bags of salt (viii) 20 kegs of vegetable oil (ix) 10 kegs of palm oil (x) 50 cartons of detergent
27.	**Gombe**	Gombe metropolitan	Petroleum tanker incidence	Loss of 17lives, injuries of few persons and destruction of 120 houses	(i) 600 bags of cement (ii) 2,000 pieces of 2x3x12 planks (iii) 2,000 pieces of 2x4x12 planks (iv) 1,000 bundles of roofing sheets

					(v) 100 packets of zinc nails (vi) 100 bags of 3" roofing nails (vii) 120 bags of rice (viii) 60 bags of maize (ix) 60 bags of guinea corn (x) 60 bags of millet (xi) 60 bags of beans
28.	**Imo State**		Communal Clashes	1,562 Persons Displaced, and Properties Destroyed.	(i) 200 bags of rice (ii) 200 bags of beans (iii) 200 bags of maize (iv) 400 bags of garri (v) 50 kegs of palm (vi) 600 bags of cement (vii) 500 pcs of mattresses (viii) 1,500 pcs of 2x3x12 planks (ix) 1,500 pcs of 2x4x12 planks (x) 300 bundles of roofing sheets (xi) 50 packets of zinc nails (xii) 50 bags of roofing nails (xiii) 10 bales os used cloths (xiv) 500 pcs of wax prints (xv) 500 pcs of bath towels (xvi) 1,000 pcs of blankets (xvii) 1,500 pcs of plastic buckets (xviii) 100 bags of salt (xix) 1,000 pcs of nylon mats
29.	**Imo State**	Owerri North and Ehima Mbano LGAs	Flood	111 houses were destroyed and 500 families displaced	(i) 300 bags of rice (ii) 300 bags of beans (iii) 300 bags of maize (iv) 200 bags of garri (v) 100 cartons of tea (vi) 100 bags of salt (vii) 100 kegs of palm oil (viii) 100 kegs of vegetable oil (ix) 600 bags of cement (x) 200 bundles of roofing sheets (xi) 1500 pieces of 2x3x12 planks (xii) 1500 pieces of 2x4x12 planks (xiii) 100 packets of zinc nails (xiv) 100 bags of 3” nails

					(xv) 1000 pieces of wax print (xvi) 300 pieces of mattresses (xvii) 1000 pieces of blankets (xviii) 1000 pieces of plastic buckets (xix) 1000 pieces of plastic cups (xx) 1000 pieces of plastic plates (xxi) 200 pieces of spring beds
30.	**Jigawa**	Hadejia, Buji, Jahun, Ringim, Dutse, Babura and Gagarawa LGA	Flood	Displacement of 194 men, 233 women and 562 children making a total of 989 registered persons.	(i) Rice: 100 bags (ii) Beans: 25 bags (iii) 3-in-1 tea:50 carton (iv) Mattress:100 pieces (v) Nylon mat: 200 piece (vi) Blankets: 300 pieces (vii) Soap:25 cartons (viii) Detergent: 25 cartons
31.	**Kaduna**	Chukun LGA	Flood	The damage caused by this disaster has brought untold hardship to about 54 families (about 270 inhabitants)	(i) 600 bags of cement (ii) 100 bundles of roofing sheet (iii) 50 bags of zinc nails (iv) 20 bags of roofing nails (v) 1,000 pieces of 2x3x12 planks (vi) 1,000 pieces of 2x4x12 planks (vii) 75 bags of beans (viii) 50 bags of rice (ix) 20 bags of maize (x) 20 bags of millets (xi) 20 bags of 100kg guinea corn (xii) 100 pieces of blankets
32.	**Kano**	Kumbo, Wosarana, Kiru and Dambatta LGAs	Fire and flood disasters	The rainstorm led to the destruction of properties worth 20 million Naira and displacement of 500 people	(i) 400 bundles of roofing sheets (ii) 100 packets of zinc nails (iii) 100 bags of 3" nails (iv) 1000 pieces of 2x2x12 planks (v) 1000 pieces of 2x4x12 planks (vi) 500 pieces of blankets (vii) 600 bags of cement (viii) 600 bags of rice (ix) 300 bags of maize (x) 200 pieces plastic buckets (xi) 300 bags of millet
33.	**Kano**	Ungogo LGA	Windstorm	The disaster resulted in	(i) 400 bundles of roofing sheets

				the displacement of 478 persons and destruction of properties of the inhabitants	(ii) 100 packets of zinc nails (iii) 100 bags of 3" nails (iv) 1000 pieces of 2x3x12 planks (v) 1000 pieces of 2x4x12 planks (vi) 500 pieces of blankets (vii) 300 bags of cement (viii) 300 bags of rice (ix) 150 bags of maize (x) 200 pieces of plastic buckets (xi) 150 bags of millet
34.	**Kano**		Donation of relief items	719 inmates at the rehabilitation centers	(i) 719 matresses (ii) 719 blankets
35.	**Kano**		Relief items to inmates of 14 numbers 0f Kano Rehab. Centers	-do-	(i) 981 pieces of mattresses (ii) 981 pieces of blankets (iii) 1000 pieces of wax prints (iv) 500 pieces of mosquito nets (v) 300 bags of rice (vi) 300 bags of beans (vii) 300 bags of maize
36.	**Katsina**	Dandume, Kastina, Batagarawa, Baure, Danja, Funtua, Kusada, Rimi, Ingea, Zango LGAs	Flood	1 person died, 889 houses were destroyed, 1,066 households were affected, and properties worth millions of naira were lost	(i) Cement:600 bags (ii) Roofingsheets:400 bundles (iii) Zincnails:100 packets (iv) Roofingnails:100 bags (v) 2x3x12 planks:1,000pieces (vi) 2x4x12 planks:1,000 pieces (vii) Rice:300 bags (viii) Beans:150 bags (ix) Corn flour:300 bags (x) Guinea corn: 150 bags (xi) Blankets:500 pieces (xii) Plastic buckets: 500 pieces (xiii) Palm oil: 200 kegs
37.	**Katsina**	Dutsin-macharanchi LGA	Flood	Displacement of about 1,400 household.	(i) Rice: 200 bags (ii) Maize:200 bags (iii) Millet:100 bags (iv) Guinea corn:100 bags (v) Palm oil: 20 jerry cans (vi) Vegetable oil: 20 kegs

