EFFECT OF URBAN GROWTH ON RESIDENTIAL PROPERTY VALUE IN CHIKUN LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN GAS AND REMOTE SENSING

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DECEMBER, 201

DECLARATION

I solemnly declare that the research work entitled **''Effect of Urban Growth on Residential Property Value in Chikun Local Government Area, Kaduna State, Nigeria''** was carried out by me in the Department of Geography and Environmental Management under the supervision of Dr A.K. Usman and Professor Binta Abdulkarim. All information obtained from literatures is duly acknowledged and referenced. No part of this dissertation was presented for another degree in any University.

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CERTIFICATION

This Research work entitled **''Effect of Urban Growth on Residential Property Value in Chikun Local Government Area, Kaduna State, Nigeria''** has been read and approved by the supervisory committee as meeting the requirements for the ward of master of science degree in Remote Sensing and GIS of Ahmadu Bello University, Zaria.

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Head of Department	Signature	Date
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Dean, School of Postgraduate Studies	Signature	Date

DEDICATION

This work is dedicated to my parents and family

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All praises due to Allah, the Lord of the Universe, the Omnipotent and Omniscience for giving me the strength, wisdom and time to undergo this study. I remain grateful to Him till eternity.

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ABSTRACT

Chikun L.G.A. has for long attracted people from other places due to the variety of functions that it performs. Consequently, the pressure of population has lead to increased demand for residential property, thus leading to rise in residential rental values. A questionnaire survey was conducted on occupiers of residential property across the 2 districts (Gwagwada and Kujama) together with the Landsat TM of 1986, Landsat ETM+ of 2000 and Landsat 8 of 2016 were used, and the questionnaire was administered using purposive sampling technique. Simple statistical technique together with Geographic Information Systems tool was used.The results of the study revealed that build-up (urban) has progressively increased throughout the study period occupying 149.2 km² (3.2%) in 1986, 190.4km² (4.1%) in 2000 and 271.5km² (5.8%) in 2016. All these growth are attributed majorly to agglomeration of business activities, security, population size increase, accessibility, among other identified determining factors. In the case of spatial pattern of residential property value, the study shows that the areas such as Narayi, Sabon – Garin Nassarawa, Sabon Tasha and Yelwa had recorded the highest residential property value for the period 1986 to 2016. Agglomeration of business activities, security and population size increase were some of the reasons adduced for the high values of residential property the areas enjoyed. Others such as Kujama, Rido, Kunai, Nassarawa, Chikun, Kunai, Gwagwada, Kakau and Kuriga enjoy moderate and lowest residential property values respectively. On the effect of urban growth on residential property value, it was found that 31.25% of the respondents were of the opinion that quality and quantity of water would affect residential property values (rental) either to increase or decrease. The study identified the trend of residential property value as not uniform throughout the entire study area (Chikun L.G.A.) with the highest recorded residential property values in 2016 and least recorded value in 1986. This is attributed to the uneven distribution of infrastructural facilities, agglomeration of business activities, accessibility, and

security among other determinant factors identified by the researcher. The study recommended the formulation and enforcement of housing policies and also planning laws in order to allow for balance allocation of values use, and also the provision of basic infrastructural facilities, such as good roads and pipe-borne water with periodic maintenance of such facilities.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Urban growth refers to the spreading out of a city and its suburbs towards a non built – up areas at the periphery of an urban area (Liu, Zhan and Deng, 2005). It is also defined as a spatial or physical enlargement of built – up areas, but its dynamics depend upon the nature of the physical developments and the population densities (UN – Habitat, 2006). According to (Liu *et.al*, 2005), this process involves the conversion of land uses into various categories over time. The built – up is generally considered as the parameter for quantifying urban growth (Torrens and Albert 2000; Barnes *et.al,* 2001; and Epstein *et.al,* 2002 cited in Jat and Khare, 2008). It is quantified by taking into consideration the impervious or built-up areas as the key features of urban growth. The extent of urban growth is one of the phenomena that drive the change in land use patterns. Urban growth is the most easily identifiable characteristic of urbanization process as it affects land cover / land use at both regional and global scale. In Calabar, for instance, urban growth in the past two decades has resulted in land conversion through the redevelopment of what was periurban agricultural and farmland into increasingly urban areas (Epstein *et.al* , 2002).

