

**REMOTE SENSING ASSESSMENT OF URBAN BLIGHT IN LAGOS
MAINLAND METROPOLIS**

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BENIN CITY.**

April, 2020

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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE DEGREE
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BENIN CITY**

April, 2020

CERTIFICATION

We the undersigned certify that this research work was carried out by PETER UCHECHUKWU MBONU in partial fulfillment of the requirements for the award of Bachelor of Science (B.Sc.) Degree in Geography and Regional Planning of the University of Benin, Benin City, Nigeria.

.....

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(Project Supervisor)

.....

Date.....

Dr. G. O. Athedor
(Head of Department)

DEDICATION

This work is dedicated to God Almighty for his grace and divine guidance prior to and through my academic years in University of Benin.

ACKNOWLEDGEMENT

I would like to take this opportunity to express my profound gratitude to God Almighty who gave me the enablement to run this programme successfully. Also to my parents who have been my backbone throughout the course of this programme, spiritually, financially, morally and otherwise. I also would like to express my profound gratitude to my able project supervisor, Professor Isi Ambrose Ikhuoria. And to my friend, Ehireme Michael Okoeka, who supported me through the course of the journey. God bless you abundantly.

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ABSTRACT

This study examined the Remote Sensing Assessment of Urban Blight in Lagos Mainland Metropolis. The objectives of the study were to; identify the causes of urban blight in Lagos mainland metropolis; examine the factors influencing blight and its rapid spread in the study area; identify the effect of blight on other elements of the urban environment; identify the most susceptible areas to blight impact in the study area and assess the measures and structures being put in place to curb urban blight in the study area. Remote Sensing and Satellite Imagery was used in assessing the level of urban blight in Lagos mainland. A comprehensive analysis of the remote sensing imagery obtained from these areas and direct physical observation, revealed that blight which is the primarily examined focal point of this research has been the first, variable that is responsible for the general deterioration of these places. Also discovered is that urban sprawling has led to a struggle for survival and accommodation facilities, thereby causing a corresponding increase in the fees and rents of the housing facilities in these areas. Blighted areas were also found to be breeding grounds of crimes. To combat the environmental and societal issues of urban blight, the study recommends urban regeneration as a curative measure for the urban blight in Lagos Mainland Metropolis. Careful planning of development in potentially flood prone areas with resettlement strategies and emergency preparedness plans developed by the involved the government in order to easily evacuate citizens in the occurrence of flood disasters. Policies that setup City codes, need to set a minimum standard for building and property maintenance and these codes need to be effectively and efficiently enforced. Also recommended is that a framework for a political, regulatory and administrative approach should be put in place to effectively combat urban blight in Lagos Mainland Metropolis.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

One of the most remarkable developments in the world especially since the 1980s is rapid urbanization. According to UNDESA (2018), fifty-four percent (54%) of the world's population lived in urban areas as at 2015 and this proportion is expected to increase to 66% by 2050. Projections show that urbanization combined with the overall growth of the world's population could add another 2.5 billion people to urban populations by 2050, with close to 90% of the increase concentrated in Asia and Africa (UNDESA, 2018).

Towns and cities in developing countries have been expanding rapidly, and the total number of urban dwellers in the region is now roughly doubling every ten years (Otoo, 1982). Urbanization in Nigeria is characterized by economic growth without development. According to George (2002), an average of 6,000 people moves to Lagos every day and the United Nation has estimated that the city of Lagos will swell to more than 20 million by 2018. The consequence of this is unabated gross degradation and decay of all the constituent fabrics of the city.

The decay in the built environment in many developing countries, Nigeria inclusive, is widespread. The factors responsible can be traced to rapid urbanization, rural-urban migration, steady economic downturn, decay of urban infrastructure, poor quality of original construction, lack of integrated planning, negligent urban housekeeping, inadequate methods of preservation of historic value, disaster and war (Omole, 2000; World Bank, 2005; Omole & Owoeye, 2006; Ahiamba, Dimuna & Okogun, 2008). This decay manifests in different forms, including squalor, squalid, blight, slum etc. The urban core of Lagos mainland metropolis exhibits such deplorable conditions where substandard houses are prevalent in unkempt environment (Owoeye, 2006).

A blight according to UN-HABITAT (2007) is an area that combines, to various extents, the following characteristics: inadequate access to safe water, inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding and insecure residential status. These characteristics are being proposed because they are largely quantifiable and can be used to measure progress toward the Millennium Development Goal to significantly improve the lives of at least 100 million slum dwellers by 2020 (UN-HABITAT, 2007).

Slums manifest in different ways and vary from country to country. Two major ones have been identified. These are slums of hope or progressing settlements and slums of despair or declining neighborhoods. The first is made of 'old' city center slums and 'new' slum estates whilst the latter is made of squatter settlements and semi-legal sub-divisions (UN-Habitat, 2003). These two major ones are sub divided into four categories of slums. These are inner city slums; slum estates, squatter

settlements and illegal sub-divisions which differ in terms of their formation, condition and extent of deprivation.

Urban blight as defined by (Okoye, 1999; Abumere, 2009; Fabiyi, 2007), is a state of urban squalidness and over crowdedness, characterized by decrepit structures, poor sanitary conditions inadequate provision of amenities and general deterioration of urban environment. It is also seen as when a part of a specific city or given area, starts to fall into decrepitude, due to neglect, crime, or lack of economic support. This may lead to deindustrialization, that is, causing the area to lose industrial strength. Changing population, abandoned buildings, high local unemployment, fragmented families, crimes, desolate, may become a Centre for illicit activities like drug dealing, bad environment for people, plants and animals (Wikipedia, 2018). Blight generally occurs in areas that are impacted by poverty and lack of economic opportunity. Neighborhoods that are exposed to blight are at risk of various social, economic, and physical health disparities.

1.1.1 Emergence of Slums in Lagos

The genesis of slum development and clearance in Lagos can be traced back to the colonial era in Nigeria. The popularity of Lagos grew as a leading commercial center in the 19th century, which attracted migrants from the Yoruba hinterlands, Europeans (including missionaries) and descendants of West African slaves, mainly of Yoruba origin from Sierra Leone, Brazil and Cuba (Echeruo, 1977 in Olukoju, 2008). Due to the diverse nature of the population in the city, the Planning Ordinance of 1902 was promulgated, which mandated the Governor to establish European Reservation Areas (ERA), as residential neighborhoods for the Europeans. Each ERA had its own local board of health with the responsibility for improving the reservation areas. However, the residential quarters of the indigenous African

people were left unregulated, leading to the creation of the earliest slums on Lagos Island (Obalende and Isale-Eko slums) (Nsorfon, 2015).

Afterwards, the Township Ordinance No. 29 of 1917 was promulgated with a mandate to provide infrastructure, public utilities, health, and environmental sanitation, yet there was no appreciable improvement in the indigenous residential areas (Oduwaye, 2009). This indifferent attitude of the colonial government with respect to these areas (also known as native towns) and the high population density led to the two dreadful plagues in Lagos, i.e. the post-World War 1 influenza epidemic and the bubonic plague between 1924 and 1930. These epidemics led to the enactment of the Planning Ordinance of 1928 and the creation of the Lagos Executive Development Board (LEDB). The LEDB mandates include extensive slum clearance, relocation of families from Lagos Island to Lagos mainland, health and sanitation checks, etc. (Ajibade & McBean, 2014). After the clearance of Lagos Island, the LEDB mainly focused on providing residential units for the British government officials and African staff in the colonial administration rather than the evictees of the slum clearance (Nwaka, 2005). This led to movement of evictees to Lagos mainland where development continued without any proper city planning (Bigon, 2008). This trend continued in Lagos until 1960 when Nigeria gained independence, where slums were cleared without adequate resettlement plans.

After Nigeria's independence in 1960, Lagos continued to experience high population growth because of its political and economic status (Immerwahr, 2007). People of different socioeconomic status (upper, middle and lower class) migrated to Lagos for better opportunities. The upper-class citizens and government officials moved to the former ERAs, and to house these prominent groups, new housing schemes were developed in the late 1960s and 1970s in the form of new Government Reserved Areas (GRA) (Olotuah & Bobadoye, 2009). While this was going on, the low-income/poor migrants were also squatting on the

available land within the mainland leading to the emergence and growth of communities such as Ajegunle, Badia, Amukoko, etc., popularly called the squatter communities in Lagos (SNC-Lavalin, 1995). While the squatter settlements were growing, villages within and around Lagos were also experiencing growth due to influx of migrants, which caused uncoordinated expansion of these villages. These unplanned villages were absorbed as the city grew (Pugalis, Giddings, & Anyigor, 2014) and were referred to as slum communities. The squatter and slum communities were categorized as blighted communities in the master plan developed for Lagos in 1984 (Lagos-State/UNCHS, 1984)

Among factors that contribute to the continued formation and expansion of slums, include rapid rural-to-urban migration, policy failure, increasing urban poverty and inequality, population growth and globalization. While more people are migrating from rural areas to towns and cities, urban areas are not expanding enough, inadequate affordable houses, and municipalities are not able to provide enough accommodation. Other factors are failed government policies, corruption, inappropriate regulation, dysfunctional land markets, and unresponsive financial systems to provide low-income people with essential public infrastructure and services (UN habitat, 2003).

Historically, blighted neighborhoods are known to also have higher rates of crime and illicit drug activities. (Wichita, 2010). The properly structured neighborhoods in several

developing countries especially Nigeria, is fast decaying. The factors that are responsible for this would include rapid urbanization, rural-urban migration and decades of steady economic downturn, decay of urban infrastructure and negligent urban housekeeping (World Bank, 2005).

Osuide and Dimuna (2005), noted that the urbanization process in many third world countries like Nigeria has not been accompanied with a resembling supply of adequate housing, basic amenities and infrastructures. This has as a result brought about a high demand on housing stocks leading to high rents, overcrowding, development of slums and squatter settlements. These have serious impacts in the properly planned and built environment and serious backwash in the health of city residents.

Urban population refers to the people living in urban areas, as defined by national statistical offices. It is calculated using World Bank population estimates and urban ratios from the United Nations world urbanization prospects. Increasing population densities indeed, are an equally contributing factor in addition to industrial production processes which generate enormous amounts of wastes, neighborhood overloading, and the resultant land use and environmental dereliction. For example, it is estimated that the volume of solid wastes generated in Nigerian cities will rise from 9 million tons in 1983 to over 15 million tons by 2000 (Mabogunje, 1985).

Lagos, Nigeria continues to grow in population density and urbanization. The city currently stands as the 14th largest urban area in the world and is on the cusp of becoming a primary coastal megalopolis. Lagos urban area is home to approximately 33% of the Lagos State population (Sunday and Ajewole 2006). Lagos state, the commercial hub of Nigeria, is the second fastest growing city in Africa and the seventh fastest growing city in the world. Recent reports estimate its population to be more than 21 million, which makes it the largest

city in the entire Africa by population. With per capita waste generation of 0.5 kg per day, the city generates more than 10,000c tons of urban waste every day. Improper waste disposal and lack of reliable transport infrastructure means that the collected wastes are soon dispersed to other localities. Another unwelcome practice is to overload collection trucks with 5-6 tons of waste to reduce the number of trips. This has necessitated calls for environmental activists to prevail on the relevant legislature to conform to the modern waste transportation standard.

The negligence of airspace in the development of habitable areas has dealt a fatal blow to the efforts of the government to provide adequate housing for the ever rowing population of Lagos state. On this note, land movers were implored to recover land from the ocean during the course of adoption of the Eko Atlantic project, thereby adopting the vertical use of airspace as a means to provide shelter for people as high rise buildings, such as the landmark towers have been erected with the aim of providing residential resources to the citizens.

The first step to the curbing of urban decay which has been adopted by many developing countries in the world has included resettlement programs for the urban poor or those who live in the slums and also see the slums as their haven for sustaining their livelihood. The use of coercion to evict people from these slums would not make the slums disappear, it instead would bring about two or more other slums elsewhere within that same zone as the evicted population need a place to live (Akinrolabu, 2017). According to Lateef Sholebo of the Lagos state urban renewal agency, “Lagos has no choice than to go up” this entails the need to incorporate more vertical, or high rise buildings in order to curb the overcrowding caused by problems of overpopulation in the state. This aims to decongest the state or avoid clusters of low budget structures which causes this said environments to be susceptible to urban decay and also to bridge gap between the residential pattern of the societal rich and poor people alike.

In addition, the ineffectiveness of town planning and urban administration has resulted to a situation where buildings cover a large portion of the urbanized area to the extent of invading flood plains in our cities. Consequently, overcrowding, building conditions and building density, street and road conditions and the solid waste arising from household consumption in our cities has struck most forcibly at our complacency regarding the planning, and management of our urban environment.

1.2 Statement of the Research Problem

The population growth rate of sub-Saharan African countries from 1995-2015 was 3.95% compared to the 0.68% of developed countries (United Nations, Department of Economic and Social Affairs, 2015). This poses a challenge for many sub-Saharan African countries, as the urban growth experienced is associated with limited or no development, causing emergence of slums in the cities (Davis, 2004; Bobadoye & Fakere, 2013). And these slums, where 61.7% of the urban dwellers lives, have continue to be the dominant residential land-use types in these countries (UN-Habitat, 2013a; Simon, Adegoke, & Adewale, 2013; Peter Hofmann, Taubenbock, & Werthmann, 2015), leading to a major concern for urban planning.

Slums gained more popularity after the launching of “cities without slums” in 1999 (Gilbert, 2007). While it is difficult to reach an agreement on how to define slums, due to their uniqueness in different region, yet they have similar characteristics such as overcrowded, poor housing quality, inadequate infrastructural facilities and degraded environment (UN-Habitat, 2003; Dung-Gwom, 2007; Nsorfon, 2015; Pratomo, Kuffer, Martinez, & Kohli, 2017: cf. ch. 2.2). Although the proportion of the urban population living in slums has reduced, the absolute number of slum dwellers have increased and this number is expected to rise in the near future, especially in the global south (United Nations, 2015;

UN-Habitat, 2016), where slum provides low cost housing for the urban poor (Augustijn-Beckers, Flacke, & Retsios, 2011). This implies that slums will continue to exist if no adequate measures are put in place.

Most policies on slum management have been more experimental rather than incremental in many sub-Saharan African countries. An incremental policy utilizes the past trend to develop the best alternative, while an experimental policy is implemented without any prior research (Roy, Lees, Palavalli, Pfeffer, & Sloot, 2014). The development from laissez-faire in the 1950s to forced eviction and slum clearance in the 1970s to slum upgrading and resettlement in the 1980s to the security of tenure and enabling approach in 1990s, and slum-free cities in the 2000s have all been found to be ineffective (Mehta, Dastur, & Janus, 2008; Arimah, 2010; Roy et al., 2014). These policies have not been able to slow down the in-formalization process, because they focus on slum manifestation rather than on the root causes (UN-Habitat, 2003; Sietchiping & Yoon, 2010). Consistently, many studies on slums (especially in sub-Saharan Africa) focus on the impact of existing slums on slum dwellers, physical environment, infrastructural facilities, health, etc., and on how to manage these effects (Pugh, 2000; Robertson, 2009; Omole, 2010; Bobadoye & Fakere, 2013). Most slum management programs/studies have thus been reactive rather than proactive.

Should the status quo be maintained, Lagos, a megacity of slums in Nigeria (IRIN, 2006), might possibly not meet the goals of the United Nations Sustainable Development Summit (2015) calling for cities to be free of slums by 2030. Presently, about 70% of its population resides in slums, and this number might likely increase with the future population growth projected for the city, as slum growth is on a par with urban growth in Nigerian cities (UN-Habitat, 2003; World Bank, 2006; Marx, Stoker, & Suri, 2013; World Population Review, 2015). While the laissez-faire attitude of the Lagos state government, in the past, have led to emergence of new slums (Morka, 2007), the neoliberal approach adopted to

governance, since 1999, towards the regeneration of the city to become a befitting megacity, through increasing slum clearances (e.g. Ilubiri, Otodo-Gbame), relocation of slum dwellers (e.g. Adeniji-Adele) and limited slum upgrading (e.g. Lagos Metropolitan Development and Governance Project), have not yielded much positive result either (Badmos, Rienow, Callo-Concha, Greve, & Jürgens, 2018), as what is observed is slum displacement rather than slum reduction (Agbola & Jinadu, 1997). Hence, there is need for new approach to manage slum and blight growth in Lagos.

Urban blight is a problem in any developing city center or town as the case may be. This is arising from the decay experienced due to improper management of rapid population increase which is a factor of urban sprawl. Urban sprawl refers to the migration of a population from populated towns and cities to low density residential development over more and more rural land. The end result is the spreading of a city and its suburbs over more and more rural land (conserve energy future, 2017). Although some would argue that urban sprawl has its benefits, such as creating local economic growth, urban sprawl has many negative consequences for residents and the environment, which is the blight which is in turn noticed in due course across these urban centers. The blighted features which can be noticed in these areas include higher water and air pollution, increased traffic fatalities and jams, loss of agricultural capacity, increased car dependency, higher taxes, increased runoff into rivers and lakes, harmful effects on human health, including higher rates of obesity, high blood pressure, hypertension and chronic diseases, increased flooding, decrease in social capital and loss of natural habitats, wildlife and open space.

Lagos state, which is the center of this research problem, over the years has experienced rapid population increase and urban sprawl which, just as the population increase has caused it to attain its status as the nation's commercial capital city, has also seen urban blight dent its identity. The notion that the city centers are a haven for prosperity just as

portrayed in movies and documentaries has also contributed immensely to this rapid population growth in the nation's largest commercial city. This has therefore brought about housing problems, such as inadequate housing for inhabitants of the city which has in turn led to the development of slums around the city. The high demand for housing has also led to the skyrocketing of rents in these areas which has also caused a significant margin between the inhabitant populace in the city. This segregates the rich from the poor. This bridge between the rich from the poor, leads to a number of problems as these slums which develops off the city centers consisting of the high class citizens of the city would be a target for these slums.

The exposure to hardships and the obvious differences between the inhabitants of both settlements opens the eyes of the masses to certain vices which are adopted as a means of livelihood by the masses. These slum inhabitants which are characterized as the urban poor would find themselves struggling to bridge the gap between them and the urban elite, the aim becomes achieving these aims via any possible means, therefore extortion, fraudulent activities and a host of other juvenile delinquencies are adopted. Which therefore endangers the inhabitants of the developed areas. Security issues then develop, alongside vices like robbery, kidnapping, thuggery, prostitution, assault, cultism, drugs and so on. This study therefore seeks to assess the nature and level of urban blight in Lagos mainland metropolis using remote sensing.

1.3 Research Questions

The study examines the remote sensing assessment of urban blight in Lagos mainland metropolis. Following from the statement of problem, the research seeks to answer the following questions

1. What are the causes of urban blight in the study area?
2. What are the factors influencing blight and its spread across the various towns in Lagos state?
3. What is the ripple effect of urban blight on other elements of the urban environment?
4. What areas are most prone to blight and what prominent features are associated with these blight-prone areas?
5. What urban renewal measures have been taken to curb urban blight?