					(vii) 3-in-1 tea:70 cartons (viii) Plastic spoons:170 pieces (ix) Plastic cups:170 pieces (x) Plastic plates:170 pieces (xi) Sugar: 20 bags (xii) 70 cartons of soap (i) Rice: 100 bags (ii) Maize:100 bags (iii) Millet: 50 bags millet (iv) guinea corn:50 bags (v) Palm oil:10 jerry cans (vi) Vegetable oil: 10 kegs (vii) 3-in-1 tea:30 cartons (viii) plastic spoons:80 pieces (ix) Plastic cups:80 pieces (x) plastic cups:80 pieces (xi) Sugar:10 bags (xii) Soap: 30 cartons
38.	**Kebbi**	Birnin Kebbi, Jega, Maiyams, Koko, Gwandu, Suru, Yuri, Arewa, Akaigo, Bunza, and Kalgo LGAs	flood	No of affected household: 194,No of affected women and children:7711,No of deaths:6, No of IDPs:19, total no of victims: 9763.	(i) Guinea corn: 300 bag (ii) Millet: 150 bags (iii) Maize:150 bags (iv) Rice: 200 bags (v) Nylon mats: 1,500 pieces (vi) Mattress:300 pieces (vii) 3-in-1 tea:200 cartons (viii) Blankets:1,500 pieces (ix) Soap:100 cartons (x) Omo: 25 cartons (xi) Sugar: 50 bags
39.	**Kogi**	Bassa LGA	Communal Clash	Loss of 400 lives, and Destruction of Properties.	(i) 200 bags of cement (ii) 100 bundles of roofing sheets (iii) 300 pcs of 2x3x12 planks (iv) 300 pcs of 2x4x12 planks (v) 40 packets of roofing nails (vi) 40 bags of zinc nails (vii) 50 kegs of vegetable oil (viii) 50 bags of rice (ix) 50 bags of beans

					(x) 50 bags of maize (xi) 50 bags of guinea corn (xii) 100 pcs of plastic buckets (xiii) 100 pcs of plastic plates (xiv) 100 pcs of plastic cups (xv) 100 pcs of blankets (xvi) 100 pcs of bath towels (xvii) 100 pcs of mattresses (xviii) 100 pcs of wax prints (xix) 100 pcs of nylon mats (xx) 10 bags of salt
40.	**Kogi**	Kabba Bunu LGA	Flood Disaster	76 Families were Affected and Properties Destroyed.	(i) 76 pcs of mattresses (ii) 150 bags of rice (iii) 150 bags of beans (iv) 150 bags of maize (v) 76 pcs of blankets (vi) 76 pcs of wax prints (vii) 76 pcs of plastic buckets
41.	**Kogi**	Kogi LGA	Flood	1,500 persons displaced with properties destroyed	(i) 250 bags of rice (ii) 250 bags of beans (iii) 200pcs of mattresses (iv) 500 pcs of nylon mat (v) 500 pcs of blankets (vi) 500 pcs of plastic buckets (vii) 150 pcs of fishing nets
42.	**Kwara**	Assa, Moro, Ifelodun and Iiorin LGAs	Fire/ Rainstorm	9,000 People Displaced, and Properties Destroyed	(i) 300 bags of millet (ii) 300 bags of beans (iii) 300 bags of maize (iv) 300 bags of rice (v) 600 bags of cement (vi) 600 bundles of roofing sheets (vii) 1,500 pcs of 2x3x12 planks (viii) 1,500 pcs of 2x4x12 planks (ix) 150 packets of zink nails (x) 150 bags of roofing nails (xi) 500 pcs of wax prints (xii) 200 pcs of mattresses (xiii) 300 pcs of plastic buckets

43.	**Lagos**	Kosofe LGA	Flood	The destruction of properties and displacement of 1,053 persons	(i) 250 pieces of wax prints (ii) 500 pieces of towels (iii) 1000 pieces of plates (iv) 1000 pieces of cups (v) 1000 pieces of spoons (vi) 500 pieces of blankets (vii) 500 pieces of mats (viii) 300 bags of rice (ix) 250 pieces of mattresses (x) 300 pieces of plastic buckets (xi) 150 bags of beans (xii) 300 bags of garri (xiii) 50 kegs of vegetable oil (xiv) 20 cartons of detergent (xv) 20 cartoons of bathing soap (xvi) 20 cartoons of washing soap (xvii) 100 cartons of tea (xviii) 3 bales of second hand clothes
44.	Nasarawa	Nasarawa North LGA	Communal Clash	Loss of 400 lives, Destruction of houses	(i) 300 bags of cement (ii) 50 bundles of roofing sheets (iii) 500 pcs of 2x3x12 planks (iv) 500 pcs of 2x4x12 planks (v) 100 bags of roofing nails (vi) 100 packets of zinc nails (vii) 150 bags of rice (viii) 150 bags of beans (ix) 150 bags of millets (x) 150 bags of maize (xi) 150 pcs of plastic buckets (xii) 150 pcs of plastic plates (xiii) 150 pcs of plastic spoons (xiv) 150 pcs of plastic cups (xv) 150 pcs of blankets (xvi) 150 pcs of bath towels (xvii) 50 cartons of bath soap (xviii) 5 bales of second hand clothing (xix) 150 pcs of mattresses
45.	**Niger**	Borgu LGA	Fire Disaster	535 Houses were	(i) 1,000 pcs of 2x3x12 planks

				affected and 668 People Displaced.	(ii) 1,000 pcs of 2x4x12 planks (iii) 400 bundles of roofing sheets (iv) 60 bags of roofing nails (v) 120 pcs of mattresses (vi) 600 bags of cement (vii) 100 bags of rice (viii) 100 bags of beans (ix) 100 kegs of v/oil (x) 100 bags of guinea corn (xi) 100 bags of maize (xii) 500 pcs of blankets (xiii) 100 bags of millets (xiv) 500 pcs of plastic buckets
46.	**Niger**	Mokwa LGA	Flood and erosion	Displacement of 3,101 persons and destruction of 487 houses	(i) 300 bags of rice (ii) 300 bag of guinea corn (iii) 300 bag of maize flour (iv) 300 bag of salt (v) 300 kegs of palm oil (vi) 800 bundles of roofing sheets (vii) 600 bags of cement (viii) 1000 pieces of blankets (ix) 500 pieces of mosquito nets (xix) 2000 pieces of 2x3x12 planks (xx) 2000 pieces of 2x4x12 planks (x) 200 packets of roofing nails 200 bags of zinc nails (xi) 500 pieces of wax print (xii) 400 pieces of mattresses
47.	**Ogun**	Abeokuta North and Abeokuta South LGAs	flood	The destruction of properties and displacement of 1,000 persons	(i) Cement: 300 bags (ii) Rice: 300 bags (iii) Blanket:500 pieces (iv) 500 pieces of nylon mat (v) 100 cartons of detergent (vi) 50 cartons of tea (vii) 500 pieces of bath towel (viii) 500 pieces of wax print (ix) 20 bags of 25kg of salt (x) 500 pieces of plastic spoon (xi) 500 pieces of plastic plate (xii) 250 pieces of bucket