Urban growth is dynamics and its nature depend upon the physical developments and the population densities they promote. It is possible, for example, a city to experience urban growth without expansion if this growth is absorbed within existing settlement boundaries. Conversely, expansion can occur without growth where new developments are created to facilitate lower population densities for an existing community. While Urban structure is the arrangement of land use in urban areas, it is closely related to urban expansion, as the physical configuration of settlement influences its population density with the amount of land required varying for different activities and urban system is a term used to characterized the distribution of urban population across settlements within a national territory. In Nigeria, a settlement is generally classified as urban where its population is up to 20,000 people or more, which is a relative high minimum population threshold compared to many other countries (UN-Habitat, 2006).

According to (Weber, 2001) urban growth is the changes that occurs in the territorial and socio economic progress of an area, including the general transformation of land use categories from being non – developed to developed. In other ward, it refers to the increase in the absolute size of a country or region's urban population. These terms (urban growth and expansion) are often confused in both academic and policy circles, but is important to recognise the difference between them, particularly in the context of Sub-Sahara Africa (SSA) where urban population growth rates are generally high but overall urbanization rate relatively low.

Urbaniztion is characterized by gradual and progressive alteration of system of surface cover composition (SCC) from natural pervious covers to more of artifial impervious ones. Surface cover composition refers to fractions of land surface cover elements of the urban fabrics which includes bare land surfaces, vegetated surfaces, buildings, roofs and pavement (roads, sidewalks and parking lots). (Erall, Pearlmuttter and Williamson, 2011).

According to (Adams, 1994 cited in Zheng, 2003) price for land or property is either the amount sought or the sum received; while the value of land or property are price estimates that reflect subjective expectations and perception of worth. Thus, in an efficient market, the value is likely to

correspond to price. According to (Kuye, 2000) there are two (2) types of land values, that is, the capital value and the rental value. While the former refers to the total lump sum realizable from the sale of an interest in the property, the later is the annual income being collected on the let out property.

The causes, consequences and control of land use change have become an issue of immense importance to the present-day world. The reasons for societal interest in land use and land cover change are many. Land use both reflects and defines where economic activity takes place, and where and how communities develop (Goetz, Shortle and Bergstrom, 2005). Economic conditions, population, and other land uses both public and private, and the size of the urban area continually change, subjecting the urban land market to forces of perpetual adjustment (Balchin, Bull and Kieve,1995).

As world population increases, there has been a general increase in the demand for land in cities around the globe, particularly residential land. It has been emphasized that residential land use, among the several contending urban land uses, is the biggest consumer of land in urban centres (Alonso,1960; Edwards, 2007; Kabba and Li, 2011; Uju and Iyanda, 2012; Adegoke, 2014) were of the opioning that increase in population elicits a proportionate increase in the land demands for residential, commercial, industrial, institutional and transportation purposes. Generally, change in the general use of land affect residential property rental values. Studies have shown that 60% of the terrestrial landscape have been disturbed by different kinds of land use practices over space and time. (Meyer, 1995, Lambin, Geist and Lepers, 2003; Jiang, Yang, Nicholas, and Wang, 2004; Asthana and Asthana,2005; Zubair, 2006; Long, Wu, Wang and Dong, 2008) Landuse and Landcover are distinct yet closely linked characteristic of the earth's surface. The use to which we put land could be for grazing, agriculture, urban development, logging, mining,etc while landcover categories could be urban buildings, lakes,trees, glacial ice, grasses, pavement,etc.

Furthermore, (Barnsley and Barr, 2000) considered land cover as the physical materials on the surface of a given parcel of land, and land use as the human activities that takes place on it. Landuse constitute variety of bio-geophysical materials found on the land surface). For instance, a single – family residential area consists of a pattern of land cover materials. The aggregate of these surfaces and their prescribed designations (e.g. park) determine landuse (Anderson, Hardly, Roach and Wiremer, 1976).