1.4 Aims and Objectives of the Study

This study aims to assess the overall impact of urban decay in Lagos mainland metropolis, using remotely sensed data. The specific objectives of the work include:

1. To identify the causes urban blight in Lagos mainland metropolis.
2. To examine the factors influencing blight and its rapid spread in the study area.
3. To identify the effect of blight on other elements of the urban environment.
4. To identify the most susceptible areas to blight impact in the study area.
5. To examine the measures and structures being put in place to curb urban blight in the study area.

1.5 Scope of the Study

This study focuses on Lagos mainland metropolis, which is the region that houses the middle and low income earners resident in the state, their standard of living, housing structures, population density quality of life and its potential susceptibility to urban blight over time, due to the ever rising population of the city and the need to accommodate this rapidly increasing population.

The areas of the mainland metropolis assessed in this study includes: Surulere, Yaba, Amuwo-Odofin, Apapa, Festac town, and Ajegunle.

1.6 Significance of the Study

This study seeks to analyze the overall impact of blight within Lagos state and how it has shaped up the current landscape of the state. The discoveries made during the course of this work, would be a useful tool to proffer possible solutions for curbing the sprawling across the urban space and also, the information derived from this work can be of great relevance to town planners, policy makers, government, relevant agencies both private and public to aid in the development and management of this important zone in the urban landscape of Lagos mainland which is the center of this research.

1.7 The Study Area

The case study of this discussion is Lagos Mainland, (Fig 1.1) which has undergone massive changes as a result of tremendous physical and economic activities of man and also modernization development mechanisms. These developments have accelerated the variety, intensity and geographical spread of environmental changes within the study area.

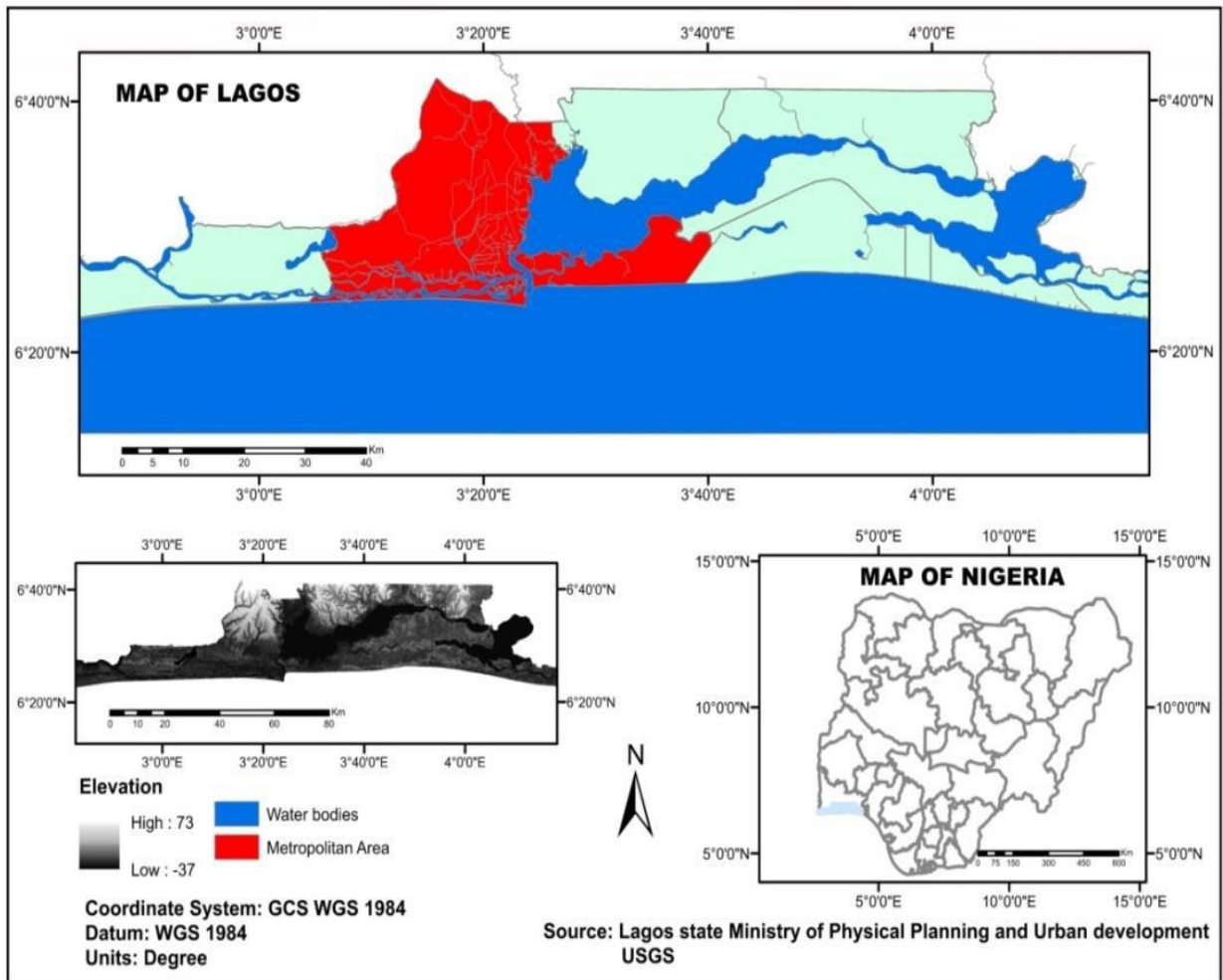


Fig 1.1: Lagos State, Nigeria.

Source: Lagos State Ministry of Physical Planning and Urban Development (2016).

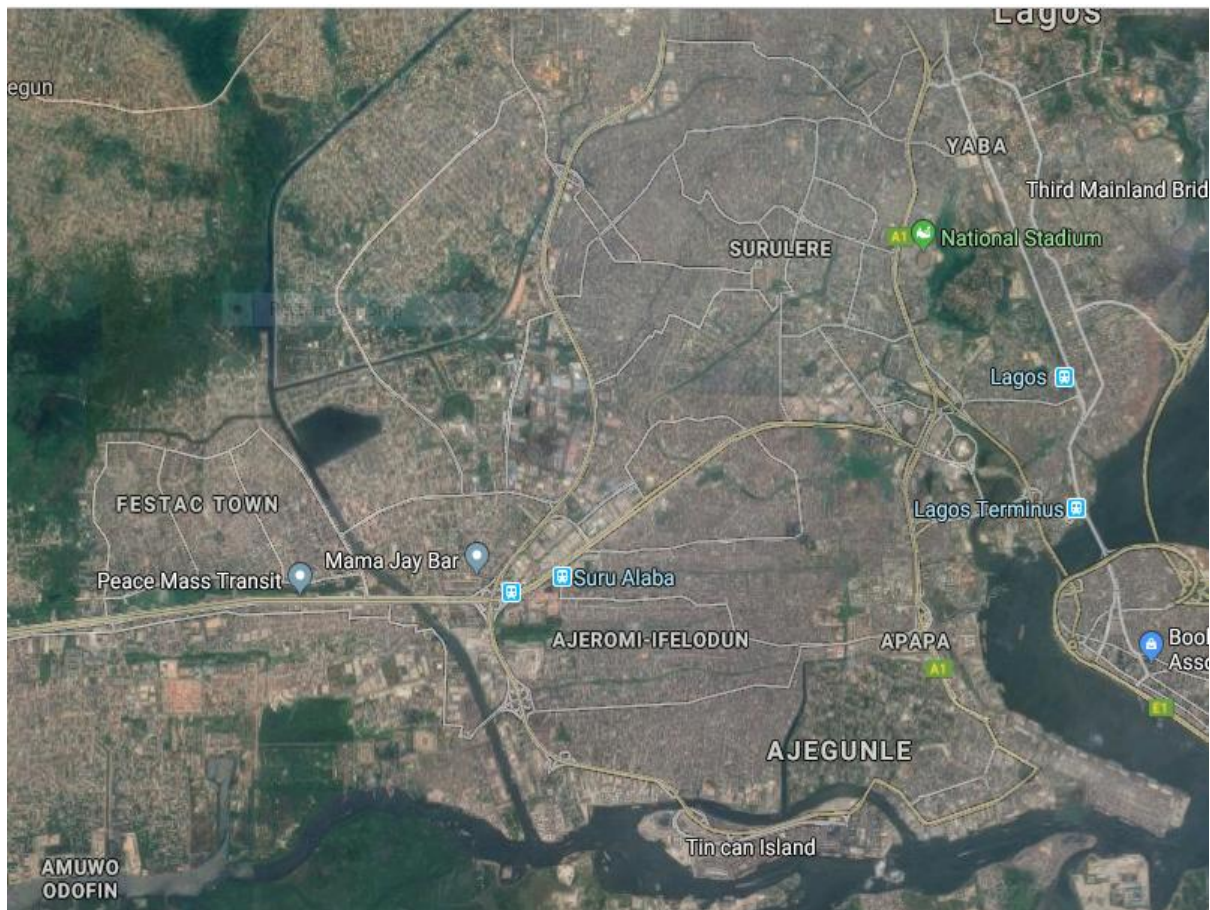


Fig.1.2: An overview of the prominent areas to be examined in this research work.
Source: Google Earth Satellite Imagery, (2020).

1.7.1 Geographical/ Biophysical Characteristics of Lagos

This study was carried out in the city of Lagos, located in south-western Nigeria between longitude 2°42'E and 3°42'E and latitude 6°22'N and 6°52'N. The city is low lying with elevations ranging from 37m below sea level to 73m above sea level. It is bordered in the west by the Republic of Benin, in the north and east by Ogun state and stretches over 180km along the Guinea coast of the Bight of Benin on the Atlantic Ocean.

The city of Lagos was initially within the present-day seven local governments, but due to rapid urbanization expanded outwards to the mainland, which has led to the loose classification of the city into mainland and island. The region covers approximately

1.171.28km², which is 33% of Lagos state land mass, and harbors more than 80% of the Lagos state population (Oduwaye & Lawanson, 2007).

1.7.2 Climate

The city experiences a tropical savannah climate with a distinct precipitation difference between the dry and wet season. The dry season is from November to March while the wet season is from April to October. During the rainy season peak period, the city experiences floods, which are aggravated by the poor surface drainage systems of the coastal lowlands (Braithwaite & Onishi, 2007). Temperatures range from 28°C to 32°C due to the city's location near the equator with a high humidity level throughout the year.

1.7.3 Demography, Economy and Administration

Lagos grew from a fishing village to become one of the fastest growing cities in the world (Filani, 2012). The population grew from 25,000 in 1866 to 665,000 in 1963. By 1995, it had reached 10 million, and the city gained the UN definition of a megacity (Abiodun, 1997; Ilesanmi, 2010). Lagos Bureau of Statistics (2013) projected the population of Lagos metropolitan area as 21,324,114 in 2015. The population growth rate is about 600,000 persons per annum, while the average density is over 20,000 persons per square kilometer in the built-up area (Okwuashi & Beulah, 2012). There are two thousand six hundred communities in the city (Obono, 2007). The city is the most urbanized in Nigeria, with the smallest land mass (Ayeni, 1979 in Oduwaye, 2009). Although the city is dominated by the Yorubas, due to in-migration from other parts of Nigeria and neighboring countries, other ethnic groups such as Hausa, Igbo, Fulani, Togolese, and Chinese, etc., and also people of different socioeconomic status live in the city. Victoria Island, Magodo, and Lekki, etc., are examples of high-income residential areas, while Ajegunle, Badia, etc., are examples of low-income residential areas in the city.

1.7.4 Economy

Lagos is the major commercial, financial and industrial focal point in Nigeria. The activities are carried out in both the informal and formal sector. The city's budget in 2017 was approximately US\$ 2 billion (Lagos state Government, 2016). Its location on the west coast of Africa promoted the development of trade in its hinterland and with neighboring and other countries. Even during the colonial era, it was a major slave trade center (Okwuashi & Beulah, 2012). The city harbors more than 60% of the industrial and commercial activities of Nigeria and also one of the largest sea ports in Africa, accounting for up to 70% of the Nigerian manufacturing value added (Braithmoh & Onishi, 2007). Furthermore, trading activities in the city are predominantly in the informal sector. The economic meltdown in the country has led to the decline of the formal sector and the flourishing of the informal sector (Nsorfon, 2015).

The city of Lagos is a major economic focal point in Nigeria, generating around 10% of the country's GDP. Most commercial and financial business is carried out in the central business district situated on the island. This is also where most of the country's commercial banks, financial institutions and major corporations are headquartered. Lagos is also the major Information Communications and Telecommunications (ICT) hub of West Africa and potentially, the biggest ICT market in the continent. Lagos is developing a 24-hour economy and has also been ranked as one of the most expensive cities in the world. In some parts of Lagos, residents have one of the highest standards of living in Nigeria and in Africa. At the same time, a sizable proportion of the residents live in slums without access to piped water and sanitation.

Conclusively, based on its high urbanization rates and dense population, the poverty level in the Lagos Metropolis is quite high. The Lagos State Government (2004) estimates

that 51% of men and 54% of women resident in Lagos live below the poverty line. Urban poverty is the scourge of most cities of the 3rd world countries and Lagos is not an exemption. This is clearly manifested in the growing number of largely unskilled, unemployed and homeless migrants from the rural areas of the country into Lagos, who find it convenient and affordable to live in existing slum communities or create new ones that are not serviced by basic urban facilities, services and amenities.

CHAPTER TWO
THEORETICAL/CONCEPTUAL FRAMEWORK AND LITERATURE
REVIEW

2.0 Introduction

The spread of urban decay in Lagos, Nigeria, as a result of forced urban expansion due to the rapid increase in the population trends in Lagos state, fostered by the daily rural-urban migration trends in the country, has become a disturbing topic and one that should not be taken lightly. The transfer of this young active populace to the city centers does not immediately reflect in the productivity levels of the city as expected because, the population holding capacity of the city has been breached or is close to being so, this therefore causes a diminishing effect in the development of that state, thereby producing a backwash effect in that said city.

In this chapter, the concepts behind the research topic would be explained, while relevant literatures that would help answer and provide more insight into the nature and impact of blight and would be review. The theories of Burgess and Hoyt explains the structures of cities and how urban blights are given birth to.

2.1 Theoretical Framework

The theoretical framework is organized along the theories of Burgess and Hoyt. These are highlighted below:

2.1.1 Burgess' Model

The concentric zone model, also known as the Burgess model or the CCD model, is one of the earliest theoretical models to explain urban social structures. It was propounded by sociologist Ernest Burgess in 1925. The model was based on human ecology theory done by

Burgess and applied on Chicago, it was the first to give the explanation of distribution of social groups within urban areas. This concentric ring model depicts urban land usage in concentric rings:

The Central Business District (or CBD) was in the middle of the model, and the city expanded in rings with different land uses. It is effectively an urban version of Von Thunen's regional land use model developed a century earlier. It influenced the later development of Homer Hoyt's sector model (1939) and Harris and Ullman's multiple nuclei model (1945).

The zones identified are: the center with the central business district; the transition zone of mixed residential and commercial uses or the zone of transition; working class residential homes (inner suburbs), in later decades called inner city or zone of independent working men's home; better quality middle-class homes (outer suburbs) or zone of better housing; and the commuter zone. Figure 2.1 is a graphic presentation of the Burgess' model and can be adapted in studying urban sprawl. The outward occupation of land uses concentrically could be as a result of pressure on inner urban land as a result of physical expansion of Lagos mainland metropolis. Due to the continuous increase in population primarily due to migration, urban expansion is forced to take place outward from the city center.

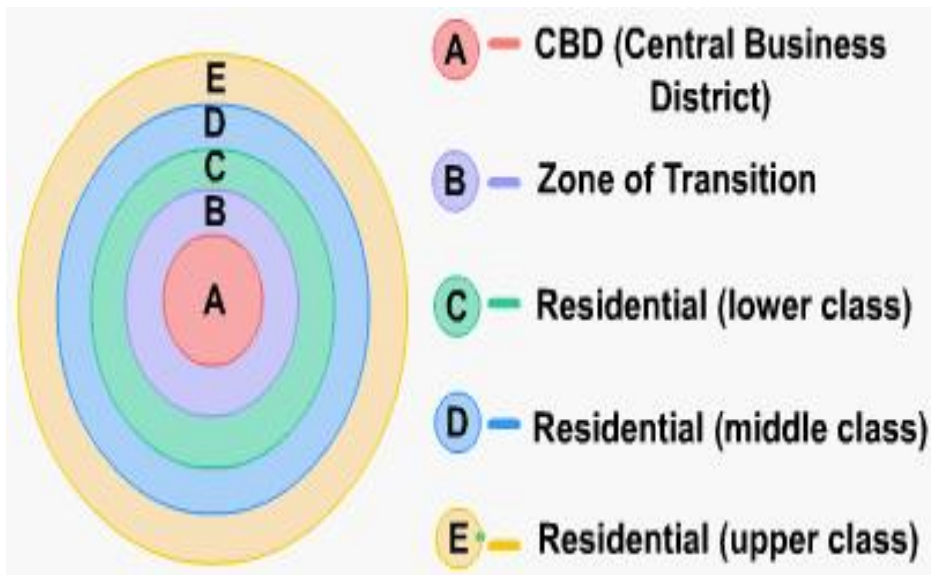


Figure 2.1: Burgess model of concentric zones
Source: S-cool.co.uk.

2.1.3 Conceptual Framework

2.1.3.1 The Concept of Remote Sensing

Remote Sensing is defined as the science and technology by which the characteristics of objects of interest can be identified, measured or analyzed the characteristics without direct contact. Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance (typically from satellite or aircraft). Special cameras collect remotely sensed images, which help researchers "sense" things about the Earth. Some examples are:

1. Cameras on satellites and airplanes take images of large areas on the Earth's surface, allowing us to see much more than we can standing on the ground.
2. Sonar systems on ships can be used to create images of the ocean floor without needing to travel to the bottom of the ocean.

3. Cameras on satellites can be used to make images of temperature changes in the oceans.

Some specific uses of remotely sensed images of the Earth include:

1. Large forest fires can be mapped from space, allowing rangers to see a much larger area than from the ground.
2. Tracking clouds to help predict the weather or watching erupting volcanoes, and help watching for dust storms.
3. Tracking the growth of a city and changes in farmland or forests over several years or decades.
4. Discovery and mapping of the rugged topography of the ocean floor (e.g., huge mountain ranges, deep canyons, and the “magnetic striping” on the ocean floor)

Electro-magnetic radiation which is reflected or emitted from an object is the usual source of remote sensing data. However, any media such as gravity or magnetic fields can be utilized in remote sensing. Remote sensing provides us with a continuous and constant source of information about the Earth, and geographic information systems (GIS) are a methodology for handling all of this geographic data. The amalgamation of the two disciplines has allowed us to carry out large scale analyses of the Earth's surface and, at the same time, provide extensive knowledge on many planetary elements and improve our understanding of its functionality. These analyses are essential for decision-making on the sustainable management of natural resources, designing networks of protected areas, and addressing the threats of global change. Remote sensing can be either passive or active. Active systems have their own source of energy (such as Radar) whereas the Passive systems depend upon external source of illumination (such as the Sun) or self-emission for remote sensing.