					(xiii) 500 pieces of plastic cup (xiv) 50 cartons of bathing soap (xv) 50 cartons of washing soap (xvi) 100 bags of beans (xvii) 200 bags of garri
48.	**Ondo**	Akure South, Ose, Odigbo, Ese Odo, Akoko South East, Akoko South West, Indanre, Akoko North West and Akoko North East LGAs	Flood	1,095 houses were affected, 1,066 households were displaced	(i) Cement:600 bags (ii) Roofing sheets:400 bundles (iii) Zinc nails:100 packets (iv) Roofing nails:100 bags (v) 2x3x12 planks:1,000 pieces (vi) 2x4x12:1,000 pieces (vii) Rice:300 bags (viii) Beans:150 bags (ix) Garri:300 bags (x) Detergent:50 cartoons (xi) Blankets:500 pieces (xii) Plastic buckets:500 pieces (xiii) Palmoil:200 kegs (xiv) Tea:250 cartoons (xv) Wax prints: 500 pieces (xvi) Mats:500 pieces
49.	**Osun**	Ifelodun, Ood-Otin, Atakumosa East, Iwo, Oriade, Egbedore, Ila, Irepondu LGAs	Flood	The destruction of properties and displacement of 2,583 persons	(i) Roofing sheets;600 bundles (ii) 2x3x12 planks:1000 pieces (iii) 2x4x12 planks: 1000 pieces (iv) Cement; 600 bags (v) Zinc nails: 100 packets (vi) 3" nails; 100 bags (vii) Parboiled rice; 600 bags (viii) 600 pieces of nylon mats (ix) Wax prints: 400 pieces (x) Blankets:700 pieces (xi) Beans: 300 bags (xii) Palm oil: 100 kegs (xiii) Garri:300 bags
50.	**Oyo**	Ona-Ara and Oluyole LGAs	flood	2000 persons displaced	(xiv) Cement:300 bags (xv) Rice: 400 bags (xvi) Garri: 200 bags (xvii) Plates:1000 pieces

					(xviii) Cups: 1000 pieces (xix) Spoons:1000 pieces (xx) Plastic buckets: 300 pieces (xxi) Wax prints:250 pieces (xxii) Salt: 70 bags (xxiii) Palm oil: 50 kegs (xxiv) Mattress:200 pieces
51.	**Plateau**	Jos, Wase	Religious Crises	Loss of 400 lives, and Destruction of Properties.	(i) 620 bags of rice (ii) 305 bags of maize (iii) 305 bags of guinea corn (iv) 1000 pcs of blankets (v) 2 bales of used cloths (vi) 10,800 pcs of plastic buckets (vii) 11,200 pcs of plastic buckets (viii) 10,350 pcs of plastic cups (ix) 90 cartons of omo detergent (x) 70 cartons of toilet soap (xi) 1000 pcs of bath towels (xii) 50 cartons of milo (xiii) 50 cartons of milk (xiv) 11,000 pcs of nylon mats (xv) 50 cartons of pampers (xvi) 50 cartons of sanitary pads (xvii) 10,000 pcs of plastic plates (xviii) 300 bags of garri (xix) 200 bags of beans
52.	**Plateau**	Jos, Dogo-Nahauwa LGAs	Renewed Violence on Religious Crises.	Loss of lives, destruction of properties and displacement of 2,500 persons.	(i) 150 bags of rice (ii) 50 bags of beans (iii) 100 bags of maize (iv) 50 bags of garri (v) 25 bags of salt (vi) 2,500 pcs of blankets (vii) 2,500 pcs of wax prints (viii) 2,500 pcs of nylon mats (ix) 250 cartons of milo (x) 2,000 pcs of plastic buckets (xi) 5 bales of used (Children) cloths (xii) 50 jerry cans of palm oil (xiii) 50 jerry cans of v/oil

					(xiv) 2,000 pcs of plastic plates (xv) 2,000 pcs of plastic cups (xvi) 2,000 pcs of plastic cups …… (xvii) 50 cartons of bath soap (xviii) 50 cartons of omo
53.	**Rivers**	Rumuobia-kani, Woji, Emeka, Mgbwoba communities in Obio/Akpor LGAs	Flood and communal dispute	Destruction of 120 building, displacement of 2000 persons and 15 loss of lives	(i) 300 bags of rice (ii) 500 bundles of roofing sheets (iii) 600 bags of cement (iv) 400 pieces of mattresses (v) 500 pieces of blankets (vi) 1500 pieces of 2x3x12 planks (vii) 1500 pieces of 2x4x12 planks (viii) 150 packets of zinc nails (ix) 150 bags of 3" nails (x) 1000 pieces of wax prints (xi) 100 kegs of vegetable oil (xii) 200 cartons of soap (xiii) 85 cartons of 3-in-1 tea (xv) 1000 pieces of plastic buckets (xvi) 1000 pieces of plastic plates (xvii) 1000 pieces of plastic spoons
54.	**Rivers**	Khana, Andoni, Gokana, Oobo/Nkoro, Okrika, and Akukutoru LGAs	Bakassi Returnees	Displacement of 421 IDPs	(i) 300 bags of garri (ii) 300 bags of rice (iii) 300 bags of beans (iv) 50 bags of salt (v) 100 kegs of vegetable oil (vi) 200 cartons of palm oil (vii) 450 cartons of bath soap (viii) 500 pieces of blankets (ix) 100 pieces of kerosene stove (x) 100 pieces of bath towels (xi) 100 cartons of 3-in-1 tea (xii) 150 wax prints (xiii) 50 pieces of sewing machines (xiv) 50 pieces of grinding machines (xv) 50 standing driers (xvi) 200 bundles of stroke 9 deep fishing nets (xvii) 200 bundles of stroke 45 deep fishing nets
55.	**Sokoto**	Sokoto LGA	Flood	No of affected	(i) 300 bags of maize