Studies involving price inventory and locational value of land change been happened by paucity nature of data. However, with the introduction of Remote Sensing and Geographic Information Systems (GIS), data is now made available for effective study on urban encroachment as it affect property value. Remote sensing is defined as a science (and to some extent, art) of acquiring information about the earth surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and processing, analyzing and applying that information. While Geographic Information System (GIS) is defined as a powerful set of tools for storing and retrieving at will, transforming and displaying spatial data from the real world for particular set of purpose.

The growth of Urban Chikun though influenced by historic circumstance and political authourity it wield prior to 19th century, is also the result of deliberate establishment of numerous educational institution (Bello, 2000). There appears to be a significant increase in residential property values (rental charges) over time as well as variation in its trend over space in the area of study (Chikun L.G.A.), with some areas exhibiting very high rental charges while others are not so high. It is believed that an

understanding of rental value and its spatial pattern will be of importance in urban planning, management and development as well as anticipating future changes. It is expected therefore, that the results of this study would broaden our understanding of urban growth economics, especially in the area of residential property values in the study area and in the country as a whole. The study would also be useful in providing a guide for urban land planning and management as well as identifying the direction for anticipated changes. In the end, it would also add to the body of literature on land value in Nigeria, especially that studies on the subject matter are few in this part of the country. It would therefore, serve as reference material for future studies on related topics.

1.2 Statement of the Research Problem

Urban areas all over the world are known to attract population due to varied socio-economic activities in such areas. For quite a long time, Chikun Local Government Area has been known to pull a large number of people not only from the north, but also from other parts of the country, as a result of the location of many institution of higher leaning, commercial banks, business activities, its fertile agricultural land and moreso, due to its close proximity to some part of Kaduna metropolis. With these developments, it is expected that demand for both commercial and residential properties as well as vacant lands would be on the rise. This gives impetus to some people to invest in landed properties.

A number of studies have attempted to determine the spatial pattern and factors of land value in various cities. A study of residential land value modelling in Hankou in China by (Ai, 2005) revealed that though land value varied drastically within and between land – use zones, most of the expensive land parcels were in the Central Business District (CBD). However, some studies (such as Uju and Iyanda, 2012 and Kabba and Li, 2011) were not in agreement that the CBD exert much significant influence on land value.

According to (Kabba and Li, 2011) examined the determinants of urban land price in Freetown, Sierra-leone, using questionnaire administration. The result shows that income, population, infrastructure, social status, environmental concerns and neighbourhood quality were the major factors that influence land value in the town. The study concluded that the distance – decay model of earlier scholars has not provided strong evidence that distance from city centre determines the price of land. In other words, the issue of distance from Central Business Districts (CBD) has not been paramount, as emphasized in classical urban economic theories. This study only examined the determinants of urban land price, however the current study seeks to establish an evidence of urban growth as it affects residential property value.

Also a number of studies have been carried out in Nigeria to determine the factors influencing urban growth in the country. For instance, (Ujoh *et.al,* 2011) analyzed Urban expansion and vegetal cover loss in and around Abuja with the use of Landsat imageries of 1987 and 2006. The result revealed that while build- up areas increased, vegetation cover decreased at an alarming rate. This study analyzed urban expansion and vegetal cover loss but did not consider how it affects residential property value.

Other studies conducted on effect of urban expansion on property value include (Emmanuel, Zahari and Yusoff, 2015) who analysed the impact of urban land use changes on residential property

value in Kaduna Metropolis, Nigeria. Questionnaire administration was used for data collection from Government agencies and registered estate surveyors and valuers. Structural Equation Modelling (SEM) was used to analyse the data. The result of the study revealed that population increase, intra – urban migration, security and safety, public and environment have combined to constitute the factors that influence Landuse change in the study area which affected residential property rental values. The current study seeks to futher analyzed the spatial pattern of residential property value.