Radiation from the sun, when incident upon the earth's surface, is either reflected by the surface, transmitted into the surface or absorbed and emitted by the surface. The EMR, on interaction, experiences a number of changes in magnitude, direction, wavelength, polarization and phase. These changes are detected by the remote sensor and enable the interpreter to obtain useful information about the object of interest. The remotely sensed data contain both spatial from the viewpoint of interaction mechanisms, with the object-visible and infrared wavelengths from 0.3 μm to 16 μm can be divided into three regions. The spectral band from 0.3 μm to 3 μm is known as the reflective region. The band corresponding to the atmospheric window between 8 μm and 14 μm is known as the thermal infrared band. The energy available in this band for remote sensing is due to thermal emission from the earth's surface. Both reflection and self-emission are important in the intermediate band from 3 μm to 5.5 μm . In the microwave region of the spectrum, the sensor is radar, which is an active sensor, as it provides its own source of EMR. The EMR produced by the radar is transmitted to the earth's surface and the EMR reflected (back scattered) from the surface is recorded and analyzed. The microwave region can also be monitored with passive sensors, called microwave radiometers, which record the radiation emitted by the terrain in the microwave region. Reflection of all the interactions in the reflective region, surface reflections are the most useful and revealing in remote sensing applications. Reflection occurs when a ray of light is redirected as it strikes a non-transparent surface. The reflection intensity depends on the surface refractive index, absorption coefficient and the angles of incidence and reflection information (size, shape and orientation) and spectral information (tone, color and spectral signature).

Transmission of radiation occurs when radiation passes through a substance without significant attenuation. For a given thickness, or depth of a substance, the ability of a medium to transmit energy is measured as transmittance (τ). Incident radiation Spectral Signature

Spectral reflectance, $[\rho(\lambda)]$, is the ratio of reflected energy to incident energy as a function of wavelength. Various materials of the earth's surface have different spectral reflectance characteristics. Spectral reflectance is responsible for the color or tone in a photographic image of an object. Trees appear green because they reflect more of the green wavelength. The values of the spectral reflectance of objects averaged over different, well-defined wavelength intervals comprise the spectral signature of the objects or features by which they can be distinguished. To obtain the necessary ground truth for the interpretation of multispectral imagery, the spectral characteristics of various natural objects have been extensively measured and recorded. (Shefali and Aggarwa, 2018).

2.1.3.2 The Concept of Urban

Urban areas are human settlements with high population densities and infrastructures of built environment. An Urban area is formed through urbanization and are categorized by urban forms as cities, towns, conurbations or suburbs. In urbanism, the term contrasts to rural areas such as villages and hamlets and in urban sociology or urban anthropology it contrasts with natural environment. The creation of early predecessors of urban areas during the urban revolution led to the creation of human civilization with modern urban planning, which along with other human activities such as exploitation of natural resources leads to human impact on the environment.

Urban areas are mostly devoid of farms and agricultural activities. Also the inhabitants of urban areas are usually engaged in non-agricultural activities. These urban areas are also characterized by the housing patterns, access to social amenities, the lifestyle of the urban dwellers and general trends in the city. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways.

2.1.3.3 The Concept of Blight

Blight according to UN-HABITAT (2007) is an area that combines, to various extents, the following characteristics: inadequate access to safe water, inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding and insecure residential status.

The legal term “blight” describes a wide array of urban problems, which can range from physical deterioration of buildings and the environment, to health, social and economic problems in a particular area. According to Colorado State Statute (CRS 31-25-103[2]), the presence of these factors, should be a reason for the rapid action of urban renewal in the area: slum, deteriorated or deteriorating structures, predominance of defective or inefficient street plan, faulty area layout in relation to size, adequacy, accessibility, or usefulness, Unsanitary or dangerous conditions, Deterioration of site or other improvements, Unusual landscape or inadequate public improvements or utilities. Defective or unusual conditions of title rendering the title non-marketable,

The existence of conditions that endanger life or property by fire or other causes, Buildings that are unsafe or unhealthy for persons to live or work in because of building code violations, dilapidation, deterioration, defective design, physical constructions, or faulty or inadequate facilities, Environmental contamination of buildings or property, The existence of health, safety, or welfare factors requiring high levels of municipal services or substantial physical underutilization or vacancy of sites, buildings or other improvements. If the said area or areas consists of a large number of the aforementioned factors above. The area is said to be a blighted.

2.1 Literature Review

Settlements represent the most profound human alteration of the natural environment through a spectrum of urban land use activities (Ifatimehin and Musa, 2008) which include, but are not restricted to, transportation, commercial, industrial, residential, institutional, and recreational land uses. The expansion that ensues as a result of increase in the demand for these land uses explains the underlying and fundamental causes of urban blight: population increase. Generally, decay of any neighborhood is associated with deteriorating physical, social, environmental and economic condition that result to loss of its initial status, image and value of the neighborhood. (Mutuli 2016). Mutuli, further explained that, Urban blight is often linked with population increase which can be used to define the movement of economically built up population from the old decaying part of the city to better areas with better social and physical infrastructures or higher income residential areas. This population is generally replaced by poor population. Several studies (UNCHBP, 1974; Lambin *et al.*, 2003; European Environment Agency, 2006; Ifatimehin and Musa, 2008) reveal that the proliferation of urban centres has been phenomenal from the turn of the 20th century. Urban blight is considered synonymous with unplanned, incremental urban development, characterized by a low density mix of land uses on the urban fringe.

Rapid urbanization in developing countries has been a major cause of environmental change (Oyinloye and Popoola, 2015). Urban encroachment and land use changes around fast-growing cities in the developing world has drawn considerable attention from urban geographers as well as city and regional planners (Rahman, 2016). According to Balogun *et al.* (2011), they are urbanization induced. Rahman (2016) further stressed that population growth in terms of increased population density is seen as the key factor directly inducing Land Use changes and urban blight. Land use and land cover change is as a result of high rate of urban growth which according to Yohanna, *et al.* (2015) is a major phenomenon in our

contemporary era. According to Vitousek, (1992), it is a vital key to global change and has significant implications for many international policy issues. Several studies have shown that uncoordinated urban expansion and unplanned land use changes due to urbanization have become a major problem in many urban areas (Chellasamy *et al.*, 2015). Sankhala and Singh, (2014) opined that although urban blight is a worldwide phenomenon as the rate of urbanization is very fast especially in the developing countries and further stressed that it is mainly driven by unorganized growth, increased immigration and rapidly increasing population.

Much of this explosive growth has been unplanned. It is quite obvious that most cities in the developing countries have been unprepared for the expansion currently witnessed. These cities are envisaged to double their urban population in the next thirty years, and possibly triple the land area (Angel *et al.*, 2010). The land use pattern of a region is an outcome of natural and socio-economic factors and their utilization by man in time and space. Therefore, rapid population growth is a key factor inducing urban blight. According to Tofowomo (2008), Urban Sprawl which induces blight is characterized by unplanned and uneven pattern of growth driven by multitude of processes and leading to inefficient resource utilization. Urban blight has its threshold limits. At the lowest end of the spectrum, a city remains uniform and vulnerable to change while rapid unplanned urban blight exceeding its maximum threshold limit creates chaos and deteriorates the quality of city transportation and utility services (Rahman, 2016).

"Blight" may just be a well-mannered approach to state "ghetto" or "slum"— another word that never again has one all-inclusive definition, yet we as a whole comprehend what it is and who it is the point at which we see it. Urban Blight was a facially impartial term mixed with racial and ethnic bias. While it purportedly surveyed the condition of urban foundation,

Urban Blight was regularly used to depict the negative effect of specific occupants on city neighborhoods.

Blighted neighborhood are associated with poverty, low income, and poor standards of living, therefore, Wilson and Waquant (1989), go on to illustrate, that it is poverty and social isolation that are key determinants of crime and not race, nor living standards, even though racial exclusiveness is a major characteristic of slums in the United States. A developing literature deals with the question of whether social isolation exacerbates the problems associated with poverty (Wilson 1987, 1991, 1996); Wacquant and Wilson 1993; Rulli; Holloway 1993, Van Kempen 1997; Marcuse 1997a, 1997b; Enchautegui 1997; Massey and Denton 1993; Mincy and Wiener 1993; Harrell and Peterson 1992) Another relationship that seems worthy of research therefore is the relationship between poverty and crime on one hand and social isolation on the other. Based on the social isolation literature, the first hypothesis is that extreme poverty in the society and disadvantage under condition of social segregation are related with high levels of crime because the situations that contribute to criminal act are particularly prominent. Residents frequently are exposed to criminal act and in conditions of near general poverty the most attractive role models especially to the young ones may be those who have made a living out of crime.

According to Skogan (1990), the "least blighted neighborhoods enjoyed low rates of distress," but he also pointed out that some relatively blighted neighborhoods encountered low levels of distress. He illustrated data showing that "wealth helps explain the position of several of the anomalous low-stability, high-income areas." Skogan (1990), also found strong similarities between levels of disorder and the density of racial and ethnic minorities in the communities he studied. As we have indicated, another correlate of disorder was poverty. Urban decay is characterized by vandalism, high crime rates, social deprivation in the form of bad housing, with obsolete schools, polluted air and a polluted river, with chronic

unemployment, run-down dock system and large areas of industrial dereliction, (Marriner 1982). However, subsequent economic change left many cities economically vulnerable. Studies such as the Urban Task Force (Dert 1999), suggest that areas suffering from industrial decline-high unemployment, poverty, and a decaying physical environment (sometimes including contaminated land and obsolete infrastructure) prove “highly resistant to improvement”.

The declining housing stock may make housing more affordable for low-income minorities, studies across the fields of political science, sociology, and economics show that the negative social outcomes outweigh affordable housing prices. In the words of (Massey et al 1993), “residential segregation, by relegating disadvantaged minorities to areas with fewer opportunities and amenities, exacerbates the existing social distance between them and the high income.”

2.2.1 Urbanization in Africa

According to the United Nations, more than 50% of the projected global population growth between 2017 and 2050 is expected to take place in Africa. Out of the 2.2 billion people projected to be added globally, 1.3 billion will be added in Africa, making Africa the highest contributor to the future population growth (United Nations Department of Economic and Social Affairs Population Division, 2017: Figure 2.1). Most of this population growth will be in urban areas of African countries (Cohen, 2006; United Nations Population Division, 2011 in Linard, Tatem, & Gilbert, 2013). Although the world population is expected to continue to grow until the end of the 21st century, however the rate at which the growth will occur is expected to decline (Figure 2.3 and 2.4). Presently, Africa has the highest growth rate of about 2.6 % compared to other major areas in the world, which is expected to continue in the future (United Nations Department of Economic and Social Affairs Population Division, 2017: Figure 2.3).

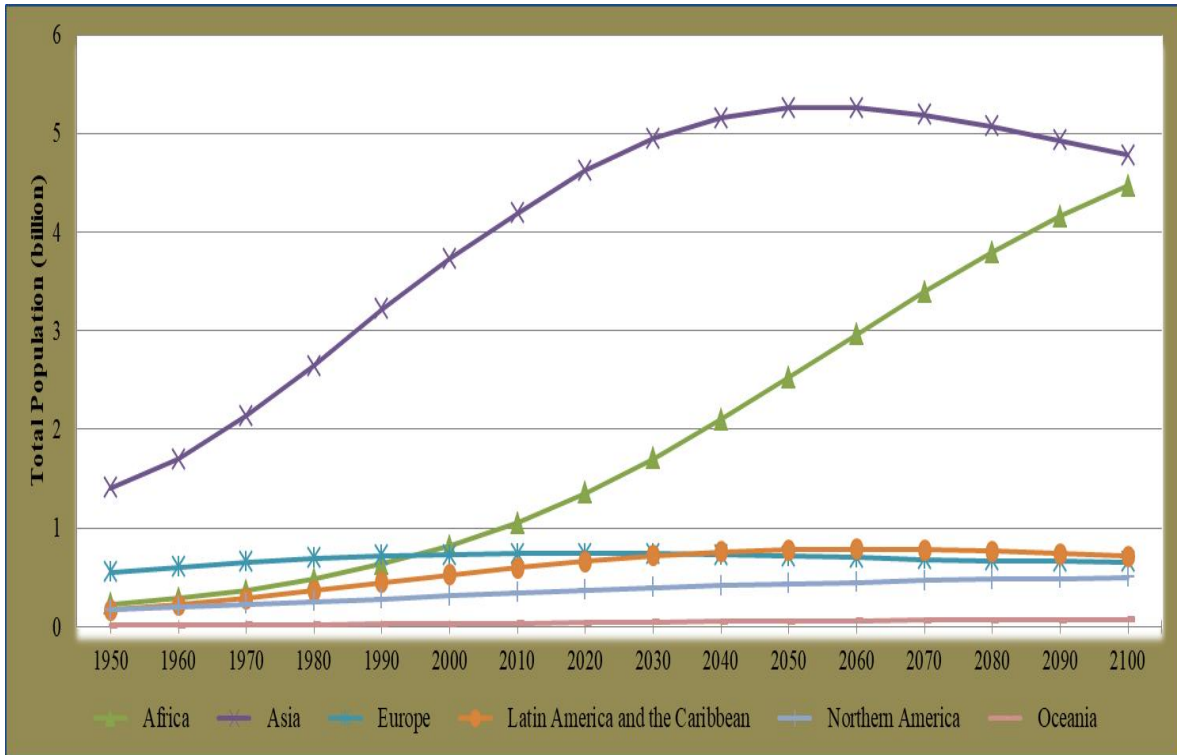


Figure 2.2: Population by region: estimates 1955-2015, and medium-variant projection 2015- 2100.

Source: United Nations Department of Economic and Social Affairs Population Division, (2017).

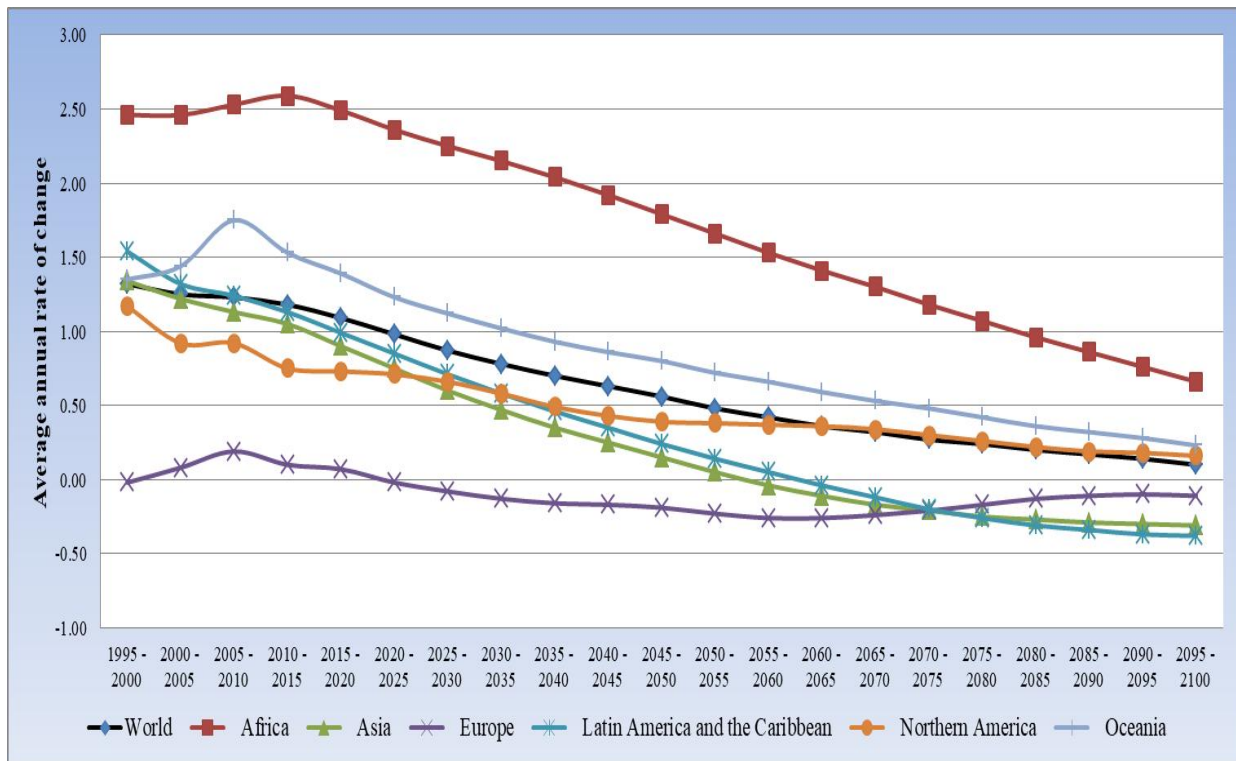


Figure 2.3: Average annual rate of population change for the world and by region: estimates 1995-2015, and medium-variant projection 2015- 2100.

Source: United Nations Department of Economic and Social Affairs Population Division, (2017).

Urbanization is defined as “the process whereby a large number of people become permanently concentrated in relatively small areas to form cities” (UNSTAT, 2005). Urbanization leads to a distinct change in the size and structure of an urban population (Bobadoye & Fakere, 2013). Urbanization is considered a good process because many countries generate the bulk of their gross domestic product from the cities (Arimah, 2010). But with the high rate of urbanization experienced in sub-Saharan African countries, the economy of these countries has been considered immature and marginalized (Cohen, 2006; Africa Fact Sheet, 2010). This is associated with the high growth of informal activities in these countries (Africa Fact Sheet, 2010), and poor governance, high poverty rate and non-coherent urban planning policies present in most of these cities have exacerbated the situation (Davis, 2004; Cheru, 2005).

Unlike other developing countries where urbanization is accompanied by growth, sub-Saharan African countries have experienced rapid urbanization, which has led to limited or even no development (Cheru, 2005; Barrios, Bertinelli, & Strobl, 2010). According to Daniel, Wapwera, Akande, Musa and Aliyu (2015), it is difficult to establish a positive relationship between urbanization and economic growth in African cities, because the urbanization experienced in Africa has created hardships for its urban residents. Davis (2004) also observed that the cause of urbanization, economic growth and slumming in Western cities such as Manchester, Berlin and Chicago, etc., was as a result of industrial revolution, while the African countries' experience of rapid urbanization and slumming cannot be totally attributed to industrialization. This is because many of these countries have experience limited or no industrialization. Despite the poor economic performance and no significant direct foreign investment in many African cities, these cities continue to grow (Cohen, 2006). The question remains what causes urbanization in African cities?

Fay and Opal (1999) observed that in general there is a strong association between level of urbanization and level of income, but when negative economic growth occurred, urbanization still persisted, and this seems to be the case for many African countries where distorted economic growth has not reduced rate of urbanization. Hence, the authors conclude that other factors such as education, differences in rural-urban wages, ethnic tensions and civil disturbances contributed to urbanization in African countries. Fox (2012) also argued that the rapid urban growth experienced in Africa after 1960 was due to decline in mortality rate and improved access to surplus food supply. This was made possible through technological and institutional changes introduced after World War II by colonialism, trade and international development.