				household: 6,905, No of women: 7703, no of affected of children: 31120, no of deaths 6, No of IDPs in the camp: 19, total no of victims: 9763.	(ii) 300 bags of guinea corn (iii) 300 bags of rice (iv) 50 bags of salt (v) 142 pieces of mattresses (vi) 2,400 pieces of towels (vii) 500 pieces of buckets (viii) 3,000 plastic cups (ix) 261 nylon mats (x) 3,000 plastic spoons (xi) 3,000 plastic plates (xii) 50 jerry-cans of vegetable oil (xiii) 50 jerry-cans of palm oil (xiv) 1,125 pieces of blankets
56.	**Sokoto**	Goronyo, Gada, Robeh, Isa, Wurno, Kware, and Wamakko LGAs	Flood	The incident resulted to displacement of over 20,000 persons; loss of lives, destruction of houses, farmlands, food crops, other means of livelihood and infrastructure like bridges were also damaged.	(i) Rice:400 bags (ii) Maize:200 bags (iii) Millet: 200 bags (iv) Palm oil: 45 jerry can s (v) Vegetable oil: 45 jerry cans (vi) 3-in-1 tea:170 cartons (vii) Plastic spoon:650 pieces (viii) plastic cups:650 pieces (ix) plastic plate: 650 pieces (x) sugar:45 bags (xi) Soap: 130 cartons (i) Rice: 200 bags (ii) Maize: 100 bags (iii) Millet:100 bags (iv) Palm oil: 25 jerry can (v) Vegetable oil: 25 kegs (vi) 3-in-1 tea:80 cartons (vii) plastic spoons:350 pieces (viii) Plastic cups:350 pieces (ix) plastic plates:350 pieces (x) Sugar:25 bags (xi) Soap:70 cartons
57.	**Taraba**	Wukari, Gassol and Ardo Kola LGAs	Religious crisis and flood	Destruction of 119 houses and farmlands. displacement of 80	(i) 300 bags of cement (ii) 400 bundles of roofing sheets (iii) 35 packets of zinc nails

				families and lost of 10 lives	(iv) 35 bags 0f roofing nails (v) 1500 pcs of 2x3x12 planks (vi) 1500 pcs of 2x4x12 planks (vii) 150 bags of maize (viii) 200 bags of millet (ix) 150 bags of beans (x) 300 bags of rice (xi) 300 pieces of bath towels (xii) 500 pcs of wax prints (xiii) 500 pcs of nylon mats (xiv) 500 pcs of plastic buckets (xv) 3 bales of second hand cloths
58.	**Yobe**	Bursari, Geidam, Yunsari, Yusufari, Karasuwa and Machina LGAs	Drought	Loss of about 3,142 metric tons of expected harvest. Virtually all the LGAs were affected	(i) 1500 bags of rice (ii) 900 bags of guinea corn (iii) 900 bags of millet (iv) 600 bags of maize (v) 600 bags of beans (vi) 100 kegs of vegetable oil (vii) 100 kegs of palm oil
59.	**Yobe**	Gujba, Fika and Nguru LGAs	Flood and windstorm	800 households and destruction of properties	(i) 300 bundles of roofing sheets (ii) 300 bags of cement (iii) 25 packets of zinc nails (iv) 25 packets of roofing nails (v) 500 pieces of 2x3x12 planks (vi) 500 pieces of 2x4x12 planks (vii) 150 bags of maize (viii) 150 bags of millet (ix) 150 bags of beans (x) 200 bags of rice (xi) 10 bags of salt (xii) 150 pieces of wax prints (xiii) 300 pieces of nylon mats (xiv) 200 pieces of plastic buckets
60.	**Yobe**	Yunusari and Nguru LGAs	Flood	Displacement of 2,344 persons, destruction of 586 houses and public properties	(i) 300 bags of cement (ii) 300 bundles of roofing sheets (iii) 1200 pieces of 2x3x12 planks (iv) 1200 pieces of 2x4x12 planks (v) 50 bags of roofing nails

					(vi) 50 bags of 3”nails (vii) 100 bags of rice (viii) 50 bags of maize (ix) 50 bags of beans (x) 50 bags of guinea corn (xi) 50 bags of millet (xii) 140 bags of biski (xiii) 300 pieces of blankets (xiv) 1000 pieces of plates (xv) 1000 pieces of cups (xvi) 1000 pieces of spoon (xvii)300 pieces of nylon mats (xviii) 500 pieces of wax print (xix) 50 cartons of detergents (xx) 100 bags of salt (xxi) 50 kegs of vegetable oil
61.	**Zamfara**	Anka and Bukkuyum LGAs	Lead poisoning	The disaster led to the death of 175, children while 157 women and 100 children were hospitalized.	(i) 150 pieces of bath towels (ii) 150 pieces of nylon mats (iii) 100 bags of sugar (iv) 50 bags of salt (v) 200 pieces of blankets (vi) 300 of plastic buckets (vii) 300 pieces of plastic plates (viii) 300 pieces of plastic spoons (ix) 200 pieces of mattresses (x) 200 pieces of wax prints (xi) 100 cartons of milo (xii) 100 cartons of milk (xiii) 100 cartons of soap (xiv) 200 pieces of mosquito nets (xv) 100 cartons of soap

Distribution of Relief Materials to State in 2011

Building Materials

State	Zinc (Bundles)	Cement (Bags)	Planks (Pieces)	Zinc Nails Cartons	Roofing Nails Cartons
Adamawa	100	150	500	20	20
Bauchi	6,030	18,090	132,660	4,824	1,200
Benue	550	1,400	6,130	1,500	1,500
Borno		760	6200	102	
Cross River	350	1,400	3,000	100	100
Ebonyi	700	-	-	150	150
Edo	4,950	900	3,000	50	50
Ekiti	300	300	800	50	50
Enugu	450	600	2,000	50	50
Imo	200	300	1,500	50	50
Jigawa	300	600	4,000	100	100
Kaduna	6,028	5,100	11,250	674	420
Kano	2,400	1,600	5,730	625	625
Katsina	-	1,200	-	-	-
Kogi	800	1,200	2,000	600	600
Kwara	1,000	1,200	5,000	1,000	1,000
Lagos		1,200			
Nasarawa					
Niger					
Ondo	600	600	-	200	200
Osun	300	600	2,000	100	100
Oyo	500	700	-	100	-
Plateau	450	600	3,000	200	50
Rivers	50			20	30
Sokoto	200	300	4,000	100	100
Zamfara	4000	5,600	8,000	200	3,200