Even though a number of studies have been carried out relating to urban problems in the study area and elsewhere in the country, most of the studies cited above and several others contained in literature review, have largely concentrated on pattern or factors that either positively or negatively affect land values (such as Ai, 2005, Adebayo, 2006, Ishaya, Ifatimehin and Okafor, 2008, Kabba and Li 2011 among others). In other word, most of the researches carried out in the area of residential property values in Nigeria has been quite considerable in recent times, although much of the research studies mainly focused on the determinants of land uses and determinants of residential property values separately. This research will delve into the crucial issue of properly defining the factors that bring about changes in residential property values and meticulously analyzing how such changes influence residential property values in the study area. This is the gap in knowledge the current study intend to fill. Therefore, the study seeks answer to the following research questions:

i What are the major determinants of urban growth in the study area?

ii How does the urban growth affect residential property value in the study area?

iii What is the spatial pattern of the residential property value in the study area?

iv What is the trend of residential property values in the study area?

1.3 Aim and Objectives of the Study

The aim of this study is to analyze the effect of urban growth on residential property values in Chikun Local Government Area, Kaduna State, Nigeria. However, the specific objectives to achieve this aim are to:

i identify the major determinants of urban growth in the study area;

ii analyze the spatial pattern of the residential property value in the study area;

iii examine the effect of urban growth on residential property value in the study area;

iv examine the trend of residential property values in the study area;

1.4 Scope of the Study

The study area, that is Chikun L.G.A. in which some part of it falls within metropolitan Kaduna (the metropolitan area of the study include: Sabon Garin Nasarawa, Sabon Tasha, Nasarawa, Narayi, Rido

and Yelwa.While those outside the metropolitan area are: Chikun, Gwagwada, Kakau, Kujama, Kuriga and Kunai) (Kaduna Master Plan, 2010).

This research work is on the effect of urban growth on residential property value in Chikun Local Government Area, Kaduna State, Nigeria. The spatial scope of the research work covered the two (2) districts (Kujama and Gwagwada) which comprise of twelve (12) political wards that is, Chikun, Gwagwada, Kujama, Kakau, Kunai, Kuriga, Nasarawa, Narayi, Rido, Sabon Garin – Nasarawa, Sabon Tasha, and Yelwa. The study considered factors of urban growth and its residential property value. In other words, the study did not determine the sales value of developed properties.

In terms of content, the study looked into urban growth and its characteristics as well as residential property values pattern in the study area over time and space. Furthermore, the study also identified the land uses around the identified urban sub-centres, the spatial and temporal distribution of urban land use. While the temporal extent of the study covers thirty (30) years that is, from 1986 to 2016. The choice of the time frame of the study was informed by exigency of data availability.

1.5 Justification of the Study

One of the impediments to rapid housing growth in Nigeria is the high cost of land in urban areas (ERSO, 2008). Again, the cost of land can contribute to a substantial portion of the project cost and subsequently manifests through residential property values (rent). In practice, therefore, land price plays a significant role in urban expansion in terms of development orientation and speed.

Several reasons call for the study of the effect of urban growth on residential property values in Chikun Local Government Area, first and foremost being one of the four (4) Local Government Areas that constituted Kaduna Metropolis would not be an exception to the problem of urban expansion and the associated effect on the residential property values. This is not unexpected given its close proximity to the State headquarters and more so its massive socio-economic activities, since there is hardly any arable land that has not been affected by human activities (Bizi, 2014).

Other reasons include the fact that, the study area is intricately enmeshed in two of the most serious environmental issues of this century: population / urban growth and climate change. In the study area both are evident, the area increased in size from 255,562 to 568,763 (NPC, 2006). This implies that, more and more people are being exposed to problems associated to inflated prices of residential property rental values among others.