The conversion of rural to urban settlements has been reported to be a cause of urban growth in Africa (Parnell & Walawege, 2011). According to McGranahan, Mitlin,

Satterthwaite, Tacoli and Turok (2009), between 1950 and 1980, more than 26% of the overall rate of urbanization recorded in Africa was due to this conversion, which has not necessarily lead to any type of development. Further, the cause of urban growth in many African countries can be traced back to the colonial era, when the colonial governments established centers for administration, cultural, economic and recreational activities where the country's population drifted to (Hope, 1998). After the colonial era, these centers became the focal point for many Africa countries (e.g. Lagos in Nigeria, Accra in Ghana, etc.), and people did not stop migrating to these places even when economic incentives no longer existed. Considering some of the causes stated above, urbanization in Africa is sometimes referred to as “parasitic urbanism, urbanization of poverty or premature urbanism” (ObengOdoom, 2010:13).

The consequence of this type of urbanization experienced in Africa is high slum prevalence, which has become the dominant residential land-use type in many African cities (Hofmann *et al.*, 2015; Simon *et al.*, 2013). With the future population projection that expects African cities to experience massive population growth (United Nations Department of Economic and Social Affairs Population Division, 2017), there is the expectation of high slum proliferation in the future. In addition, future migrants to these cities are assumed to be mostly poor, and if the present trends continue, these migrants are expected to follow their predecessors' way of securing shelter by either living in the existing slums or occupying vacant plots (Akom, 1984; Garau, Sclar, & Carolini, 2005).

In Nigeria, urban growth is not a recent phenomenon. Since the emergence of ancient cities such as Benin, Kano and Zaria between the 14th and 17th century, there has been a steady evolution and multiplication of urban centers. The rate of multiplication however became greater from the 1960's with more urban centers emerging than before then. As at 1960 only four major administrative centers existed, these centers were Lagos, Ibadan, Enugu,

and Kaduna. By 1967, the centers rose to 13, while it became 21 centers in 1987. The center's again rose to 30 administrative state headquarters in 1991. Similarly, administrative changes were undertaken at the local level resulting in the emergence of towns which are now headquarters of local government areas (Onokerhoraye and Omuta, 1994).

According to George (2002), "an average of 6,000 people moves to Lagos every day and the United Nation has estimated that the city of Lagos will swell to 25 million by 2016". The consequence of this is unabated gross degradation and decay of all the constituent fabrics of the city. Makoko is an integral part of the Lagos community in terms of its population, and its importance to the economy of Lagos state, Nigeria. Makoko is one of the many water and shoreline settlements. Their economic activity includes salt making, sand dredging, sawmills, firewood, and fishing. According to Habitat (2007), Makoko is one of the 43 large blighted slums identified in Lagos, and has been classified as one of the 9 largest slums in the city. Makoko is characterized by adverse environmental conditions otherwise known as urban slum. The total area of space covered by this settlement cannot be easily estimated as residents continue to build and encroach on the water body as population increases.

According to Kilani (2012), Makoko, "village in the city" shows a community long abandoned by government, and with inadequate basic social amenities. The residents lack sufficient sanitation – „communal latrines are shared by about 15 households and wastewater, excreta, kitchen waste and polythene bags go straight into the water“, the oily black water is no longer suitable for fishing; it emits a pungent smell, and a thick layer of white scum gathers around the shack stilts, when it rains, conditions turn particularly nasty (Udoma, 2013). Despite the poor environmental conditions found in the settlement, Makoko continues to grow in both population size and physical boundary. More housing units can be seen sprawling into the Lagoon and roadside.

Urbanization is here to stay and needs to be integrated into city development processes (Shekhar, 2012b). Even if all rural areas are developed, people will still migrate to cities. This is because cities are not just a focal point of the economy, they are also a driver of societal development (Odufuwa, Fransen, Bongwa, & Gianoli, 2009), and therefore curtailing urbanization might not be possible. Hence, governments need to stop regarding over-urbanization as a cause for slum formation and expansion, but rather need to look for ways to utilize land-use policies to manage urban growth (Aguilar, 2008). They should also consider the uniqueness of cities while planning their future development (Angel et al., 2011 in Agunbiade, Rajabifard, & Bennett, 2012).

2.2.3 Problems of Urbanization

Rapid urbanization of urban centers creates a number of problems. One of such problems is that of housing shortage. Due to high population concentration, urban houses have become inadequate thereby resulting in overcrowding, a situation where a large number of people are living together in a room or in an apartment that is insufficient for them (Omole 2001). Available studies show that about 50% of households live in a single room in Nigeria urban centers (Ozo 1981). Also Sule (1994) identified that most of the urban centers have high occupancy ratio of 3 to 4 persons per room. Due to overcrowding, the housing environment in Nigeria is now characterized by huge refuse dumps, stagnant drains, dilapidated housing facilities and infrastructure and the emergence of squalor residences.

Studies in housing in some urban centers in Lagos State show evidences of problems such as housing shortages, high rents, overcrowding and a wear down of some parts of the urban housing environment. A study carried out by Ufuah *et al* (2000) revealed that there is problem with housing in Nigerian Cities. The evidence of this was shown in the lack of accommodation and high occupancy ratio of 4 persons per habitable room. It was also identified that residents were not very accessible to social facilities such as water while refuse

dumps littered the housing environment. The cause of these problems was attributed to rapid urbanization of the city especially the high population concentration. Ojeifo (2005) study on spatial quality of housing showed evidence of the housing problems similar to that identified by Ufuah *et al* (2000). This study identified rapid population growth as the major causes.

Another problem is the rapid encroachment of physical development into agricultural and forest land (Ojeifo 2007). The cause of this was identified to be the high rate of physical expansion due to housing and infrastructural development. Rapid housing and infrastructural development was necessitated by the need to meet with the demands of the ever increasing population. Ojeifo (2007) identified the effects of this encroachment to include the cultivation of smaller farm sizes and movements to distant lands to farm. Another problem of urbanization is the lack of infrastructure and the overburdening of the few existing ones by the increasing population. Most urban dwellers do not have access to facilities such as roads, markets, schools, playground and health facilities because physical expansion created by population growth has outgrown places where the facilities are provided. For example, it is common to see large areas of urban centers particularly new areas having no tarred streets, water, clinics and post offices. Also the evidence of overuse of the existing urban facilities by the increasing population is overwhelmingly clear. Most facilities have depreciated in quality while some are in state of disrepair because they are now being used by a population higher than the capacity they were meant for. In most urban area in Nigeria, the increase in school enrolment, patient-doctor ratio, lack of access to water due to capacity of reservoirs, power outages due to transformer over loading and use of available space for the display of good in the markets are some examples to show the pressure that increase population is exerting on facilities. Because facilities are not often provided, expanded and maintained to meet with the increasing demand, majority of the urban population do not therefore have access to facilities.

The lack of adequate and essential facilities to cater for the teeming population leads to the sprawling and blighting of urban neighborhoods.

2.2.4 The Causes of Sprawl

The role of population growth as a central factor is echoed in a study of Dhaka, Bangladesh where the urban core is already congested and badly polluted and as a result, new developments must take place in the fringe areas despite these being prone to flooding and containing highly productive farmland (Camagni et. al, 2002). Population growth is also seen as a key driver of sprawling development in southern France (Audriac & Ivonne, 2005), which suggests that the understanding of the drivers of sprawl is not endemic to the developing world.

A study of development patterns in the European Union asserts that sprawl is not an inevitable consequence of economic growth, but rather a result of specific government policies that allow, and in some cases promote, unsustainable development (Austrian EU Presidency, 2006). This sentiment is echoed in Borrego et. al (2006) whose views were that hidden government subsidies is a key contributor to urban sprawl in the United Kingdom. Overly permissive land development regulations have been cited as the main cause for sprawl in the Mascalucia region of Italy (Camagni et. al, 2002). In India, sprawl is attributed in large part to government policies aimed at decongesting city centers, yet the overall result is unplanned, poorly connected residential areas (Barredo et. al, 2003). According to Barredo et. al (2003), a lack of systematic regional land-use planning coupled with the fragmented local government structure within each metropolitan area has fueled suburban sprawl on the periphery of Indian cities. Borrego et. al (2006) contended that a lack of planning and enforcement of existing regulations designed to protect water supply watersheds has led to sprawling development within the Istanbul metropolitan area. In China, a lack of planning is not generally considered to be an underlying driver of urban sprawl, but rather the result of

the inability of central planners to consider the full range of impacts associated with development decisions (Antrop, 2004). As these studies attest, policy decisions can have far-reaching and unanticipated consequences with uncoordinated or otherwise inadequate planning efforts as commonly cited contributors to sprawling development across geographic contexts.

Tofowomo (2008) on the city of Akure cited the causes of sprawl to include population growth, rise in household income, subsidization of infrastructure investments like roads, ineffective land-use, excessive growth, social problems in central cities and poor land policies. One of the main factors that help in explaining the increasing sub-urbanization of population in rich countries is the demand for larger suburban lots. With rise in household incomes, people who move into the suburbs are motivated to a significant degree by the desire for more living space. The rise of the automobile is certainly not the only factor driving the decentralization of population and employment. The high correlation between using automobiles and living in low-density edge cities may not prove that cars caused sprawl but is an indication that the two strongly complement each other.

One factor that has surely played some role in explaining the increasing suburbanization of population is the demand for larger suburban lots. People who move into the suburbs in Akure are motivated to a significant degree by the desire for more living space. However, for a land-oriented view to explain the rise in suburbanization, it needs to explain why the demand for land should have risen so much over the last 15 years. A second major alternative hypothesis is that the growth of the suburbs has come about because people have fled the social problems of the core region of Akure. Core city problems may have led people to leave and seek solace in socially controlled suburbs. At the individual level, this theory is irrefutable. Lots of residents have surely been directly motivated in their move to the suburbs by the desire for a more attractive social environment.

2.2.5 Impacts of Sprawl

Sprawl, by virtue of being a multifaceted problem, is bound to have multiple impacts. It is no wonder, then, that the literature provides evidence of different kinds of negative impacts of sprawl. Biologists claim that sprawling development causes degradation of natural habitats of several species (for example, see Boone and Krohn, 2000; Calme and Desrochers, 2000). Sociologists blame sprawl for spreading inequities among people by “socially excluding” residents of inner city neighborhoods (for example, see Power, 2001) and by creating longer distances between jobs, services, shopping, and communities making traveling more expensive, particularly for the disadvantaged (see Horan and Jordan, 1995). Economists hold sprawl responsible for loss of valuable agricultural land and a reduction in the value of land for farming where urban growth is occurring (e.g. see Nelson and Duncan, 1995), on one hand, and adding costs for the homeowner in urban cores, on the other. Infrastructure costs have proved to be higher in the case of low-density sprawling development through analyses that suggest that density has a much stronger effect than urban form on public facility costs (Nelson and Duncan, 1995). Nelson and Duncan (1995) showed that although the greatest savings are at 15 to 30 units per acre, density at 10 units per acre is only 10 percent costlier than density at 15 units per acre, but it is nearly a quarter less expensive than five units per acre based on contiguous development patterns. At less than three units per acre, development becomes very costly

Urban sprawl may have both positive and negative impacts (Antrop, 2004); however, negative impacts are generally more highlighted because this growth is often uncontrolled or uncoordinated and therefore the negative impacts override the positive sides (Blue Plan, 2005). Positive implications of urban growth include higher economic production, opportunities for the underemployed and unemployed, better life because of better opportunities and better services, and better lifestyles (Antrop, 2004). Urban growth can

extend better basic services (such as transportation, sewer, and water) as well as other specialist services (such as better educational facilities, health care facilities) to more peoples (Borrego et. al, 2006). However, in many instances, urban growth is uncontrolled and uncoordinated resulting in sprawl. As a result, the upside impacts vanish inviting the downsides (Borrego et. al, 2006).

Developed and developing countries of the world differ not only in the number of people living in cities, but also in the way in which urbanization is occurring. In many megacities of developing world, urban sprawl is a common problem and a substantial amount of city dwellers live in slums within the city or in urban periphery in poverty and degraded environment (Cameron et. al, 2004). These high-density settlements are often highly polluted owing to the lack of urban services, including running water, sewer, trash pickup, electricity or paved roads. Nevertheless, cities provide poor people with more opportunities and greater access to resources to transform their situation than rural areas (Burton, 2000).

One of the major effects of rapid urban growth is that sprawl increases traffic, saps local resources, and destroys open space (Camagni *et. al*, 2002). Urban sprawl is responsible for changes in the physical environment, and in the form and spatial structure of cities (Blue Plan, 2005). In many countries including the developed countries like United States, poorly planned urban development is threatening the environment, health, and quality of life. In communities across the world, sprawl is taking a serious toll. Evidence of the environmental impacts of sprawl continues to mount. Bartley and Treadwell Shine (2003) reported that the impact of urban land on environmental quality is much larger than its spatial extent would imply. The consequences and significance of sprawl, good or ill, are evaluated based on its socioeconomic and environmental impacts.

In recent years, understanding the dynamics of sprawl, quantifying them and subsequently predicting the same for a future period has attracted significant interest of researchers. Measurement of these traits and additional attributes are used to develop standardized indices of sprawl development. Some researchers have employed an array of indicators, including land-use conversion, population change, traffic and vehicles, miles travelled, energy consumption, and fiscal measures (Nelson, 1999). Other researchers focused on measuring sprawl through the use of population data and detailed land-use and land-cover pattern (Eryilmaz *et al.*, 2008; Sudhira *et al.*, 2003). The physical expressions and patterns of sprawl on landscapes can be detected, mapped and analyzed using remote sensing and GIS (Geographical Information System) technologies (Gadal *et al.*, 2009; Hasse, 2007; Kumar *et al.*, 2008; Pilouk and Abdul- Rahman, 2007; Rashed, 2007; Yang, 2007; Zhu and Hu, 2010; Hurd *et al.*, 2001; Yeh and Li, 2001). Also, there are dedicated software programs developed for simulating urban sprawl, such as NAUTILUS (2001) and EMPACT (USEPA, 2002).

2.2.6 Mapping of Slum

Effective slum management processes require a methodology that can link historic trends of slum patterns with the driving forces (Arimah, 2010). This entails first identifying and mapping of existing slums. Census-based approach, participatory approach and remote sensed-based approach can be utilized to identify and map slums and informal settlements (Kohli *et al.*, 2012).

The census-based approach uses data obtained from census surveys to delineate deprived areas. Mapping is based on aggregating slum household data according to the enumeration areas (EA). Any EA with more than 50% of its population deprived of the indicators given by the UN-Habitat (2003) is declared a slum (Sliuzas *et al.*, 2008). This method does not consider other variables such as location of slums, condition of roads, etc. (Sliuzas *et al.*, 2008). Also, some countries do not have recent data for each EA, and where

they do have data, this is only partially reliable as it does not recognize slum settlements (Arimah, 2010). For instance, the last census conducted in Nigeria (2006) was characterized by many controversies, as some state governments (e.g. Lagos) rejected the result of the census given by the Nigeria federal government (Akoni, 2013).

In the participatory approach, stakeholders (experts, government, slum dwellers, etc.) are involved in the mapping of the slums. Joshi, Sens and Hobson (2002) showed how slum dwellers and non-governmental organizations (NGOs) worked together to map slums in Pune and Sangli, India, through the collection of information at household level in slum settlements. Lemma, Sliuzas and Kuffer (2006) used the rapid urban appraisal method in form of focus group discussions with experts supported by GIS tools to map and analyze slums in Ethiopia. Also Slum Dwellers International (SDI), a transnational network of urban poor communities, used the slum dwellers to count and map the slum residents in some slum communities in over 32 countries, as a means to transform slums into resilient neighborhood and inclusive cities (Slum Dwellers International, 2016). However, gaining detailed information through the participatory approach is time consuming, especially in cities with many slums (Kohli *et al.*, 2012), hence the need to identify another strategy to map slums in cities.

Although slum dwellers may have influence how slums look, defining a slum neighborhood is also a function of the physical and infrastructural environment (Weeks, Hill, Stow, Getis, & Fugate, 2007). Slums, like any other land-use type, have their own spatial location and characteristics which are different from non-slum environments (Sietching, 2005). Weeks *et al.* (2007) showed that slums have footprints that can be detected from satellite imagery and can be utilized as an alternative to socioeconomic data collection (census-based approach). Some characteristics of slums such as haphazard high density building pattern, flood-prone area, structure, size and condition of road network, etc., can be detected using high-resolution satellite imageries (Shekhar, 2012a). Hence, remote sensed

data can be utilized to delineate and analyze slum patterns when detailed census data is not available. It can also provide information on the spatial distribution and heterogeneity of slums, which can be used for the analysis of the location and physical composition, which are challenging for the traditional data collection method such as census data (Olthuis et al., 2015). A slum map produced from remote sensed data can be an input for urban planning, modeling, growth monitoring, etc.

Remote sensing has some advantages when used to map slums in urban areas, nevertheless there are some limitations associated with this approach. When Gruebner *et al.* (2014) mapped slums in Dhaka, Bangladesh, it was observed that pre-existing knowledge of Dhakar was required to visually interpret the very high resolution satellite imagery. According to Rhinane, Hilali, Berrada and Hakdaoui (2011), mapping different classes (e.g. slum, commercial, industrial, open space, etc.) in urban spaces is challenging, and this was attributed to the similar spectral and textural properties of different classes in an urban space. For instance, misclassification could be due to slum-like areas having a similar microstructure, overlapping rooftops, and irregularly shaped buildings like in slums (Veljanovski, Kanjir, Pehani, Otir, & Kovai, 2012). Kuffer and Barros (2011) also observed that segmentation at object level sometimes does not give an explicit representation of real life. Considering some of these limitations, it can be inferred that the challenge of the application of remote sensing in slum mapping is in form of over- and under representation of slums on the ground.

Nevertheless, many studies have effectively incorporated the remote sensing data to detect slums in many cities. Hofmann, Strobl, Blaschke and Kux (2008) utilized IKONOS image to detect informal settlements in Rio de Janeiro using a fuzzy-logic rule-base as a basic classifier for the generated segments. Busgeeth, van den Bergh, Whisken and Brits (2008) used Quickbird images of Soweto, South Africa, to illustrate how informal settlements could be monitored in countries without complimentary census data or cadastral maps. Stoler *et al.*

(2012) used medium-resolution satellite imagery from ASTER to show slum presence in Accra, Ghana, and compared the results with socioeconomic data obtained from census data of Ghana and obtained similar 'slum indices'. Marghany and Genderen (2014) utilized a fuzzy B-spline algorithm to detect slums in Cairo from ENVSIAT ASAR and Google Earth imagery. Kuffer, Sliuzas, Pfeffer and Baud (2015) were also able map slums in built-up areas from WorldView-2 images of Mumbai, India, using co-occurrence matrix (GLCM) and NDVI.

Hurskainen and Pellikka (2004) used black and white and true-colour aerial photography to study the growth and change of informal settlements in VOI, south-east Kenya, between 1985 and 2004. Kit and Lüdeke (2013) captured the spatiotemporal dynamics of slum-related land-use change in the whole city of Hyderabad, India, between 2003 and 2010. Adepoju et al. (2013) mapped and monitored slum development in Abuja, Nigeria, between 2005 and 2012 using the pixelbased classification method to classify the slums, before studying their temporal growth. Veljanovski *et al.* (2012) utilized QuickBird and GeoEye imagery to study settlement growth and changes in the Kibera slum, Kenya, between 2006 and 2009. These studies show that integrating remote sensing techniques into identifying and studying the growth of slums could also be done in countries with insufficient data, however the time gap for most of these studies was less than 10 years, attributed to unavailability of high resolution satellite imageries and recent development of remote sensing techniques for slum delineation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This section focuses on the methods that were used in data collection and analysis. The method of research indicates the procedure that is employed by the researcher in putting together the raw facts and data processing technique. To this end, this section addressed the study design, population of the study, study subjects, sample size and sampling technique, as well as the methods of data analysis. The methods adopted in the chapter are therefore inclusive of procedures and techniques adopted in data collection and analysis in a bid to achieving the aforementioned aims and objectives of this study.