Distribution of Building Materials on Zonal Basis in 2011

Zones	Zinc (Bundles)	%	Cement (Bags)	%	Planks	%	Zinc Nail (Pkts)	%	Roofing Nails	%
Abuja Operation	1,800	8	2,400	7	7,000	4	1,600	16	1,600	26
North-Central	1,000	4	2,000	6	9,130	5	1,700	17	1,550	25
North-East	6,130	26	18,240	51	133,160	76	4,844	47	1,220	20
North-West	6,200	27	7,900	22	16,980	10	1,299	13	1,045	17
South-East	1,350	6	900	3	3,500	2	250	2	250	4
South-South	5,000	22	2,300	6	3,000	2	120	1	180	3
South-West	1,700	7	2,200	6	2,800	2	450	4	350	6
Total	**23180**	**100**	**35940**	**100**	**175570**	**100**	**10263**	**100**	**6195**	**100**

Distribution of Food Stuffs to States in 2011

States	Rice (Bags)	Maize Flour (Bags)	G/Corn (Bags)	Millet (Bags)	Sugar (Bags)	Salt (Bags)	Garri (Bags)	Palm Oil (Kegs)	Beans (Bags)	Veg. Oil (Kegs)
Adamawa	50	50	50	50	10	10	-	-	-	-
Akwa-Ibom	100	-	-	-	-	-	200	-	100	-
Anambra	150	-	-	-	-	50	-	50	150	50
Bauchi	580	485	210	110	180	150	-	375	311	415
Bayelsa	-	-	-	-	-	-	100	-	-	-
Benue	350	300	300	300	-	-	-	-	300	-
Borno	850	50	200	300	170	20			50	
Cross River	250	-	-	-	-	150	200	100	175	150
Delta	300	-	-	-	-	-	-	-	-	-
Ebonyi	500	-	-	-	-	-	-	-	100	-
Edo	600	-	-	-	100	200	400	200	400	200
Ekiti	300	-	-	-	-	-	-	-	-	-

Enugu	300	100	-	-	50	50	200	20	300	20
Gombe	230	230	230	100	50	45	-	-	165	-
Imo	100	50	-	-	-	-	-	-	50	-
Jigawa	300	150	150	100					150	
Jigawa	300	150	150	150					150	
Kaduna	3,050	931	1,060	960	322	152	248	261	455	95
Kano	800	700	500	300	-	-	-	-	400	-
Katsina	600	-	300	300	-	-	-	150	600	150
Kogi	600	-	-	-	-	-	-	-	300	-
Kwara	600	-	-	-	-	-	-	100	300	-
Lagos	900	-	-	-	-	-	50	175	50	95
Nasarawa	200	150		150					150	
Niger	45	45				15		30	10	30
Ogun	250	100	-	-	-	-	100	50	100	50
Ondo	600	50	-	-	40		50	-	100	-
Osun	750	100	-	-	-	-	350	250	100	50
Oyo	100	-	-	-	-	-	-	50	50	50
Plateau	4,250	1,100	1,550	1,650	-	75	350	50	920	311
Rivers	850	-	-	-	-	10	250	-	-	100
Sokoto	300	100	100						100	
Taraba	100	100	100	100	100	100	-	-	-	-
Yobe	50	50	50	-	50	25	-	-	-	-
Zamfara	7,200	3,600	600	3600	200	50		100	3600	100

Distribution of Food Stuff on Zonal Basis

Zones	Rice (Bags)	%	Maize (Bags)	%	G/Corn (Bags)	%	Millet (Bags)	%	Sugar (Bags)	%
Abuja Operation	1,200	6	0	0	0	0	0	0	0	0
North-Central	6,045	23	1,595	20	1,850	39	2100	28	0	0
North-East	930	4	480	6	410	9	350	5	270	27
North-West	11,950	45	5,331	68	2,460	52	5160	68	522	53
South-East	1,050	4	150	2	0	0	0	0	50	5
South-South	2,200	8	0	0	0	0	0	0	100	10
South-West	2,900	7	250	3	0	0	0	0	40	4
Total	**26,275**	**100**	**7,806**	**100**	**4,720**	**100**	**7,610**	**100**	**982**	**100**
Zones	**Salt (Bags)**	**%**	**Garri (Bags)**	**%**	**Palm Oil**	**%**	**Beans (Bag)**	**%**	**Veg. Oil**	**%**
Abuja Operation	0	0	0	0	100	6	600	6	0	0
North-Central	90	11	350	14	180	11	1,980	20	341	18
North-East	90	11	0	0	0	0	365	4	415	22
North-West	202	24	248	10	511	32	5155	53	345	18
South-East	100	12	200	8	70	4	500	5	70	4
South-South	360	43	1150	47	300	19	675	7	450	24
South-West	0	0	500	20	450	2	400	4	245	13
Total	**842**	**100**	**2,448**	**100**	**1,611**	**100**	**9,675**	**100**	**1,866**	**100**

Distribution of Children's Requirements and beverages to States in 2011

States	Kunu Tsamiya (Cartons)	3-In-1 Tea & Mix Tea (Cartons)	Milo (Cartons)	Pampers (Pieces)	Children Powdered Milk (Cartons)	Indomie (Cartons)	Water (Cartons)
Adamawa	100	-	-	-	-	-	-
Akwa-Ibom	-	100					
Anambra	-	200					
Bauchi	1,015	2,017	100	240	150		
Enugu		50					
Gombe	150		35		75		
Kaduna	100	-	-	50	-	600	525
Kano	500						
Nasarawa		500					
Ogun		50					
Osun		100					
Oyo		20					
Plateau	1,050	900	300	50	600		
Rivers		30					
Sokoto							
Taraba	100	100					
Yobe	400		75		150		
Zamfara	1000						

Distribution of Beverages on Zonal Basis

Zones	Kunu (Carton)	%	Mix-Tea/3-In-1 Tea (Cartons)	%	Milo (Cartons)	%	Children Powder Milk (Cartons)	%	Water (Cartons)	%
Abuja Operation	0	0	0		0	0	0	0	0	0
North-Central	1,050	36	900	26	300	63	600	62	0	0
North-East	1,750	59	2,117	60	175	37	370	38	0	0
North-West	150	5	0	0	0	0	0	0	525	100
South-East	0	0	200	5	0	0	0	0	0	0
South-South	0	0	130	4	0	0	0	0	0	0
South-West	0	0	170	5	0	0	0	0	0	0
Total	2,950	100	3517	100	475	100	970	100	525	100