Urban growth processes have been a hot research area for several decades. One of the most important reasons for such interest is that, the size and spatial configuration of urban areas directly impacts energy and material flows such as carbon emissions and infrastructure damands, and thus, has direct or indirect consequences on the proper functioning of Earth as a system and on the quality of urban inhabitant. Although urban growth is an inescapable process, efforts can be made to protect natural resources, reduce natural hazards such as flooding and improve the livelihoods of urban dwellers through proper way of urban planning and management (Soffiana, Ahmadi, Yaghamaei and Falahatkar, 2010).

The study area has gone through structural changes in its physical form, population, economic and social constituents over the years largely owing to urban growth, and this had engendered changes in land uses in the study area (Saleh, Badr, El Banna, and Shahata, 2014). Moreover, an analysis on urban expansion and the resultant effect on residential property value will provide a basis for understanding how Government and other Private Partner Land Developers (PPLD) can come in. In terms of academic importance, the implications for further research will be generated which will serve as a guide posts for futher research elsewhere.

It is expected therefore, that the result of this study would broaden our understanding of urban land economics, especially in the area of residential property values in the study area and in the country as a whole. The study would also be useful in providing a guide for urban land planning and management as well as identifying direction for anticipated changes. In the end, it would also add to the body of literature on land value in Nigeria. Finally, it would therefore serve as a reference material for future studies on related topics.

CHAPTER TWO
THEORETICAL FRAMWORK AND LITERATURE REVIEW

2.1 Introduction

This chapter examines the key concepts, theories and previous studies that are related to the subject matter of the present study which focuses on urban growth, factors that influence urban growth, land value and urban rent theories in the study area.

In addition a detailed review of previous empirical studies of urban land value was undertaken in order to identify knowledge gaps that exist in the literature which this study has attempted to fill.`

2.2 Conceptual Issues

2.2.1 The Concept of Urbanization

Urbanization is a complex process of converting rural land uses to urban land uses and which may cause various impacts on ecosystem structure, function and dynamics (Antrop and Van Eetvelde 2000; Pickett *et al.* 2001; Luck and Wu, 2002). One of the major problems for most urbanized countries and regions is the conversion of agricultural land into developed land uses, which is a direct result of urbanization (Batisani and Yarnal, 2009; OECD, 2001). In most developing countries, especially Nigeria,

the pattern of urbanization takes the form of a central core city with peripheral areas that are suburban (UNPF, 2007).

Urbanization in developing world occurs from two main reasons: natural increase of population and rural to urban migration. Natural increase occurs when the number of births exceeds the number of deaths. In developing countries, urbanization usually occurs when people move from villages to settle in cities in hope of gaining a better standard of living. These movement of people from one place to another is called migration. Migration is influenced by economic growth and development and technological change (Marshal *et. al*, 2009). More so, urbanization affect land, water, air and wildlife because of the number of people, the amount of buildings and construction and the increased demands on resources it has impact on the physical environment in several ways.

High population density in urban areas has resulted in a large- scale modification of the landscape and environment. As city grows, the increasing concerntration of population and economic activities demand more land to be developed for public infrastructures (e.g.roads, water facilities and utilities), housing, and industrial and commercial uses. Urbanization is a process by which rural areas became urbanized as a result of economic development and industrialization. Demographically, the term urbanization denotes the redistribution of populations from rural to urban settlement over time. However, it is important to acknowledge that the criteria for defining what urban is may vary from country to country. The fundamental difference between urban and rural is that urban populations live in larger denser and more heterogeneous cities as opposed to small, more sparse and less differentiated rural places (Peng, Chen, and Cheng, 2009).

Many towns and cities in Africa are experiencing rapid urbanization. More towns and cities are booming with change in the land use along the highways and in the immediate vicinity of the city.This dispersed development outside of compacted urban and village centres along highways and in rural countryside are defined as urban encroachment (Theobald, 2001). Urbanization is a form of metropolitan growth that is a response to be wildering set of economic, social, and political forces and to the physical geography of an area. Some of the causes of urban encroachment include population growth, economy pattern of infrastructure initiatives like the construction of roads and the emergence of infrastructure that serves as growth point. The direct implication of such urban growth and encroachment is the change in land use and land cover of the region.