3.2 Research Design

The method employed in data collection for this research work is known as the direct observational method. This involves the researcher taking participatory stance in observing the setting within which the subject of observation is located, while taking note, video recordings and so on. In this case, remotely sensed data from a geographic information system and participatory observation was used to observe the blighted areas under study.

3.3 Sources of Data

The data collection methods used in the acquisition of data for this research study was got from both primary and secondary sources and these include:

1. Personal observation by the researcher.
2. Remote sensing data.
3. Existing materials and journals related to the research study.

Field observation alongside assessing remotely sensed data was adopted given that direct observation of the blighted areas is a key facet of this research endeavor. Participant

observation is the process enabling researcher to learn about the activities of the people and phenomena under study in the natural setting through observing and participating in those activities. It provides the context for development of sampling guidelines and interview guide (Dewalt and Dewalt, 2002). This is also important as prior knowledge of the study area is mandatory for the researcher, for proper interpretation of the remotely sensed images, so as to connote recent changes in the area and also assess the reasons that have brought about these changes. The need is to acquire vast amounts of data rapidly, and interpret or process them. It must be determined, which environmental parameters, are to be measured and the technology with which they are to be monitored.

In the formulation of analytical approaches to solving urban problems, geographers and regional planners have heavily relied on statistical tools and public statistical information from the government like census data and periodic sample survey data. There are dangers associated with using such data, as some are subject to statistical bias, they may be collected so infrequently that they do not reflect the current situations and are sometimes inaccurate due to inconsistencies in training and dedication level of the individual data collectors. And therefore, so many recent studies have shown that remote sensing can be used to seek answers to urban problems. (Estes, 1970; Davies *et al*, 1973; Adeniyi, 1980; Ikhuoria, 1983).

This purpose of study therefore is majorly to show how remote sensing methods can be used to facilitate the precise delimiting of urban land-use activities that exhibit characteristics of blight and how these methods can provide structural indicators of low quality neighborhoods.

3.4 Study Population

The study population includes the buildings, flood and drainage conditions, recreation centres and open spaces, Road and street conditions, General sanitations and the various indicators in the study area that are factors of urban blight. According to Durden (2013), these are conditions that literally pose a threat to the health and safety of not only the residents of the blighted area, but also brings about the exposure of the general public to such conditions. On the bigger picture, these conditions also depress an area's quality of life, and jeopardize the social and economic viability of an area. From a valuation point of view, Robinson & Cole (2007) thus describe urban blight as a result of unguided urban growth and arguably an indiscriminate mixture of not only homes but also factories, warehouses, junk yards, and stores that in turn result in depressed property values.

With that said, one can therefore reiterate that urban blight manifests itself in many dimensions, which can be orderly grouped in different traditional forms of either physical blight, frictional blight, functional blight or economic blight, or a combination of these depending on the context as they are further explained in this chapter.

3.5 Sampling Technique

According to HealthKnowledge.org, Sampling is a method that allows researchers get information about a population based on results from a subset of a population, without having to investigate every individual. Sampling is the process of choosing the sample units from a populace. Which therefore provides the needed details or data for the research, and further categorizing them into probability and non-probability techniques. Random and clustered sampling techniques were used in this study.

In clustered sampling, subgroups of the population are used as the sampling units rather than individuals. The individuals are divided into subgroups known as clusters, but in

this case, the clusters that are assessed for the sake of retrieval of information are the buildings (type and pattern).

3.6 Methods of Data Collection

Direct observation and remote sensing data were used in this study. Remotely sensed data was used to create a general overview of the study area, and also to supply the needed data and help the researcher have a clearer view and understanding of the different areas under study. It also helps cover a vast majority of the landmass that wasn't covered on the field by the researcher.

Direct observation was also done as a means of reconnaissance survey, in order to help the researcher, have a general idea of the study area on ground and look at the prominent blighted features of the said area, which would therefore help provide detailed information and ensure that the topic under research was adequately covered by the researcher. The Direct observation method was used in an attempt to understand the effect of blight on various phenomena.

Remote sensing involves acquiring of phenomenon without having sensory devices in direct contact with the sensed object. Satellites and objects are the common platforms from which remote sensing is made. The term remote sensing is associated with data acquisition that employ electromagnetic energy as a means of detecting and measuring target characteristics. Electromagnetic energy includes light, infrared rays, heat and radio waves. The remote sensory tool which is the main data source in this research is remote sensing imagery gotten from aerial photographs taken from satellites, which are found on Google Earth database. Aerial photography is the original form of remote sensing and is widely used for topographic mapping, engineering and geographic and environmental studies (Sabins, 1973).

3.7 Method of Data Analysis

Data analysis is done in order to obtain useful information. The analysis, irrespective of the type whether quantitative or qualitative, maybe used for description and summarization of data, identify relationships between variables, compare variables, and identify the difference between variables and forecast outcomes. The remotely sensed data collected during the course of this study was analyzed using descriptive methods used in the analysis of qualitative data, which includes explaining or providing a clear insight to understanding the data collected from the field via observation or remote sensing data. The remotely sensed data from Geographic information systems, was required because these blighted areas were majorly inaccessible and unsafe for research or personal contact by the researcher. Remote sensing is the art or science of retrieving information about an object, an area or phenomena, through the analysis of data gotten from a sensor, without having direct contact or interference with the object, area or phenomena being researched.

Aerial photographs from remote sensing imagery, has provided us with a complete perspective view of the city and its environs. It provides a means for rapid and potentially reliable inventory and monitoring of urban environments for areas of development and change. It also provides a mechanism, which assesses the magnitude and direction of such changes. Especially relevant involves the spatial context of land use patterns in relation to urban housing, developments, both commercially and industrially, utilities and also geomorphic characteristics and distribution seen in aerial photographs and thematic maps. This provides the analyst, knowledge of aerial extent, proximal relationships, patterns and trends of development and what, how, why and where they have occurred.

Remote sensing was used to obtain majority of the information in this research, because of coverage of the very vast study area that is being considered in this work, also due

to the analysis and interpretation which is vast and could be widely applicable, there is no limitation to the information gathered from a single remotely sensed image. Also, a remotely sensed image, can be analyzed and interpreted in a laboratory, which actually reduces stress and the extent of groundwork to be done. (Grind GIS)

CHAPTER FOUR

DATA PRESENTATION ANALYSIS AND DISCUSSION

4.1 Presentation of Survey Details

This chapter deals with detailed analysis of the remote sensing data derived from geographic information systems satellite imagery and from participant observations carried out by researcher. For this purpose, the chapter deals with in-depth image details and proceeds to the analysis and discussion of results.

The study was conducted in five areas (Apapa, Festac Town, Amuwo-odofin, Surulere/Ojuelegba, and Ajegunle) of Lagos metropolis, constituting a section of the older part of the city. The population densities (persons' km⁻²) of Apapa, Festac Town, Amuwo-odofin, Surulere/Ojuelegba, and Ajegunle was 18,016; 137,102; 3892; 62,552; 123,290; and 42,598, respectively in 2015 (Lagos Bureau of Statistics, 2013) (Figure 4.1). Most of the unplanned settlements (slums and squatter communities) are located within this area because of its proximity to Lagos lagoon and the central business district (World Bank, 2006).

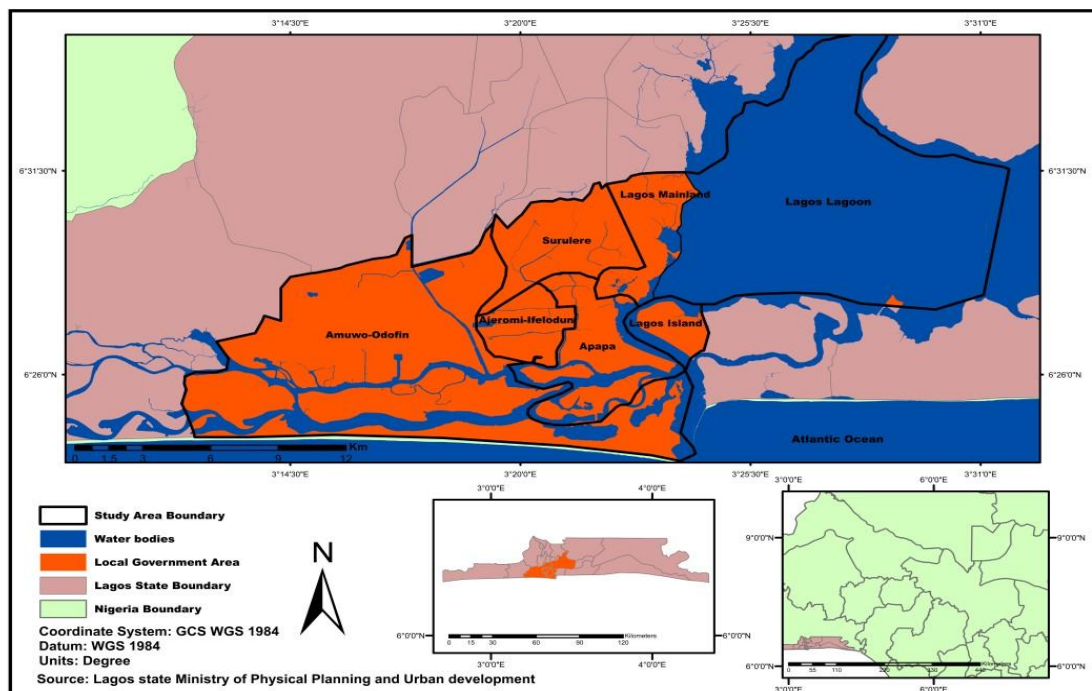


Fig. 4.1.1: Study Area in Lagos Mainland Metropolis
Source: Lagos State Ministry of Physical Planning and Urban Development (2019).

The study area covers approximately 395 km², and lies between 3°12'E and 3°24'E longitude and 6°24'N and 6°31'N latitude. Elevations range from 38m below sea level to 52m above sea level. Four dominant land-cover categories were identified using a RapidEye image (20/12/2015) which included vegetated area (20.1%), water (47.9%), open space (8.5%), and built-up area (23.5%) (Figure 4.2).

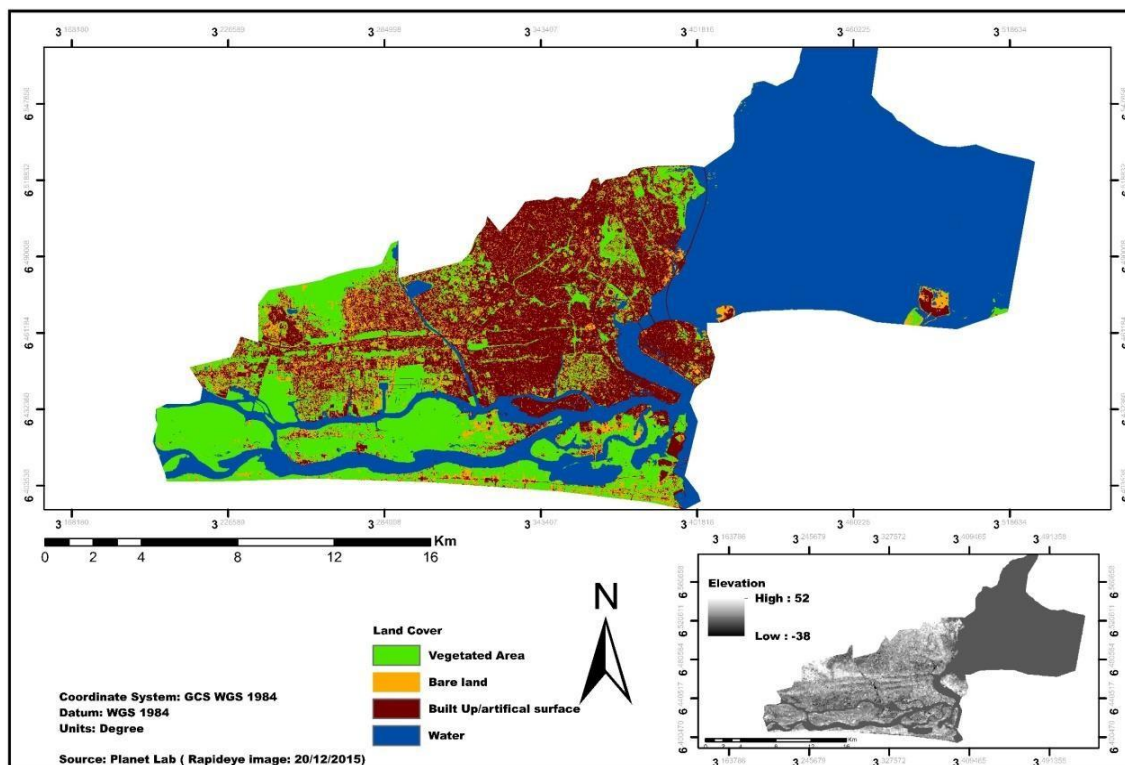


Fig. 4.1.2: Land-cover map and digital elevation model of the study area.
Source: Planet Lab (RapidEye Image), 2015.

Onokerhoraye (1995) submitted that there are two types of deprived urban areas in Nigeria: squatter communities and slums. Squatter communities are uncontrolled or temporary dwellings inhabited by migrants from within and outside the city, while slums are old residential areas built long ago in line with the then-prevailing urban planning, zoning, and construction standards, but now dilapidated and overcrowded. The research conducted by Lagos-State/UNCHS (1984) shows that Lagos has the two deprived areas. Further, the Lagos state government sometimes includes squatter under the category of slums due to the similar

physical characteristics, as observed in the Lagos Metropolitan Development and Governance Project (2006) where water, roads, and electricity were provided to nine blighted communities (Apapa, Festac Town, Amuwo-odofin, Surulere/Ojuelegba, and Ajegunle) without considering if these were a squatter community or slum. In this study, squatters and slums were equally considered to prevent bias, as they all need to be monitored and improved.

4.2 Imagery, Analysis and Discussion

Identifiable signs on land use characteristics generally and housing characteristics particularly were extracted from the imagery. Although many structures and features were easily identified, other indicators of environmental quality based on physical structure, site and situation were also assessed. These indices would be looked at critically in every part of the study area and they include Open Spaces, Accessibility, General Sanitation, Housing pattern, Population Density Housing density and Building conditions, Flood and drainage conditions. To get a good representation of the various places within the study area, the area would be divided into 5 zones (Zones A, B, C, D, and E).

Table 4.1: Classification of the study area into Zones.

Study Area	Zone
Ajegunle	Zone A
Amuwo-Odofin/Satellite Town	Zone B
Apapa	Zone C
Festac Town	Zone D
Surulere/Ojuelegba	Zone E

Source: Field Survey, 2020.

The table above classifies the study area into different zones, thereby increasing the level of ease of representing the features, interpretation and analysis of the characteristics of the various study areas. There were similarities in characteristics the various areas found

within the study area. To carefully look at these, the study areas would be divided into 4 parts - East, West, North, and South respectively, or quarters, dependent on the shape taken by the land mass of the area to be assessed.

From observations made in the field, there are 4 noticeable patterns of physical development in Lagos state,

- i. Clustered poor facility housing,
- ii. Linear medium facility buildings and housing estates,
- iii. Government reservation areas,
- iv. High rise buildings

4.3: AJEGUNLE (ZONE A)



Fig. 4.3.1: Overview of Zone A (Ajegunle)

Source: Google Earth Imagery

Ajegunle, popularly known as AJ City is a neighborhood situated in the heart of Lagos, Lagos State, Nigeria and is located in Ajeromi-Ifelodun Local Government Area.

Ajegunle in the Yoruba language means "A place where riches dwells". It is bordered on the west by Apapa Wharf and Tincan, two of Nigeria's biggest sea ports through which over 70 percent of imported goods come into the country. Ajegunle is a community featuring residents from many of the ethnic groups in Nigeria.

Ajegunle has been divided into two and with pictorial evidence, we would look at the physical characteristics in relation to the social and cultural effects of blight in the study area.



Fig 4.3.2: Ajegunle (Selected Area), showing its physical characteristics
Source: Google Earth Imagery

4.3.1 Housing and Building Conditions

From the first quarter according to the division pattern adopted in this research, the houses are visibly clustered and street divisions are mostly rectangular shaped in order to increase accessibility across the entire area. The houses are usually low rise buildings and bungalow, within which the holding capacity usually averages 5-7 people in a room which is generally not conducive for human habitation but given the fact that this area is one which houses a vast majority of the urban poor in Lagos State, the situation has become the norm in

this neighborhood. The houses are of court type with the majority of the houses in this area roofed with rusty corrugated roof sheets. These rusty roof sheets are an indication of the old age of these buildings and serious dilapidation, and in need of dire rehabilitation. The houses are majorly family properties which have been passed down to the current generation and have mostly never undergone any form of renovation and as a result, its facilities are outdated and dilapidated. These rusty roofs are usually weak and are dangerous, they also do not provide any form of protection as all it takes is a heavy storm or rain to bring about leaking roofs. The oxides of these roofs also pollute the air and therefore causes the environment to be unsafe for human habitation.

From a general physical observation, it is safe to say that the housing patterns and characteristics are of low quality and when coupled with the visible scarcity of houses in the area, as a result of the high population density makes this area an unpleasant place to live in.

4.3.2 Recreation and Open Spaces

Ajgunle is almost devoid of open spaces, this is mostly due to high population density and clustered housing. It has some 57,276.3 inhabitants per square kilometer, making it one of the most densely populated area in the world (Wikipedia). Due to its ever growing population, housing is therefore seen as a more pressing need when compared to recreation, hence the apparent absence of open spaces and recreational centres.

Recreation in the area, is mostly based on hotel services and in club houses. From observations made, there is on average, a hotel, bar or lounge per street. Despite the high population density in the area and a struggle for survival, hotels, brothels and night clubs still remain the best form of recreation and relaxation in the area and receive high patronage, especially on weekends.

4.3.3 Flood and Drainage Conditions

Ajegunle boasts of a relatively good and connectible road network, an examination of the maps and photographs of the area, has shown that there are no coastal landforms within Ajegunle, but there are a few swamps around which may have arisen from the flow of water from the island into the mainland without a source of proper drainage. This has effectively led to the formation of swamp or wetland in the area. One of such wetlands with its source from Apapa, passes through Wilmer Crescent down to Kirikiri town and terminates at Amuwo Odofin.