Distribution of Household Items/Clothings to States in 2011

States	Guinea Brocade & Wax Print (Pcs)	Used Clothes (Bales)	Towels (Pieces)	Sanitary Pads (Packets)	Blankets (Pieces)	Nylon Mats (Pcs)	Detergent & Bath Soaps (Cartons)
Adamawa	30	5	50		50	50	-
Akwa-Ibom	-	-	300		200	-	50
Anambra	-	-	1,000		500	1,000	150
Bauchi	500	56	4,310	40	10,950	5,700	400
Bayelsa	500	-	-	-	500	-	-
Benue	3,000	-	1,000		1,250	250	1,050
Cross River	500	-	1,150	-	1,500	-	20
Delta	-	-	-	-	1,000	-	-
Ebonyi	800	-	800	-	300	200	-
Edo	1,500	-	600	-	1,000	-	350
Ekiti	-	-	200	-	250	250	-
Enugu	500	-	400	-	627	627	100
Gombe	-	-	-	-	-	-	-
Imo	-	-	-	-	500	500	40
Jigawa					100		
Jigawa					100		
Kaduna	5,370	-	2,430	650	8,360	5,700	466
Kano	1,400		-	-	1,081	-	750
Katsina	2,000	-	300	-	2,500	1,000	340

Kogi	-	-	-	-	600	-	-
Kwara					1,000		
Lagos					3,000		
Nasarawa		2	1000	200	3000		
Niger	60		60		60		30
Ogun			500			500	100
Ondo	1,000				500	1,000	
Osun	1,500				1,500	1,600	70
Oyo	500	-	-	--	-	-	-
Plateau	4,650	12	1,400	50	11,400	5,800	1,115
Rivers	1,900	-	-	-	700		100
Sokoto					100		
Taraba	500	-	-	-	700	700	200
Yobe	500	3	200	-	400	400	80
Zamfara	1000	500			200	2000	100

States	Mattresses	Metal Beds	Buckets	Plates	Spoons	Cups	Mosquito Nets	Pampers
Adamawa	50	30	50	50	50	50		
Akwa-Ibom	100	-	-	-	-	-		
Anambra	250	-	500	1,000	1,000	1,000		
Bauchi	3,900	-	-	-	-	1,000	2,000	
Bayelsa	-	-	500	-	-	-		
Benue	1,000		1,000	1,000	1,092			
Cross River	150	-	700	500	-	-	500	
Delta	600	-	-	-	2,000	-		
Ebonyi	-	-	-	-	-	-	-	
Edo	500	-	1,000	-	-	-	-	
Ekiti	-	-	-	-	-	-	-	
Enugu	50	-	50	-	-	-	-	
Gombe	300	-	-	-	-	-	-	
Imo	-	-	500	200	200	-	-	
Jigawa			100					
Jigawa			100					
Kaduna	5,150	500	3,050	2,700	3,130	1,830	874	
Kano	734	-	500	-	-	-	300	
Katsina	500	-	-	-	-	-	-	
Kogi	200	-	-	-	-	-	-	
Kwara	100							
Lagos							500	
Nasarawa			1000	400	400	1000		100
Niger	80	20	30		60			

Ogun								
Ondo								
Osun	200	-	-	-	-			
Oyo	100	-	500	1,000	1,000	1,000	500	
Plateau	1,300	-	19,250	-	13450	16,250	-	
Rivers	500		1,007	200	200	-	300	
Sokoto			100					
Taraba	200	-	700	500	500	600	200	
Yobe	250	-	500	300	200	200	400	
Zamfara	800						5000	

Note: A cash sum of ₦19,000,000.00 and ₦900,000.00 was donated for hospital bills and accommodation in respect of displaced widows and children in Madalla bomb blast Niger State. Also, 60 pillows, 20 bed side lockers and 30 plastic chairs were provided as hospital materials to the people affected

Distribution of Bedding Items on Zonal Basis

Zones	Blankets	%	Nylon Mats	%	Mattresses	%	Metal Bed	%
Abuja Operations	1,600	3	0	0	0	0	0	
North-Central	12,650	26	6,050	25	2,300	15	0	
North-East	11,700	24	6,150	25	4,700	31	30	100
North-West	11,941	24	6,700	27	6,380	42	0	
South-East	1,927	4	2,327	9	300	2	0	
South-South	3,900	8	0	0	1,350	9	0	
South-West	5,250	11	3,350	14	300	2	0	
Total	48,968	100	24,577	100	15,330	100	30	100

Distribution of Building Materials to States in 2012

State	Zinc (Bundles)	Cement (Bags)	Planks 2x3x12 (Pcs)	Planks 2x4x12 (Pcs)	Zinc Nails (Pkts)	Roofing Nails (Bags)
Abia	200	300	2500	2500	100	100
Abuja						
Adamawa	500	1400	3200	3200	400	370
Akwa-Ibom		200	1000	1000		
Anambra	100	500	1000	1000	50	50
Bauchi	200	300	2700	2700	100	130
Benue	700	1300	1500	1500	135	135
Borno	870	1180	3100	3100	200	100
Bayelsa	-	-	-	-	-	-
Cross River	2380	2000	6000	6000	400	300
Delta	300	550	1250	1250	250	250
Ebonyi	200	500	2000	2000	100	50
Edo	300	600	1000	1000	100	100
Ekiti	380	350	1000	1000	150	50
Enugu		200	200	200	20	20
Gombe	300	600	1500	1500	60	30
Imo		750	1550	1800	140	140
Jigawa	200	1400	3000	3000	60	60
Kaduna	595	2050	7350	6450	620	353
Kano	550	1700	2500	2500	80	100
Katsina	100	300	1500	1500	50	150
Kebbi	550	2000	2000	2000	1050	150
Kogi	900	1200	2000	2000	190	190
Kwara	300	900	1000	1000	50	50
Lagos	500	900	2000	2000	300	300
Nasarawa	1700	1800	2857	2500	600	750
Niger	1150	2800	5100	5100	1200	1020
Ogun	300	300	1000	1000	50	50
Ondo	1000	1100	2800	2800	250	250
Osun	100	300	1500	1500	100	100
Oyo	200	300	1000	1000	100	100
Plateau	1330	1500	2000	2000	620	620