The process of urbanization is fairly contributed by population growth, migration and infrastructure initiatives resulting in the growth of villages into towns, towns into cities and cities into metropolis. However, in such a phenomenon for ecologically feasible development, planning requires an understanding of growth dynamics. Nevertheless, in most cases there are lot inadequacies to ascertain the nature of uncontrolled progression of urban encroachment. Encroachment is considered to be an unplanned outgrowth of urban centers along the periphery of the cities. Due to lack of prior planning, these outgrowths are devoid of basic amenities like water, electricity and sanitation. Provision of certain infrastructural facilities like new roads and highways help in fueling such encroachment, that ultimately result in inefficient and drastic change in land use affecting the land value (Abubakar, 2015) and (Vernon, 2002).

Remote sensing is defined as a science of obtaining information about an object, area, or phenomenon through the analysis of data acquired by a device that is not in contact with the object, area, or phenomenon under investigation (Lillesand, *et al,* 2004). Since the launch of Lasnd-1, the first

Earth Resource Satellite in 1972, remote sensing has become an increasingly important tool for inventory, monitoring, and mananament of earth resources (Abubakar, 2015). The increasing availability of information products generated from satellite imagery has added greatly to our ability to understand the pattern and dynamics of the earth resource systemas at all scales of inquiry.

A particular important application of remote sensing is the generation of land use/ land cover maps from satellite imagery which when compared with traditional mapping approaches such as terrestrial survey and basic aerial photo – interpretation, land use mapping using satellite imagery has the advantage of low cost, large coverage, repeatative and computability (Frumklin, 2001).

2.2.2 The Concept of Land

Land is best described as the physical earth and its waters which form the life supporting system for all living creatures. It is also seen as a basis for crop and tree production and water storage. Land provides space for living, construction and the development of various social activities (FOA, 2003). Thus, land has a production value, it is a primary commodity and a commercial asset. Large areas of land may also be considered as a property of tradition, customary rules, prestige, or other non economic reasons.

Three important attributes give land a ‘‘public’’ character even in economies which are not governed by a central planning policy. First, land is a natural resources may be held and used as a common property (non – exclusive but competing use). Second, land ia an essential resources for habitat, and needs to be available in sufficient quantity and quality to provide for security and stability of the society as a whole. Finally, land development and management is often expensive and frequently exhibits natural monopoly characteristics (declining average cost over large ranges of investment sizes).

Given that land in many societies is often considered as ‘publicly owned’ as well as scarce, the question is how the public owner can obtain the greates benefit from its asset while, at the same time, ensuring its conservation and efficient use. (Randal, 1987) defined a pure public good as one which, because of its very characteristics, is both non- exclusive and non- rival. That is, there is no capacity to control access to the land, and land use by one individual does not prelude another from using the same unit of land. Non-rival resources use has a zero marginal cost, though that definition is somewhat less than precise because it must not include both zero incremental cost of provision and zero opportunity cost, i.e. foregone benefits from a specific use. This definition does not prelude a public good from being scarce, if there is a cost to furnishing it.

2.2.2.1 Residential Property Land Value

The concept of land value in general economic theory is that of market value (Ewert, 1979). All other users of the term ‘value’ require careful definition to avoid confusion with the concept of market value. As market forces determine market value at a particular point of time, there can only be one value at a time. However, over a period, value will fluactuate above and below a normal level

determined by the income earning capacity of the property. This, value appraisal in an attempt to approximate market price at a given moment over period of time. In effect, it measures the magnitutde of the entire fund of value that exists for a given set of circumstances. On the other hand, assessment in an attempt to establish a value on the basis of an estimate of the height of the income fund,which best serves as a measure of the tax paying capability of any property (Ewert, 1979).