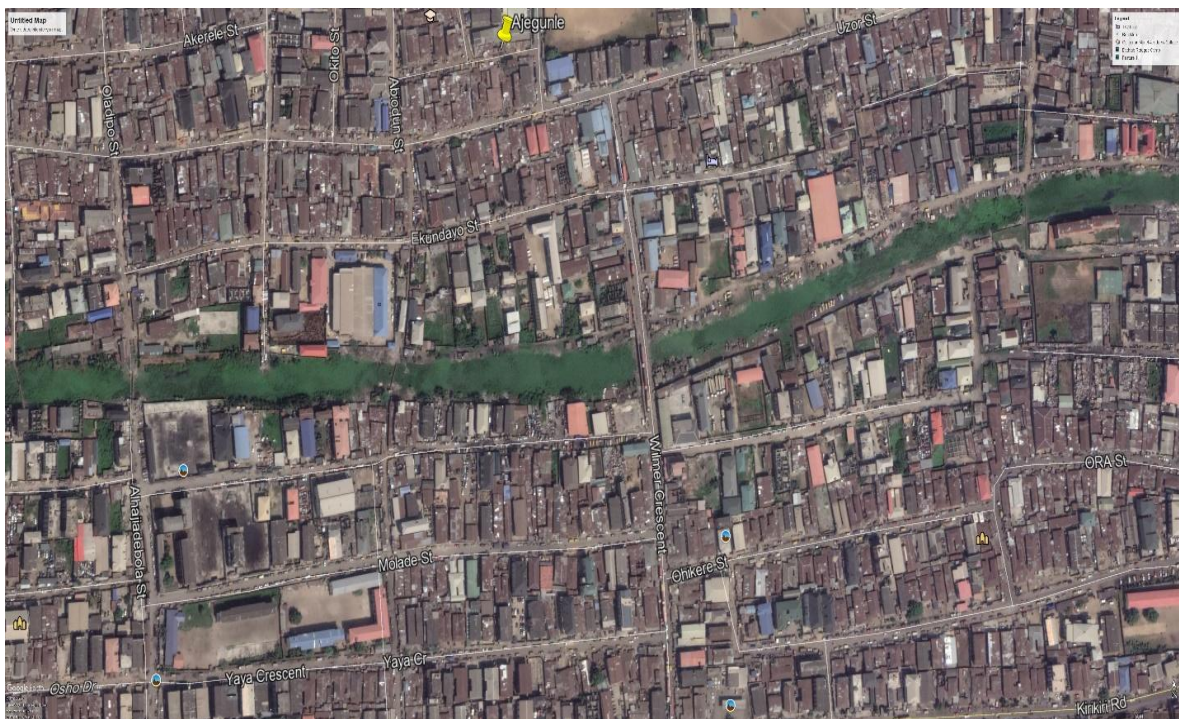


Fig 4.3.3: Image showing the wetland/ swamp area of Wilmer Ajegunle.
Source: Google Earth Imagery

There has never been notable reports of massive flooding in the area in years. This is owed to the soil type of this region - the sandy soil which is known for its high permeability and the presence of wide drainage in the streets helps channel the flow of water from the streets. Due to the high need for accommodation, the flow of water has been disturbed over the years as people are converting every available piece of land into building and this had led to the formation of slums. The slums present in the area are found within the Oyedeji axis of

Ojo Road. This settlement is so densely populated that occupants had to start building wooden houses close to the swamps just to solve the problem of accommodation. Despite the government's intervention through eviction of these swamp dwellers, the swamp areas have increased in size and more people troop into these areas on a daily basis just to have access to shelter. All other areas of standard housing or slightly standard housing have less problems of flooding during the rainy season, but the houses situated near the swamps with wooden houses find themselves in a sorry state during the wet season. The flooding and drainage conditions are deemed fair enough as there is little or no interference from the coastal areas besides the emergence of swamps and wetlands across some areas in Ajegunle.



Fig 4.3.4: Image showing the other swampy areas with slums surrounding it.
Source: Google Earth Imagery



Fig 4.3.5: Image showing the slums present in the swampy areas in closer view

Source: Google Earth Imagery

4.3.4 Road and Street Conditions

In Ajegunle, the major arterials are mostly double carriage ways, surfaced with bitumen (tar) and paved, but the ones connecting the feeder streets are not tarred. In some cases they are interlocked while in most cases they are untarred. Consequently, the untarred roads have developed potholes and they become worse during the rainy season. In some areas there is also the problem of annual erosion during the rainy season, and this is being made worse by residents emptying refuse content on the streets and drainage. The debris washed off from these streets by water erosion during the rainfall therefore flows to the arterials, and as a result causes it to hamper the flow of traffic. Also absence of parking facilities in this area causes it to have litters of cars around streets making the roads smaller and difficult to navigate. The absence of an industrial area has also impacted on the functionality of roads and drainages in the streets as many welders and motor engineers site their workshops in the streets ignorantly, therefore causing blockages in the streets.



Fig 4.3.6: Image showing mechanic workshops situated on the streets
Source: Google Earth Imagery

Another major notable feature in this area is the presence of heavy duty trucks and lorries in the streets. These lorries destroy the subarterial streets because they are now being used as official parking spaces for these trucks instead of the proper parking lots or parking yards for these vehicles. This causes destruction of these roads due to it carrying heavy vehicles which are beyond its carrying capacity, therefore causing rapid dilapidation of the roads within the shortest possible time. Also, the presence of these heavy duty trucks in the streets causes massive traffic gridlocks which mostly takes a lot of time to ease off.



Fig 4.3.7: Image showing streets covered with heavy duty trucks.
Source: Google Earth Imagery

4.3.5 General Sanitation

For along time environmental sanitation has been a key component in the streets of Lagos state. From pictorial observations from Google Earth streetview as shown in the above posted photos, the streets of Ajegunle are relatively clean and reasonably fit for human habitation. Notable differences were observed in the photographs from the swampy/wetland areas (Slum), where the streets are covered up with dirt and litter.

In Ajegunle, environmental Sanitation and public cleaning are done by inhabitants and supervision is overseen by Sanitary inspectors. Defaulters are fined or punished. Sanitary inspectors see to it that personal and public hygiene is kept. Consequently, during the analysis of the remotely sensed data, it was quite visible that this sanitary regulations were more difficult to keep in the market and swampy areas such as boundary market, Oja markets also, and waterlogged and highly densed population areas of Ajegunle.



Fig 4.3.8: Image showing a market and waste disposal on the roads.
Source: Google Earth Imagery

4.4: AMUWO-ODOFIN (ZONE B)



Fig 4.4.1: An overview of Amuwo-Odofin

Source: Google Earth Imagery

Satellite Town, Lagos is a community and state housing estate located at $6^{\circ}26'59''N$ $3^{\circ}17'3''E$ along the Lagos-Badagry Expressway in Amuwo-Odofin Local Government Area of Lagos State. Satellite Town. (Wikipedia). During the early 1960s, the Lagos State Government set up Satellite Town to help low income earners gain access to affordable housing, with some of the areas allocated to oil workers and private buyers.

The deplorable state of roads and illegal structures in Satellite Town shows that what was once known to be an estate, has over time, turned into a slum. There were reports that in May 2009, the Lagos State government awarded contracts to help stop flooding, which is a major problem in that area. (Wikipedia) but such contracts are yet to be seen in this area.

4.4.1 Housing and Building Conditions

From a general overview of the Amuwo-Odofin as observed from the satellite image displayed earlier, the area is a housing Estate, with relatively fair quality housing type/pattern. The physical signatures examined included the appearance of the houses, and other buildings, which were relatively classified to be medium-grade, residential areas, for relatively middle income earners and well to do households. Also, it boasts of medium environmental quality of neighborhood, which is owed to the quality of maintenance of the immediate environment.

Amuwo-Odofin LGA has a population density of approximately 300,000 people per square kilometer, with a population of over 1,500,000 according to the 2006 Census (Wikipedia). But satellite town has one of the lowest population densities in the area. Satellite town in Amuwo-Odofin, from first observation is a developing area, with large expanse of unoccupied land, with vegetation visibly present. There are a lot of undeveloped buildings, while the developed ones are less clustered, sparsely located and evenly distributed. Modern roofing sheets with recent roof types are the common coverings for residential houses. The estate, is a private estate as the houses are built and developed by individuals, as zoning ordinances are given to them to guide land owners in the development of their land or aid the proper planning of their land uses. Consequentially due to the slow rate of growth and development in this areas, slums are being forced to spring up on unclear and undeveloped lands. Visibly, some areas have clear patterns with some residents arranged symmetrically.

The core is made up of greenery with almost little or no houses present in the area, while around the core there is dense housing units consisting of a mixture of flat types and rooming type dwellings. The northeast area of the map showing Amuwo-Odofin housing estate, shows the area which the higher income earners dwell in the area. There is a visible presence of arranged buildings, with a proper plan and accessible roads with a visible parking

space towards the north east. The other developing areas lack the regular arrangement patterns and proper planning that is visible in the residential areas of the high income earners. Thus, their development, has serious negative consequences on the environment. As the drastic development has improved some areas, the lack of this impetus in other places has sprung the development of slums.

From the land use characteristics, we can deduce that the dominant land use in the area is residential, although, there is visible vacant lands and greenery which should suggest the use of such open spaces for agricultural activities, the area is devoid of any substantial agricultural land uses.

4.4.2 Recreation and Open Space

Amuwo-Odofin estate is devoid of sizeable open spaces, but there is the notable presence of vacant land plots in and around the area. There is almost no western style recreation parks notable in the area. The area is a typical residential area and has no other visible land use rather than housing.

4.4.3 Flood and Drainage Conditions

Amuwo-Odofin is situated in the mainland area, of Lagos state, and area, which is known to be devoid of water bodies, it is a landlocked area in the coastal city of Lagos. One major characteristic of the mainland is the presence of swamps, therefore causing it to develop minor wetlands. Also, owing to the development of these wetlands is the high water level of Lagos, which is as a result of Lagos state being a lowland, close to the ocean and also just a few meters above sea level. There have been a few cases of flooding incidents in Amuwo-Odofin Estate, over the years. These flooding incidents are owed to the type of terrain and the topography of the land space in the area. The area is dominated with areas that have untarred roads and despite the presence of gutters and drainage facilities in the area, the

absence of tarred roads and the presence of white sandy soils in the area, would not permit surface runoff and cause the area to be flooded also, an unsteady terrain which is largely visible in the area, would cause water to pile up around some unsteady areas in the area.

Also, it is important to note that Lagos being a coastal city almost in no way affects the drainage pattern and drainage conditions of Amuwo-Odofin Estate, as it is fully landlocked and all drainage conditions that arise in the area, is largely contributed by large natural independent occurrences. Instead a factor analysis of Land use parameters like, catchment slope, Catchment area, area under flood, Road drainage length, degree of impervious cover, housing density, developed areas and vacant lands, shows that built up areas (impervious surfaces) are responsible for flooding in Amuwo-Odofin. (Rasid, 1982; Odemerho, 1983).

4.4.4 Road and Street Conditions



Fig 4.4.2: Street Condition in Amuwo-Odofin

Source: Google Earth Imagery

In Amuwo-Odofin, the major arterials are single carriage lanes surfaced with Bitumen (tar) and paved, but the numerous connecting feeder roads are not tarred as they are visibly not levelled and cannot be deemed to be standard. Consequently, it is easy for potholes to develop in these streets especially during the rains. Also the presence of many vacant lands in the area, has negated the need for the development of road networks. The available roads in this area are evenly distributed, for easy accessibility and connectivity. Despite the accessibility and connectivity being largely visible from the aerial photographs, this is not the obvious case on ground as many of these roads are becoming unusable due to their annual flooding and also being taken over by debris that have been washed in by the flood. These debris cause major road blockages and traffic in the area. However, the visible presence of parking lots in the area, help in the control of traffic thus leaving the area not to be as congested or littered with cars, compared to other areas of Lagos.

4.4.5 General Sanitation

In terms of general sanitation, environmental sanitation has been a traditional activity across Lagos state. The practice of environmental sanitation and public cleaning has been adhered to over the years and the practice is still in vogue. Public cleaning in the area is supervised by the sanitary inspectors and senior officials from the Lagos State Waste Management Agency (LAWMA). And the defaulters of this sanitary process are duly punished by a fine or sanction. This is done in a bid to facilitate the productivity of the sanitation exercise. The sanitation process went beyond being just a general thing as both public and personal hygiene were checked, peoples' house conditions and streets had to be properly cleaned and made to meet certain standards. In estate areas such as that of Amuwo-Odofin Estate, where there are visible distinctions in the level of development of the area, the built up areas close to the estate entrance are usually monitored and are kept up to standards, but the developing areas which are further away from the main entrance of the estate, are where you find the vacant lands and little slums forming around are not as monitored.

The area is usually littered with debris and is surrounded by bushes vacant lands and uncompleted buildings showing signs of abandonment. This litter of debris around the area brings about a feeble, poor looking and substandard environment which is almost uninhabitable. So the cleanliness levels of the area differ by the area. The development of slums in these other areas, and the traces of refuse dumps which could be sighted on the streets of the underdeveloped areas of the estate is an unpleasant sight and is one factor which could make human habitation in these areas difficult. This conditions could lead to the spread of an epidemic or disease in that area, and be a threat to the health of the inhabitants here. Also the neglect and nonchalance of the estate authorities to this effect would cause further deterioration of these areas. Despite the efforts of the government to curb the dilemma of incessant waste disposal in Lagos state, defaulters still abound. This also tied to the fact that the frequency of availability of this waste disposal service is usually too seldom and there is

accumulated and excess waste, which could bring about the residents looking for alternative ways to dispose their waste. This leads to improper waste disposal by residents in the area, thereby causing the area to be very unpleasant environmentally and aesthetically.



Fig:4.4.3: Street condition in Amuwo-Odofin estate showing signs of decay and abandonment.

Source: Google Earth Imagery

4.5: APAPA (ZONE C)



Fig 4.5.1: An Overview of Zone C (Apapa)

Source: Google Earth Imagery

Apapa is a Local Government Area in Lagos, located at 6.4553° N, 3.3641° E, to the west of Lagos Island. Apapa contains a number of ports and terminals operated by the Nigerian Ports Authority (NPA), including the major port of Lagos State and Lagos Port Complex (LPC). The port of Lagos consists of Apapa Quay, on the mainland, which serves as the principal outlet for Nigeria's exports. The creeks and lagoons are plied by small coastal craft. This port is Nigeria's largest and the main outlet for international trade practiced by Nigeria. This port was built to facilitate the transportation of agricultural raw materials abroad, and till date it is still the busiest and best Nigerian port. The Port of Apapa Quay is the primary outlet for the country's exports. The Port is the country's biggest port, handling a wide range of commodities. The Port contains facilities specialized in handling wheat, oil, cement, fish, dry cargo, and containers, that are to be processed for exportation. (World Port Source).



Fig 4.5.3: Aerial Photograph showing the building patterns and high grade buildings in Apapa

Source: Google Earth Imagery.

Apapa, being a large commercial hub in Lagos state, boasts of the presence of many large government agency secretariats and government residential areas. Apapa is known to have various land uses but, it is worthy to note that the residential areas in Apapa are not what accounts primarily for its most dominant land use as offices, businesses including both private and public offices are present there. Urban development and planning of this area, since the days of colonization in Nigeria is largely responsible for the land use pattern and housing types present in the area, including the streets nomenclature. This is largely because Apapa housed the whites as it was also their main means of entrance and exit to and from Nigeria.

The area is characterized by dense housing, regularly arranged monotonously in rectangular shape according to the subdivision plan of the particular area. The houses are modern type roofed with modern roofing sheets or corrugated roof sheets.

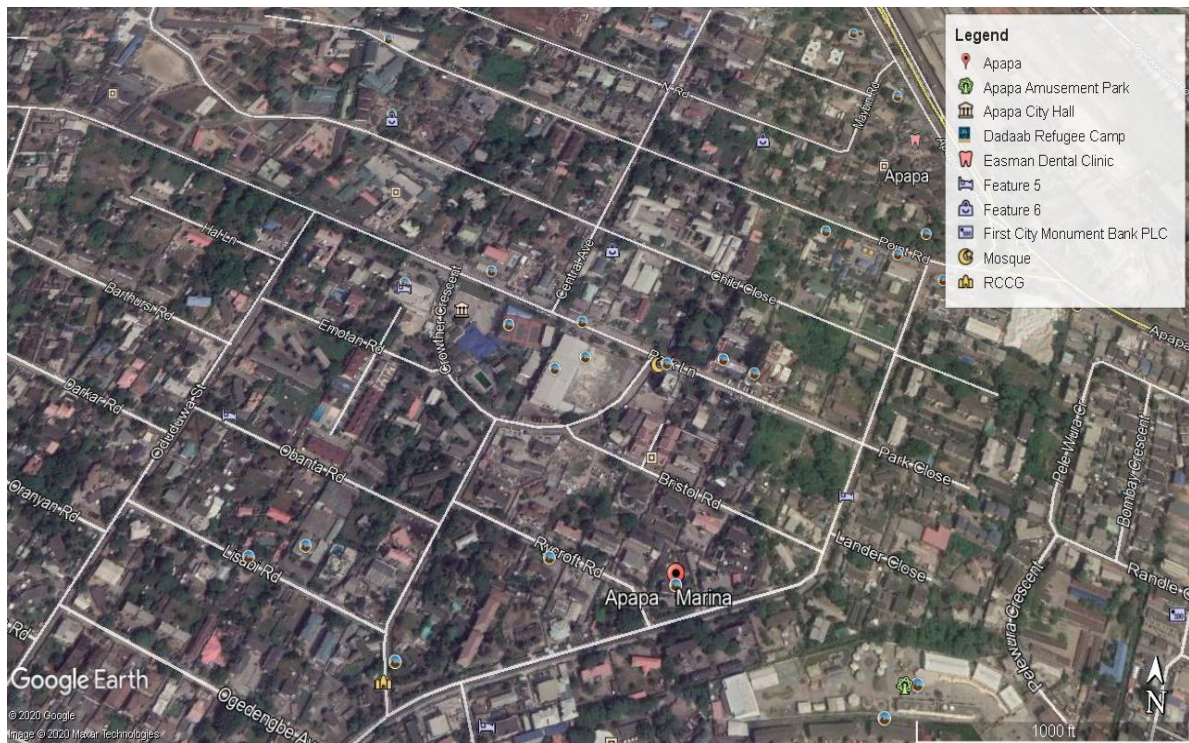


Fig 4.5.4: Aerial Photograph Showing Apapa’s Core

Source: Google Earth Imagery.

Notable features within the core of Apapa include the presence of Apapa City hall, Apapa Mall and Apapa City Club. The core is surrounded by various land uses ranging from religious land uses to administrative amongst others.