Rivers	245	1100	3500	2000	60	80
Sokoto	450	500	1500	1500	100	100
Taraba	150	500	1300	1300	80	45
Yobe	1200	800	2000	2000	200	120
Zamfara	430	1800	4500	4500	200	50
Totals	**18,380**	**33,980**	**79,907**	**79,400**	**8,165**	**6,463**

Distribution of Building Items on Zonal Basis

Zonals	**Zinc (Bundles)**	**Cement (Bags)**	**Planks 2x3x12 (Pcs)**	**Planks 2x4x12 (Pcs)**	**Zinc Nails (Pkts)**	**Roofing Nails (Bags)**
Abuja Operation	2300	4900	8100	8100	1440	1260
North-Central	3730	4600	6357	6000	1355	1505
North-East	3220	4580	12800	12800	990	675
North-West	2875	9750	22350	21450	2160	963
South-East	500	2250	7250	7500	410	360
South-South	3225	4450	12750	11250	810	730
South-West	2480	3250	9300	9300	950	850
Total	**18,330**	**33,780**	**78,907**	**76,400**	**8,115**	**6,343**

Distribution of Food Stuffs to States in 2012

States	Rice (Bags)	Maize (Bags)	Maize Flour (Bags)	G/Corn (Bags)	Millet (Bags)	Beans (Bags)	Sugar (Bags)	Salt (Bags)	Garri (Bags)	Palm Oil (Kegs)	Veg. Oil (Kegs)	Yam Flour (Bag)	Pap (Bag)
Abia	590	120				314		150	340	150	150		
Abuja	330					220	30	60	130	80	15		
Adamawa	850	950	200	400	550	350		60		20	20		
Akwa-Ibom	400					450			550	150	150		
Anambra	973	300				350	100		600	300	250		
Bauchi	450	400		400	400			70					
Bayelsa	2955					1650	718	800	2535	1130	1140		
Benue	882	90		290	290	190		10	350	220	150		
Borno	726	390		210	310		120	40		40	40		
Cross River	1150					900	25	175	650	80	205		
Delta	980					770		190	1150	240	200		
Ebonyi	900	320				470	60		400	135	135		
Edo	900					600	50	50	600	150	150		
Ekiti	250	100							300	30	30		
Enugu	559		300			350	50		300	150	170		
Gombe	200	200		200	150	150		50					
Imo	680	250				450	30	30	630	150	175		
Jigawa	1150	417		383	350		30						
Kaduna	860	710		650	320		10			145	145		
Kano	800			250	200		80			20	20		
Katsina	300	300			300		200						
Kebbi	100	100		300	100	200							
Kogi	1611	864	50	620	90	570	190	150	50	50	40	50	50
Kwara	950	160			200	391	170			180	150		
Lagos	550					100	10		150				
Nasarawa	850	410		410	550	200	220		320	20		200	200
Niger	1490	100		350	450	280	50	70		155	105		
Ogun	100									20	20		
Ondo	550					150							
Osun	300									50	50		

Oyo	500					150			150	50	50		
Plateau	3660	1020		771	1115	940	60	180	50	250	220		
Rivers	850	100				240	90	240	490	95	175		
Sokoto	300	200		200	100	100			100	110	110		
Taraba	500	500	100	200	500	100	50	20		10	10		
Yobe	560	420				200	200						
Zamfara													
TOTAL	**29,756**	**8,421**	**650**	**5,634**	**5,975**	**10,835**	**2,543**	**2,345**	**9,845**	**4,180**	**4,075**	**250**	**250**

Distribution of Food Stuffs in Zonal Basis

Zones	Rice	Maize	Maize Flour	G/Corn	Millet	Beans	Sugar	Salt	Garri	Palm Oil	Veg Oil	Yam Flour	Pap
Abuja Operation	4,231	1,074		970	690	1,291	440	275	80	450	295	50	50
North-Central	7,465	1,430		1,181	2,665	2,790	998	980	2,905	1,400	1,360	200	200
North-East	3,342	2,570	300	1,490	2,840	940	250	210	350	250	180		
North-West	3,510	1,727		1,783	300	300	320		100	275	275		
South-East	3,702	990	300			1,934	240	180	2,270	885	880		
South-South	5,006	490		210	310	2,960	285	695	3,440	755	920		
South-West	2,250	100				400	20		600	150	150		
Total	**29,506**	**8,381**	**600**	**5,634**	**6,805**	**10,615**	**2,553**	**2,340**	**9,745**	**4,165**	**4,060**	**250**	**250**

Distribution of Children's Requirements and beverages to States in 2012

States	Kunu Tsamiya	3-In-1 Tea & Mix Tea	Milo (Cartons	Pampers	Powdered Milk	Indomie (Ctts)	Water (Cartons)	Tin Tomatoes	Maggi (Pkts)	Children Wears
Adamawa	30		100	50	100			40	40	
Akwa-Ibom		300								
Bauchi					20					
Bayelsa		600								
Benue						100				100
Borno			110		110	113		1100	50	
Cross River		400		50						
Delta			890			100		100		50
Edo			50			100	100	50		
Enugu						50				
Gombe	300	20	150							
Imo						150				
Jigawa			30		30					
Kaduna			10							
Kano			20		20					
Katsina					50					
Kogi			50	200	50	100	100			
Kwara							150			
Lagos		100								
Nasarawa	200					200		20		
Niger			50		50	50	50			
Plateau	50					1200		270		
Rivers			70							
Sokoto										
Taraba	50		50		80	50			70	
Yobe			200		200	800		100	50	
Zamfara										
Total	**630**	**1,420**	**1,780**	**300**	**710**	**3,013**	**400**	**1,680**	**210**	**150**

Distribution of Children's Requirements and beverages in Zonal Basis

States	Kunu Tsamiya (Cartons)	3-In-1 Tea & Mix Tea (Cartons)	Milo (Cartons)	Pampers (Pieces)	Powdered Milk (Cartons)	Indomie (Ctts)	Water (Cartons)	Tin Tomatoes (Cts)	Maggi (Pkts)	Children Wears (Pairs)
Abuja Operation	30	-	200	250	200	180	400	40	40	-
North-Central	250		-	-	-	1500	-	290	-	100
North-East	350	20	400	-	280	850	-	100	120	-
North-West	-	-	60	-	100	-	-	-	-	-
South-East	-	-	-	-	-	200	-	-	-	-
South-South	-	1000	-	50	-	200	100	150	-	150
South-West	-	100	-	-	-	-	-	-	-	-
Total	**630**	**1120**	**11660**	**300**	**580**	**2930**	**500**	**580**	**160**	**250**