Land marketing distinguishes between exchange value, real value and sales value. The exchange value is commonly associated with a price and is expressed in money because this is the only generally accepted means for comparing values. The real value represent the equilibrium between supply and demands. When supply exceeds demand, the value decreases in the opposite case. Value is thus a relative concept, which varies in time and as a function of circumstance. While real value corresponds to a commonly accepted value for everybody, the opportunity value involves also the personal appreciation of one or more individuals. The sales value is highly influenced by personal appreciation and circumstance, and it therefore rather variable in time and space.

2.2.2.2 Determinat of Land Value

According to FOA (2003) there are two main factors that determine land value are (i) its inherent production potential and (ii) options of use. In addition to these underlying factors, supply and demanmd and the perception of the future benefit of any piece of land also affect the determination of its price in a functional market. Therefore, in rural areas, inherent agricultural production potential is the primary factor of land value because food supply from arable land, timber production from forest, or cattle rising from grassland are the main objectives. On the other hand, in urban and peri- urban areas, optional land use in a changing land market is the main component. In such areas, social activities concerntrate more on the transformation of primary goods, the provision of services and residential space.

Urban areas are continually subjected to changes in use pattern and therefore in value. As social and economic factors making for such changes exert their influence, land uses within an urban area will change with the resultant effect on property (land and buildings) values. Lean and (Goodall, 1966). Basically, the pattern of land use is a reflection of competition for sites between various uses operating through the forces of demand and supply. In an attempt to compete for space at the choice location (the city- center) some uses are displaced for other potential uses willing to pay higher prices. In the same vein, owners of property at the choice location will be willing to convert the use of their property to those ones that offer the greatest advantages of rents and better management. In modern society, land resources usually earns a higher return or income/net gain when used for commercial or industrial purposes rather than for any other types of use. As a result, these uses are often able to outbid other uses for almost any site in an urban area. Since, the land in such urban areas are limited in supply, the use of such land is intensified for commercial purposes that command the highest value. This situation is such that exists in Kaduna metropolis.

In practice, land price (or value) plays a significant role in urban growth in terms of its development orientation and speed (Hu, Cheng, Wang and Xie, 2012). Therefore the characterization of what (Brueckner and Colwell, 1983) described as Land Price Distribution (LPD) is essential to provide information needed to imrove our understanding and modeling of urban land use change to reveal the drivers and spatial pattern of change of urban development.

2.2.2.3 Pattern of Land Value

Pattern refers to the characteristics and properties found in repeated and regular manner within one object, or between a number of objects with such repetition in a form of shape, density, distribution, linkages, connection or orientation. (Mackaness and Edwards, 2002) these occur among the same kind of object, or different kind of objects or within an object, or between objects that are repeated with sufficient regularity, such repeated properties may be shape, orientation, connectedness, density or distribution and the frequency of such pattern enables development of prototypical views of geographical processes.

Further more, (Zacks and Tverskey, 2001) examined the idea of events as objects and argued that patterns themselves are object bounded in space, organized hierarchically and recognizable by a set of distinctive qualities. The qualities can be emphasized through the process of abstraction and symbolization, viewing pattern patterns as complexes of primitive objectives and relationship between the primitives giving shape, extent, orientation, density, topology and configuration as their intrinsic properties.

In explaining pattern of property values, (Lean and Goodal, 1966) opined that the centre of an urban area is the position of greatest accessibility where transport route system coverage. Competition between firns whose revenue is high when in such a position will force up rents and land values above those in the remainder of the urban area. Firms will compete to locate in the centre to take te advantage of complementarity, which to large extent, is a function of accessibility. The large the urban area the more distinct will be the clusters of complementary uses becomes. Similarly, the higher the land value in the centre is likely to be.

2.2.2.4 Land Market

According to (FOA, 2003) land market is seen as a mechanism through which people acquire or transfer land use and land rights. But according to (Dowll, 1991 cited in Owei, 2007) land market is a mechanism by which seekers of land for various uses can acquire it for its development into the required uses. According to (Kironde, 2000) a land market is a mechanism through which those seeking for land , and those owing or controlling are brought into transaction in order to affect access to land by the land seekers. Like in most economic transactions, economic forces of demand and supply.