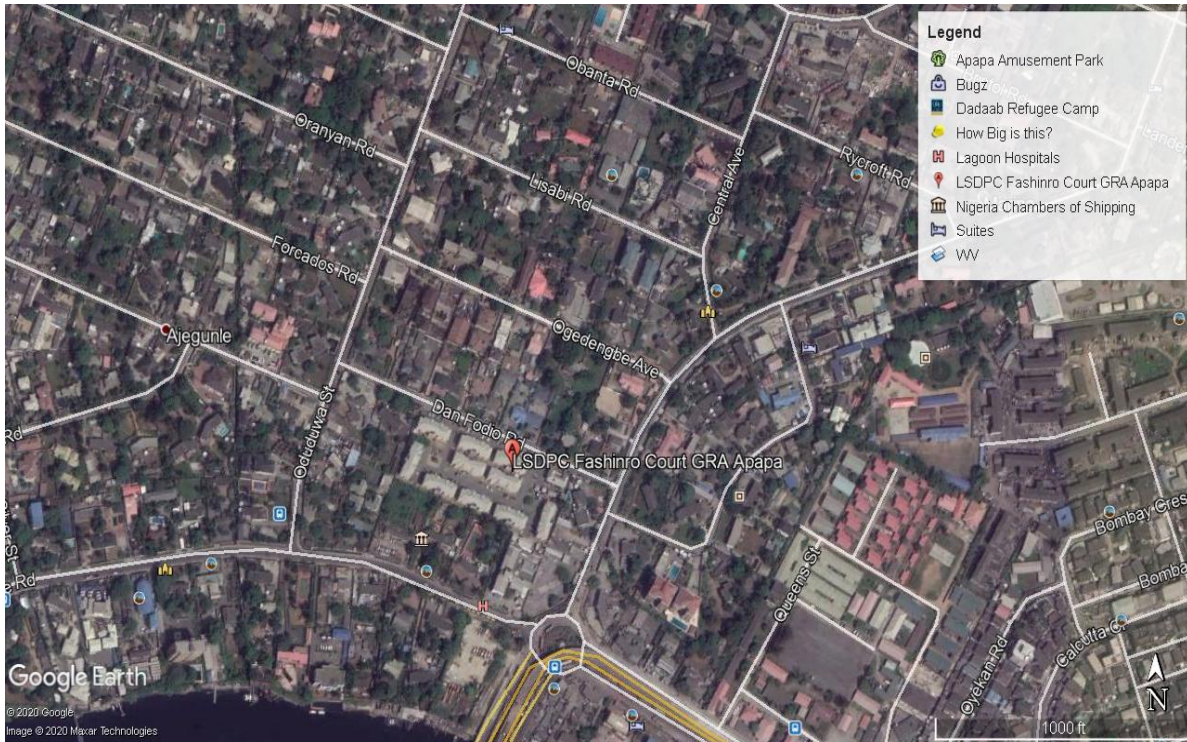


Fig 4.5.5 Aerial Photograph Showing Apapa’s Core

Source: Google Earth Imagery

Apapa GRA which is located South East from its core is occupied by top class government officials who work in Apapa and high ranked naval officers who work within the area. It is an affluent area in all ramification. This area holds the luxurious Lagoon Hospitals and Nigerian Chambers of Shipping which are known to be the biggest landmarks in that area.

Apapa boasts of having the area with the most modern type of housing in Lagos state, owing to the influence of the whites during colonial times, from the land subdivision to building patterns and zoning. Also, its commercial functions which it performs has caused it to be a hotspot for development of the entire area and its environs. It is largely arguable that the development of Apapa over the years during the post-colonial era is owed to the performance of its various functions as a growth pole. Apapa which has an Area: 38.5 km² and a population density of 7,977/km² according, NPC (2016).

4.5.2: Recreation and Open Spaces

Apapa is filled with a lot of recreation centers and open spaces. The area has popular shops, good restaurants and an excellent market, including UTC, Park & Shop, Oasis Supermarket, Casamia, Dallas Bakeries and Frenchies. Takawa Bay and Apapa Beach club are good for recreation and they offer a good view of the Tin Can Island Ports and Apapa creek. Residents and tourists often visit these open spaces to have fun and sometimes for business engagements. They also serve as an escape of some sort from the bustling city life that often leads to stress. The availability of these open spaces and recreation centers is thus very key in the future development of Apapa.

4.5.3: Flood and Drainage Conditions

Apapa like most parts of Lagos bordering water bodies is susceptible to annual flooding. Flooding is one of the most important concerns for the region of Apapa because of the varied adverse socio-economic and public health impacts (Adelekan, 2010; Ajibade *et al.*, 2013). The geographical features of the city including the low-lying topography, coastal location and network of rivers provide the context for the three different types of flood hazards recorded. The characteristics of the city – large population, concentration of assets and social vulnerability of the majority of the residents as well as the level of economic activity within the city – mean that flooding events have the potential to become catastrophic not only for the city, but also for the whole of Nigeria, especially in economic terms. Clogged drains and poor roads filled with potholes are continuous contributing factors to the problem of flooding in Apapa.



Fig. 4.5.6: Flooded road in Apapa.
Source: Field Survey, 2020.

4.5.4: Road and Street Conditions

Apapa is now home to congestion, bad road, daily broken down trucks, container accidents coupled with incessant pollution and flooding since 2014 in addition to the recent truck tankers related problems that keeps generating through the distribution of refined petroleum products (AGO, PMS, Kerosene etc.). Poorly constructed roads that do not allow for effective water surface runoff coupled with the heavy tankers that ply these roads has led to the development of potholes which in turn has further destroyed the roads making them unbearably difficult to navigate.



Fig.4.5.7: Potholes infested Apapa-Oshodi Expressway
Source: Google Images, 2020.

In some areas of the local government area, traders have taken over the both sides of the roads with the available drainage systems serving as refuse dumps for their wastes. The streets are relatively clean, although there are areas where wastes are still being dumped in the open drainages.

4.5.5: General Conditions

The importance of Apapa to Lagos State and Nigeria in extension cannot be overstated especially its economic impact. However, the environmental problems in the region has become very worrying in recent times. The Apapa gridlock is one of such problems. The Apapa gridlock is caused mostly by the trucks and tankers trying to access the Apapa port to load materials shipped in from outside the country. The sheer number of these trucks coupled with the poor roads and the lack of real alternative routes led to the gridlock in Apapa. Efforts are being made both at state and the federal level to find a lasting solution to the problem.



Fig. 4.5.8: Apapa Gridlock
Source: Google Images, 2020.

Also the annual flooding problems in parts of Apapa and the lack of proper waste disposal hygiene by residents is gradually leading to the decay of the region. All of these problems has culminated in the formation of slums in parts of Apapa. The development of slums in these other areas, and the traces of refuse dumps which could be sighted on the streets of the underdeveloped areas of Apapa is an unpleasant sight and is one factor which could make human habitation in these areas difficult. This problem can however be linked to the fact that many residents in these regions do not have a viable means for their refuse disposal and the frequency at which the waste management body comes for waste retrieval is also small. This often leads to the accumulation of wastes. To curb this, the residents look for alternative ways to dispose their waste and this has led to improper waste disposal by residents in the area, thereby causing the area to be very unpleasant environmentally and aesthetically.

4.6: FESTAC TOWN (ZONE D)



Fig. 4.6.1: Overview of FESTAC Town
Source: Google Earth Imagery.

FESTAC Town, originally referred to as "Festival Town" or "FESTAC Village", is a residential estate designed to house the participants of the Second World Festival of Black Arts and Culture of 1977 (FESTAC77). Consisting of 5,000 contemporary dwelling units and seven major avenues, the town was designed in an efficient grid in order to accommodate upwards of 45,000 visitors as well as any Nigerian employees and officers working at the Festival. The Nigerian government invested substantial sums of money and resources into building FESTAC Town, which sported state of the art electrical generators, police and fire stations, access to public transportation, supermarkets, banks, health centres, public restrooms, and postal services. The village was therefore intended to evoke the modern age and the promise of state-sponsored economic development fueled by oil revenues.

After the Festival, the Federal Government of Nigeria allocated the housing and landed properties to eventual winners who participated in a ballot. Initial regulations forbade such winners from renting and disposing-of the properties to third parties.

4.6.1: Housing and Building Conditions

From a general overview of FESTAC Town as observed from the satellite image displayed earlier, is a housing Estate, with mixture of old and modern housing types. The houses in the core are old with older features compared to the houses in the peripheral areas. The physical signatures examined included the appearance of the houses, and other buildings, which were relatively classified to be medium-grade residential areas, for middle income earners and well to do households, although the infiltration of unchecked developments is becoming rampant. Also, it boasts of medium environmental quality of neighborhood, which is owed to the initial quality of the environment and the maintenance constant maintenance of roads and neighborhood by the residents.

FESTAC Town, from first observation is a developing area with an ordered and developed core and vastly unchecked development in the peripheral areas. There are a lot of undeveloped buildings, while the developed ones are less clustered, sparsely located and evenly distributed. Modern roofing sheets with recent roof types are the common coverings for residential houses in areas surrounding the core. The estate, being a government estate was originally built to house athletes with a building capacity of 5,000 housing units. However, the number and frequency of growth of new and uncoordinated development is on the increase, especially in the periphery.

The core is made up of dense housing with sparse greenery and open spaces present in the area. Around the core there is dense housing units consisting of a mixture of flat types and rooming type dwellings. There is a visible presence of arranged buildings, with a proper plan

and accessible roads with a visible parking space towards the north east. The other developing areas lack the regular arrangement patterns and proper planning that is visible in the core areas of the town. Thus, their development, has serious negative consequences on the environment. As the drastic development has improved some areas, the lack of this impetus in other places has sprung the development of slums. This level of unchecked development has led to the degeneration of infrastructures in FESTAC Town. The governor of Lagos State described the development crisis in FESTAC Town as unpleasant, pointing out that the population growth and influx of people led to the degeneration of the neighborhood. He also said the failure of oversight on activities of property developers in FESTAC Town distorted the original master plan of the area.



Fig. 4.6.2: Housing Layout in FESTAC Town.
Source: Google Earth Imagery.

4.6.2: Road and Street Condition

FESTAC Town is built in a grid network consisting of seven major roads/boulevards or avenues from which minor roads extend. These avenues are identified by their numbers: 1st, 2nd, 3rd, 4th, 5th, 6th and 7th Avenues respectively. The 1st, 2nd, 4th and 7th Avenues surround a portion of the town in what seems like an almost rectangular road network which are connected and accessible through each other. The 3rd and 5th avenues run parallel within the town. The 6th avenue is found in a portion of the town accessible through a bridge from the 1st Avenue. The town consists of cul-de-sacs or closes which are named in an alphabetical format.

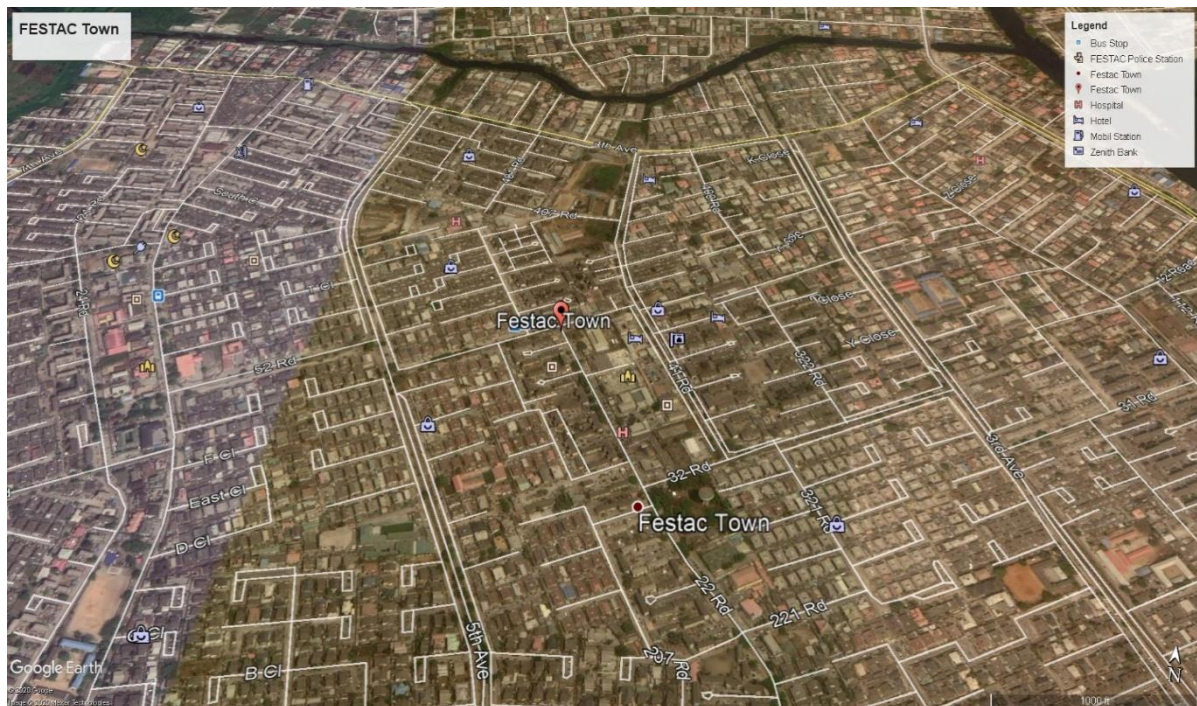


Fig. 4.6.3: An Overview of FESTAC Town Showing the Road and Street Layout.
Source: Google Earth Imagery.

FESTAC town is accessible from the Lagos-Badagry Expressway through three main gates that open into the 1st, 2nd and 7th avenues and are called the First, Second and Third gates respectively. The town is also accessible through the FESTAC Link Bridge. The status of FESTAC Town is somewhat confusing as the Federal, State and Local Government all lay

claim to the management of the estate and occasionally issue the residents with various charges ranging from valuation fees, local government levies to tenement rates.



Fig. 4.6.4: A Street in FESTAC Town.
Source: Google Earth Imagery.

4.6.3: Recreation and Open Space

Once a sleepy estate, FESTAC Town has in the past few years attracted varied forms of businesses within the estate and its environs. Today, there is a growing number of commercial banks, and shopping complexes that cater to the residents. There are also several hotels and hangout spots within the estate which have contributed to the vibrant night life. Due to the estate being heavily built up, there is limited open spaces and greenery, especially in the core.



Fig. 4.6.5: An Open Space FESTAC Town.
Source: Google Earth Imagery.

4.6.4: Flood and Drainage Conditions

FESTAC Town like most places in Amuwo-Odofin local government area is situated mostly in the mainland of Lagos state, and hence largely devoid of large water bodies, although swamps are a major characteristic of the mainland. The presence of these swamps has led to the development of minor wetlands. There have been a few cases of flooding incidents in FESTAC Town over the years and this issue is becoming more prominent by the day. These flooding incidents is mostly owed to the poor drainage facilities and slum development in the area especially in the 6th and 7th Avenue which can sometimes stay flooded for weeks depending on the intensity of the downpour. Lack of maintenance of available roads has led to the breaking of these roads and thereby leading to the development of pot holes on the roads. These potholes act as barriers to surface runoff of water.

Also, it is important to note that Lagos being a coastal city almost in no way affects the drainage pattern and drainage conditions of FESTAC Town, as it is fully landlocked and

all drainage problems in the area arise mostly from the blockade of drainage canals by people living close to these drainages.



Fig. 4.6.6: A Road with Drainage Canal in FESTAC Town.
Source: Google Earth Imagery.

4.6.5: General Conditions

In terms of general sanitation, environmental sanitation has been a traditional activity across Lagos state. The practice of environmental sanitation and public cleaning has been adhered to over the years and the practice is still in vogue. Public cleaning in the area is supervised by the sanitary inspectors and senior officials from the Lagos State Waste Management Agency (LAWMA). And the defaulters of this sanitary process are duly punished by a fine or sanction. This is done in a bid to facilitate the productivity of the sanitation exercise. The sanitation process went beyond being just a general thing as both public and personal hygiene were checked, peoples' house conditions and streets had to be properly cleaned and made to meet certain standards.

The major areas in the town are most often neat and kept tidy but internal areas, especially where slums are developing are usually littered and unclean. The level of

environmental pollution in these areas is often alarming. Refuse dumps and thick bushes with stagnant water having offensive odors are a common sight in these blighted neighborhoods. Despite the efforts of the government to curb the dilemma of incessant waste disposal in Lagos state, defaulters still abound. However, both the federal and state government are committed to regeneration of FESTAC Town and efforts are being made to redevelop the region.

4.7: SURULERE (ZONE E)

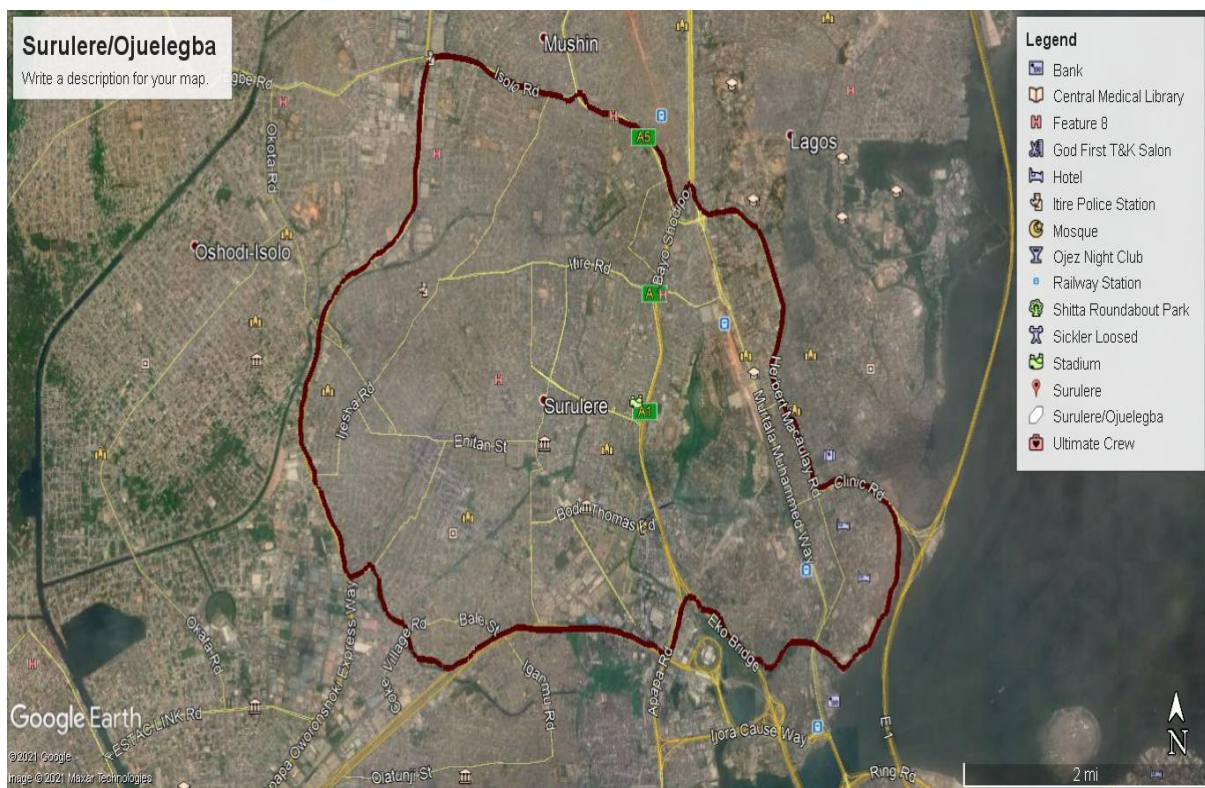


Fig. 4.7.1: Surulere Local Government Area
Source: Google Earth Imagery, 2020.

Surulere is a residential and commercial Local Government Area located on the mainland of Lagos in Lagos State, Nigeria, with an area of 23 km². At the last census in the year 2006, there were 503,975 inhabitants, with a population density of 21,864 inhabitants per square kilometer. The local government area is bordered by Yaba, Mushin and Ebute-Metta.