Distribution of Household Items/Clothing to States in 2012

States	Guinea Brocade/Shadda	Wax Print (Pcs)	Used Clothe (Bales)	Bath Towels	SanitaryPads (Pkts)	Blankets (Pcs)	Nylon Mats (Pcs)
Abia		600		1100		800	
Abuja		800		500		1300	800
Adamawa		900				1700	1600
Akwa-Ibom				1300		1000	
Anambra	800	900		2700		2500	2200
Bauchi	200	200				1000	900
Bayelsa		1500		2100		4500	1500
Benue	900	1700		1900		2100	1100
Borno	40	500		1000		820	1050
Cross River		3800		2600	100	2200	1000
Delta	1000	1840		2800	1000	5600	
Ebonyi	500	1600		1500		2500	1500
Edo		300	6	2100	1000	1300	1000
Ekiti	100			400		300	300
Enugu	180	800		600		200	450
Gombe		200				300	200
Imo		1400		1200		1650	800
Jigawa	270	270				2800	1500
Kaduna	240	550		80		1600	1000
Kano		50		200		200	100
Katsina	100	100				700	500
Kebbi							200
Kogi	1000	1500	5	1500	200	3600	3400
Kwara	1000			1200		900	
Lagos	550	500	100	2000		1400	1900
Nasarawa	1200	1700		1340		3500	1800
Niger	500	900	2	700	100	1560	1000
Ogun						100	
Ondo	100	400				700	200
Osun				500		500	500

Oyo		100				600	
Plateau	3700	3770		1400		9700	3156
Rivers	200	990		1300		1100	200
Sokoto		100		100		200	
Taraba		200				1200	100
Yobe				1000		1000	1000
TOTAL	**12,580**	**28,170**	**113**	**33,120**	**2,400**	**61,130**	**30,956**

States	Omo Detergent (Cartons)	Bath Soaps (Cartons)	Mattresses	Buckets	Plates	Spoons	Cups	Mosquito Nets
Abia	170	250	350	1400				
Abuja	180	170	210	800	1000	1000	1000	**1050**
Adamawa	110	170	100	1000	1000	1000	1000	1400
Akwa-Ibom		250	600					
Anambra	200	200	850	2000	2500	2500	2500	1100
Bauchi	100	150		400	400	400	400	900
Bayelsa	1400		2800	6000	500	500	500	3500
Benue	100	180	350	1500	500	500	500	1100
Borno		200	60	1450	1000	1200	1000	1600
Cross River	60	130	2800	1630	300	300	300	100
Delta	420	440	2800					3650
Ebonyi	250	280	250	1700	3000	3000	3000	600
Edo		100	1700	500	500	500	500	2300
Ekiti			200	500				
Enugu	200	200	350	650	900	1100	900	450
Gombe	20	20		100	200	200	200	150
Imo	175	205	150	1300	1600	1600	1400	200
Jigawa	40	50	1400	200				1200
Kaduna	160	60		100				270
Kano	30	20	230					50
Katsina	50		600	300				
Kebbi	100	80	100					
Kogi	400	500	850	2100	1000	1000	500	
Kwara	290		1350	1400	1000		1600	
Lagos	200	150	550	750	1500	1500	1500	900
Nasarawa	220	120	600	1500	1500	1500	1562	1500
Niger	200	100	960	950	700	500	700	500
Ogun								
Ondo	25	60	600					450
Osun								

Oyo	200	50	200					350
Plateau	1000	1010	1522	5800	1700	2500	3200	2510
Rivers	140	181	400	700	300	300		1700
Sokoto	100	20	50					100
Taraba	50	40	200	200	200	200	200	420
Yobe	50	100		1000	1000	1000	1000	1000
TOTAL	**6,640**	**5,486**	**23,182**	**35,930**	**22,300**	**22,300**	**23,462**	**29, 050**

Distribution of Household Items/Clothing in Zonal Basis

Zones	Guinea Brocade /Shadda	Wax Print (Pcs)	Used Clothe (Bales)	Bath Towels (Pieces)	Sanitary Pads (Pkts	Blankets (Pcs)	Nylon Mats (Pcs)
Abuja Operation	2,500	3,200	7	3,400	300	6,460	4,400
North-Central	4,900	6,980		4,840		17,700	6,456
North-East	1,100	3,200		2,900		7,200	4,900
North-West	610	1,070		380		5,500	3,300
South-East	1,480	5,300		7,100		7,650	4,950
South-South	1,281	7,430	6	11,100	2,100	12,020	3,250
South-West	750	1,000	100	2,900		3,600	2,900
Total	**12,621**	**28,180**	**113**	**32,620**	**2,400**	**60,130**	**30,156**

Distribution of Household Items/Non Food Items in Zonal Basis

Zones	Omo Detergent (Cartons)	Bath Soaps (Cartons)	Mattresses (Pieces)	Buckets	Plates	Spoons	Cups	Mosquito Nets
Abuja Operation	1,050	700	3,070	4,750	2,700	1,500	2,800	1,100
North-Central	2,620	1,130	4,922	13,300	3,700	4,500	5,262	7,510
North-East	430	660	550	4,200	3,300	3,300	3,300	4,970
North-West	480	230	2,380	600				1,620
South-East	995	1,135	1,950	7,050	8,000	8,200	7,800	2,350
South-South	620	1,301	8,360	4,280	2,100	2,300	1,800	9,350
South-West	425	260	1,550	1,250	1,500	1,500	1,500	1,700
Total	**6,620**	**5,416**	**22,782**	**35,430**	**21,300**	**21,300**	**22,462**	**28,600**

Distribution of household items to States in 2012 cont'd

States	Cooking Stove	Cooking Pots	Mobile Toilets	Life Jacket	Sewing Machine	Grinding Machine	Jerry Cans	Iron Woods	Tissue Papers	Stroke 45 Fishing Nets	Units ofTents	Spring Beds
Bayelsa	700				200	390					50	
Delta	2000	2000	22						100			
Katsina												200
Kogi										50		
Niger				5								
Ondo								1000				
Plateau											5	
Rivers			10				150			10	2	
Total	**2,700**	**2,000**	**32**	**5**	**200**	**390**	**150**	**1,000**	**100**	**60**	**57**	**200**