During the rapid urbanization of Lagos, the city expanded to the west of its lagoon, which included present-day Surulere. Families from different regions of the country have historically settled in Surulere. In addition to the local settlers of Lagos, during the nineteenth century, various emancipated African Brazilians and Cubans, who were referred to as Aguda or *Saros*, settled in Surulere. Nigerians from the Northern region initially ended at Idi-Araba, while many people from the eastern part were in various quarters but predominantly at Obele, Ikate, and Aguda areas. Residents of Lagos Island who bought or leased land from the government and Aworis settled in New Lagos. In contrast, others lived in the neighborhoods of Itire, Lawanson, Ojuelegba, Animashaun, and Shitta. The New Lagos neighborhood, also known as the Surulere Re-Housing Estate, is among the first public housing projects in Nigeria.

The main commercial streets in Surulere are Western Avenue, Adeniran Ogunsanya, Adelabu, Ogunalana drive and Aguda, various open markets are dispersed in different neighborhoods. Industrial establishments are predominantly located at Iponri, Coker and Iganmu. One of the most popular places in Surulere is Ojuelegba. It is known for its crowded setting and regarded as one of the busiest places in Lagos. It is one of the key transport nodes of Lagos, connecting the city's Mainland with Lagos Island and Victoria Island.

4.7.1: Housing and Building Condition



Fig. 4.7.2: Housing Condition in Surulere.
Source: Google Earth Imagery, 2020.

Houses in Surelere/Ojuelegba are visibly clustered and the street divisions are mostly rectangularly shaped, in order to increase accessibility across the entire area. The houses are usually low rise buildings and bungalows, within which the holding capacity usually averages between 4 to 7 people in a room which is a far cry from the standard human habitation in a room but given the fact that this area is one which houses a vast majority of the urban poor in Lagos State, the situation has become the norm in this neighborhood like in most neighborhoods in the state. The houses are of court type with the majority of the houses in this area roofed with rusty corrugated roof sheets. These rusty roof sheets are an indication of the old age of these buildings and serious dilapidation. The houses are majorly family properties which have been passed down to the current generation and have mostly never undergone any form of renovation and as a result, its facilities are outdated. These rusty roofs are usually weak and are dangerous, they also do not provide any form of protection as all it takes is a heavy storm or rain to bring about leaking roofs.

From a general physical observation, it is safe to say that the housing patterns and characteristics are of low quality and when coupled with the visible scarcity of houses in the area, as a result of the high population density makes this area an unpleasant place to live in.

4.7.2: Road and Street Condition

Roads in Surulere are mostly single carriage roads with drainage on either sides for many of the roads. Ojuelegba hosts a major bus park for buses going to various locations in Lagos. Ojuelegba road leads to Yaba easily which is a bonus for people working in this axis. The traffic lights help make the traffic congestion bearable. Ojuelegba can be reached from most parts of the Lagos mainland via Yaba and Oshodi and from the Island via the Carter Bridge. Buses, bikes, and tricycles are available to move people through different parts of the area. The roads in the area are tarred and motorable however, the street roads are narrow as a result of cars being parked along the road. The drainage systems are poorly maintained, most of the drainage channels are blocked with dirt and stagnant water. Some streets in Ojuelegba experience flooding occasionally when it rains heavily due to the slow rate of water runoff from roads and drainage facilities.



Fig. 4.7.3: Street Condition in Surulere.
Source: Google Earth Imagery, 2020.

Residents of Ojuelegba who work in business districts like Victoria Island and Ikoyi enjoy the advantage of accessibility as the area serves as a major link from the mainland to the Island. Going through the Eko bridge, Ojuelegba is approximately 29 minutes from Ikoyi and 24 minutes from Victoria Island. It is also easy to access other areas in Lagos mainland from Ojuelegba.

4.7.3: Recreation and Open Space

Surulere has a number of recreation centers and open spaces. The area has popular shops, good restaurants and an excellent market, including the Suncity Hotels located at 44 Karimu St, Ojuelegba, Lagos. The hotel is strategically located and provide easy access to nerve centres within the vicinity and a host of other recreational spots. Residents and tourists often visit these open spaces to have fun and sometimes for business engagements. They also serve as an escape of some sort from the bustling city life that often leads to stress. The availability of these open spaces and recreation centers is thus very key in the future development of Surulere/Ojuelegba.

4.7.4: Flood and Drainage Condition



Fig. 4.7.4: Flooded Drainage filled with waste materials in Surulere.

Source: Google Earth Imagery, 2020.

Flooding is a big problem in Surulere, even during the mild rainfalls streets are flooded and many times water rises to house levels. Intensity of rainfall in short period, in rainy season, leads to extremely high runoffs and floods. Surulere is a lowland which makes the situation even worse because the lowland nature hinders water discharge to the sea. Also, due to poor soil infiltration only a small proportion of rainwater seeps into the ground. Because of poor infrastructure planning, buildings often block natural watercourses and canals are too narrow to convey rainwater away from the area. Roads are often unpaved and the hard rain makes them muddy and bumpy. Inhabitants of the Local Government Area wish to have expanded canals, paved roads and better drainage to prevent flooding of homes and other problems during the rains.

The incessant flooding incidents in Lagos and hence Surulere have become a major cause of concern especially because of its disastrous aftermath. At the onset of the rainy season, The Lagos State government indicated that Surulere Local Government Area is one

of the parts of Lagos that are in danger of being flooded. This frequent incident has been linked to changes in the precipitation pattern with more rains with higher frequency and intensity. Due to the poor infrastructural planning, buildings often block natural water drainage systems and roads constructed without drainage prevents rainwater from flowing out. The construction of buildings close to water bodies in Surulere/Ojuelegba is also another factor responsible for flooding in the area. A key factor affecting this region and Lagos at large is the problem of dumping waste materials in drainage canals as this prevents water runoff due to the blockage of these drainage canals.

4.7.5: General condition

Surulere is a residential and commercial area, with majorly residential areas and a few commercial centres. The Ojuelegba area of Surulere is a major hub of commercial activities, with the former Tejuosho market situated along Ojuelegba road towards the railway axis. The Aguda and Iponri markets are also major markets in the LGA. Streets such as Adeniran Ogunsanya Street, Akerele Street, Ogunlana Drive are major streets where commercial activities also take place. The National and Lagos State Stadiums are both situated in Surulere and serve as sport recreational centres.

Living in Ojuelegba can be exciting and challenging at the same time, depending on what the day brings. It is, however, not without the usual blast of music from roadside speakers and drivers honking their car horns. A feature that has become accustomed to this part of Lagos. Famous for being a crowded and busy neighborhood, Ojuelegba is arguably one of the busiest places in Lagos residents do not enjoy serenity and tranquility that is experienced in some other areas in Lagos. Houses in Ojuelegba are mostly old although there are a few structures built with modern designs in recent times. Apartment types here are majorly one-bedroom apartment popularly known in Nigeria as “Face me I face you”, mini flats, 2-bedroom apartments, 3-bedroom apartments among others. Surulere experiences

annual flooding issues mostly as a result of its low topography, bad soil, inadequate drainage canals and the blockage of available canals with waste products by inhabitants of the region.

4.8: Performance Rating of each Zone by Variable

In terms of housing and building condition in the study area, it was discovered from observation that the best houses and building conditions were found in Apapa. The houses here are modern and are in good conditions. This is followed by houses in FESTAC Town where buildings are also in good shape. In Surulere/Ojuelegba axis, the housing and building conditions can be said to be in a fair condition but the area is gradually deteriorating as a result of the slum impact. The building and housing condition in Amuwo-Odofin/Satellite Town and Ajegunle can be rated as poor and very poor respectively given that these areas are gradually becoming the headquarters of urban blight in Lagos Mainland Metropolis due to the dilapidated buildings and unstructured housing format.

Apapa and Surulere are very good and good respectively in terms of road and street conditions. Though the roads in these areas have bad patches littered everywhere, they are still better compared to the other zones. The roads and street conditions in FESTAC Town can be tagged as fair with Amuwo-Odofin/Satellite Town and Ajegunle respectively having poor and very poor roads and streets littered with dirt and pot holes.

In terms of flood and drainage condition, the zone with the highest likelihood of being flooded is Ajegunle given the marshy nature of the region, their proximity to swamps and the poor drainage system installed in the zone. FESTAC Town is the next most likely zone to get flooded due to a deterioration in the drainage facilities and poor environmental maintenance. Amuwo-Odofin/Satellite Town has a lesser probability of getting flooded when compared to

FESTAC Town and Ajegunle while the zones that experience the least flooding in the study area are Surulere and Apapa respectively.

Surulere/Ojuelegba zones have the most recreation centres and open spaces in the study area. This is followed by Apapa and FESTAC Town with Ajegunle also having a sizable proportion of open spaces and recreation centers in Lagos Mainland Metropolis. Amuwo-Odofin/Satellite town is the zone with the least amount of open spaces and recreation centres as the focus in this region is the building of residential structures.

In terms of the general sanitation of the study area, Apapa is adjudged to be the most conducive place to live in the Mainland with Surulere and FESTAC Town respectively following suit. Amuwo-Odofin/Satellite town is a poor place in terms of their general sanitation with Ajegunle being the least conducive place to reside in Lagos Mainland Metropolis due to the sanitation of their environment being generally poor.

4.9: Drivers of Urban Blight Development in Lagos Mainland

Distance to markets, distance to industrial/public land use, distance to shoreline, distance to canal, distance to access roads, distance to local government administrative buildings, land price, population density, elevation and slope are significant drivers of urban blight in Lagos. Slum development and neighborhood blight tends to occur close to markets, meaning that the probability of slums to develop in an area increased as one moves closer to the markets. This could be explained by the fact that many slum dwellers in Lagos are artisans and thus work in the informal economy (Agbola & Agunbiade, 2009), and unskilled job opportunities are common in the open markets. Furthermore, when tracing the origin of some slum settlements in Lagos, one will always detect a market not too far from them, e.g. boundary market in Ajegunle and the former Tejuosho market in Ojuelegba, however in some

cases it is the slums, especially the old ones, that leads to the creation of the open markets e.g. Ikorodu slum and market.

As Lagos is the economic hub of Nigeria and West Africa. Many people move to Lagos for job opportunities, which can be found in industrial/public areas, signifying that slums will likely develop closer to this land-use type than further away. An example is the proximity of IjoraBadia slum to Apapa Wharf, a major seaport, and NIPCO, a major oil depot in Nigeria (Morka, 2007). In Lagos, slums tend to also develop close to the shoreline, low slopes and elevations. Although the city harbors more than 10% of Nigeria's population, its landmass is considerably small, the smallest state in Nigeria with respect to land mass, consequently leading to high land and housing prices, which many cannot afford due to the high poverty in the city (Lagos Bureau of Statistics, 2014; Adedayo & Malik, 2015). The alternative for many people is usually the hazardous areas where the land value is low. However, the recent slum clearances in Lagos (e.g. Otodo Gbame, Ilubirin) have shown that some of these sites, especially those close to the shorelines, are now prime locations for formal housing development in Lagos, which might dissuade slum development in such locations in the future. Another key factor of urban blight development is high population density.

CHAPTER FIVE

SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1: Introduction

This section deals with the summary of the research findings which were drawn from the data analysis. This is followed by the conclusion and the recommendation while attempt is made to identify opportunities for further research.

5.2: Summary of Findings

This study analyzed the blighted areas of Lagos mainland, and its overall effect on the area both, culturally, physically, socially and environmentally.

A comprehensive analysis of the remote sensing imagery obtained from these areas and direct physical observation, revealed that blight which is the primarily examined focal point of this research has been the first, variable that is responsible for the general deterioration of these places. It is no doubt that Lagos state in Nigeria's commercial capital and is the hub of social activities. These were the prominent factors behind the explanation of the rapid population increase and urban sprawl, which is the first causal effect of urban blight. The second cause of blight which was observed was bad housing, and development of slums. It was noticed that the conditions of this slum painted a picture of an overall poor quality of life of these people who are actively resident in these areas. These areas are generally unfit for human habitation and has led to the exposure of residents to environmental dangers, culminating in residents living in fear.

Urban sprawling has led to a struggle for survival and accommodation facilities, thereby causing a corresponding increase in the fees and rents of the housing facilities in these areas. To combat the high rents and high cost of living in the built up and expensive

areas, more and more people have resorted to living in slums. Also sprawling and rapid population increase would lead to erection of substandard building facilities, as landlords are more or less pressured to erect buildings within the shortest possible time to benefit from the collection of rents. As a result of this, people's lives are endangered and there is a cluster of individuals in an area, with so many substandard houses. Also another problem of substandard housing is that structures wouldn't be erected based on its maximum qualitative capacity, but more of its quantitative capacity is taken into consideration, in order to have a building which would hold more people as opposed to holding a small number but for a long time.

From a social viewpoint, blighted areas are generally poor areas for children upbringing. This is as a result of exposure of young ones within their teenage and adolescent age's to crime and possibly drugs. Blighted areas, expose children to vices at early ages. The wrong choice of property investment in the area, was seen also as a cause to negatively affect youths, teenagers and adolescents in this area. It was discovered that there was presence of hotels, bars, and night clubs at almost every street in these areas, which therefore exposes them to the forays of the nightlife. The presence of these hotspot for illicit activities, is a passive causative element of the vices and delinquencies which would be a prominent feature of these areas.

It is no doubt that urban blight is something that every government owned institution and parastatal which is environment based tries to avoid because of its rapid spread and the rate of environmental degradation. Aerially, the overview of the study area, showed the presence of abundance of slums, low-rise buildings like bungalows, which house over 30 families. First glance at the remotely sensed imagery data represents the clusters of houses with brown old deteriorated roofs, with sorry conditions of sub-standard housing which is dangerous to human habitation.

This prompts building code violations and unsanitary conditions which pose a threat to the public for health and security reason. Essentially, this is indicative of a town which caters for people far exceeding its maximum threshold, a factor that is symptomatic of an urban overload. Consequently, this builds up to a blighted urban landscape, which undeniably needs radical intervention. Another notable problem in this blighted area is the struggle for survival, and the use of resources and amenities. These areas are characterised by excess pressure on the existing resources as the resources are subject to use by the people who are resident in these areas and its ever growing population, this brings about a corresponding overuse of a certain resource which could lead to exhaustion if not conserved and renewable.

Blighted areas continue to suffer and would take a downward curve of development as they are usually overlooked in resource distribution and bigger and more urban societies are usually favored, these blighted areas lack development most times because the variables which are supposed to bring about development are mostly overlooked, even though the high population in this area suggests a good and large market for commercial activities. Emerging companies and industries who contribute to the overall development of an area usually prefer the developed areas and the blighted areas prove resistant to development unless specially considered and rehabilitated by the government as, seen in some areas of Surulere, which included the National Stadium and Teslim Balogun stadium areas, which hosts the annual Access Bank Lagos City Marathon, which is attended by athletes from all around the world.

5.3. Recommendations

Based on the findings of this study, the following recommendations are made:

In order to effectively address the issue of urban blight, the study therefore recommended urban regeneration as a curative measure for the urban blight in Lagos Mainland Metropolis. In response to the issues that are subjective to the study area, urban

blight seeks to take advantage of the town's attractiveness by recommending legislative and policy measures that will aid in the provision of infrastructure and housing delivery for the development of the local economy. Eventually this will arguably improve the revenue base of the Lagos mainland Metropolis which is the study area, thus playing a crucial role in the improvement of lives of the low and middleclass income earners in Lagos state. Other recommendations include;

1. Policies that setup City codes, need to set a minimum standard for building and property maintenance. These codes need to be effectively and efficiently enforced.
2. Existing neighborhood associations should take action and report to the agencies, responsible for the inspection of buildings in poor conditions that need to be addressed by home/property owners.
3. Tenancy laws that guide tenants against an aggressive increment of rents by the landlords, should be enforced to protect the people and make sure good affordable housing is provided.
4. Organize neighborhood associations to advocate for needed community services to combat blight in the area.
5. Careful planning of development in potentially flood prone areas. This should be supported by appropriate legislation, public information and education programs (to ensure that residents understand the flood risk), flood insurance, and flood warning systems (to reduce the impact of floods). Also, flood forecasting and flood warning services. This service has been readily provided by the Nigerian Meteorological Agency.
6. Roads should be constructed with proper drainage channels and dumping of refuse in drainage channels should be prohibited and penalties attached to non-adherence. More drainage channels and reservoirs should be constructed such as canals and gutters.

Side drains and gutters could have removable precast concrete or steel cover for ease of maintenance. Water meadow areas can be created with which to divert flood water. Drainage channels should be cleaned out regularly to avoid blockage by silts and mud. This can be achieved by enforcing the monthly environmental sanitation by the local government authorities.

7. Runoff control - source control measures should be put in place to reduce the amount of runoff in the event of flooding. These measures include construction of permeable pavements, afforestation and artificial recharge. Also stores of runoff can be created such as wetlands, detention basins and reservoirs.
8. More in-depth research should be carried out on the impact of global climate change and associated impacts on floods. Flood risk maps should be produced and a comprehensive floodplain management plan should be developed for areas likely to be affected by floods. Also flood management studies should be carried out to discover more advanced and effective ways to control flooding. The government should put a ban on the construction of buildings on flood plains with penalties attached. However, there should be adequate awareness and dissemination of this information in the media and also the availability of flood risk maps to the public.
9. Resettlement strategies and emergency preparedness plans should be developed by the involved the government in order to easily evacuate citizens in the occurrence of flood disasters. Flood warnings and timely emergency action are complimentary to all forms of intervention. A combination of clear and accurate warning messages with a high level of community awareness gives the best level of preparedness for self-reliant action during floods. Public education programs are crucial to the success of warnings intended to preclude a hazard from turning into a disaster. Evacuation is an essential constituent of emergency planning and evacuation routes may be upward

into a flood refuge at a higher elevation or outward, depending upon the local circumstances. Outward evacuations are generally necessary where the depths of water are significant, where flood velocities are high and where the buildings are vulnerable. Successful evacuations require planning and awareness among the population of what to do in a flood emergency. Active community participation in the planning stage and regular exercises help ensure that evacuations are effective. The provision of basic amenities such as water supply, sanitation and security in areas where refugees gather is particularly important in establishing a viable evacuation system.

10. Finally, Flood recovery measures such as counseling, compensation and insurance should be put in place. The pros and the cons of the policy of flood insurance should however be weighed before implemented. Also, the sociological aspects of coping with flood in affected areas should be taken seriously and appropriate counseling given to affected victims.

Currently, some of these measures are already being put in place by the Lagos State government. Given the prediction of Nigerian Meteorological Agency (NIMET) that this year will witness heavy rains, the Lagos Government has commenced construction of drainages and canals in the Mainland especially in Surulere Local Government Area which is very flood prone to reduce the impacts on its citizens. Also, The Lagos State Government is clearing slums, especially those on the drainage channels and right of way. Recently, at Adelabu area in Surulere, behind an elitist school, Fountain Heights Secondary School, a slum community of over 2,000 inhabitants including women and children, were given an eviction notice to allow for the construction of channels and drainage to check flooding in Surulere, which has been a yearly occurrence due to the activities of these people.

5.4 Conclusion

Conclusively, this urban regeneration is centered on increasing the capacity of Lagos Mainland to cater for the people from these towns through adopting them and economically capitalizing on their existence for the benefit of the metropolis.

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