The study of (Kironde, 2000) observed that rapid urbanization on African continent has generally been accompanied by a failure on the part of public authorities to provide sufficient land to meet the needs of burgeoning population. (Kironde (op. cit.) and Ikejiofor, 2005) further added that in many Sub-Saharan Countries government and agencies that were expected to be primary suppliers of urban land have proved to be largely ineffective, Consequently, two types of land market emerged in most African cities, these are formal and informal markets (UN – Habitatat and Land Mark, 2010, Bello, 2011; Gordon, Nell and Batoldi, 2007). The formal land market is that in which transactions are based on a well - defined legal framework and land deals entered are officially registered in the government's system. While the informal land market on the other hand, transactions are based largely on a gentleman's agreement and trust with very little written documentation involved.

According to (Farvacque and McAuslan, 1991) are expected to determine price of urban land. And demand is usually for construction of buildings and their appurtenances. This demand is usually affected by things like household income, capacity for saving, access to credit and the number of people who want to keep lans as investment. Supply on the other hand is affected by spatial pattern of infrastructure, topology, willingness of land owners to make land available on the market , and government restrictions on the use of land , such as through zoning.

According to (FOA, 2003) there are two (2) different types of economic approach to determine land value. The first is to provide a basis for market – driven allocations and prices. The second is pricing by central authourity to recover costs of services. Market allocations require two specific intitial conditions: secure property rifghts and low transaction costs. First land users must have some form of certain right to land. In many instances, tese are usufruct rights. That is, although the 'state' is the ultimate owner of the land individual s or groups have the legal entitlement to use land. Secondlty, these usufruct rights must be tradable in some form for markets to develop. Wether or not the state is able to recoup income from the rights is generally irrelevant to te efficient use of resources.

2.3 Theoretical Considerations

The urbanization process can be said to be transformation of landscapes, characterized by rural life style into urban landscapes and determines lateral and structural changes that result into a new landscape pattern. According to (Rimal, 2011) urbanization is an increased system of modernization process which modifies the socio-economic activities and revolutionizes the land use pattern in accordance with time frame. Also (Modeca *et. al*, 2012) define urbanization as a complex diffusion process, that result into dramatic spreading and variously affecting rural landscape at varying spatial scales.

A number of theories have been proposed for a long time on which they have blended into and intersect with theories that also pertain to cities, industrialization, and more recently, globalizations, these are:

2.3.1 Theory on Self-generated or Endogenous Urbanization

This theory suggests that urbanization requires two separate prerequisites, namely the generation of surplus product that sustain people in non-agricultural communities to be socially viable and stable (Peng, Chen, Cheng, 2009). From a long temporal perspective, these changes took place simultaneously in the Neolithic period when the first cities emerged in the Middle East. A much later period in which these two preconditions interacted strongly was the late eighteenth century when the rise of industrial capitalism led to the emergence of urban societies in Great Britain, North-WestEurope and North America (Peng, Chen Cheng, 2009).

In a demographic sense, this theory focuses on the rural-urban population shift as the foundation of urbanization but it identifies industrialization as the basic driver behind the movement of rural population to urban areas for factory jobs. The historical evidence undoubtedly bears this out. Before the industrial Revolution in Great Britain, no society could be described as urban or urbanized (Peng, Chen, Cheng, 2009). All countries, primarily in the West, that began to industrialize rapidly after Great Britain became highly urbanized by the mid-twentieth century, which was followed by the accelerated

industrialization and then urbanization in the rest of the world through the last century and into the present (Peng, Chen and Cheng, 2009).

2.3.2 Modernization Theory

Modernization theory focus on the evaluation of development factors mainly on such interconnected elements as level of materials, production and consumption and associated technical,cultural as well as political transformation of pre-modern societies.This Modernization theory on urbanization actually emerged from a broader theoretical school known as the modernization theory that became prevalent and influential from the 1950s through the 1970s. While overlapping with the first theory in the timing of development, modernization theory had a wider set of assumption and scope of influence. (So, 1990). Looking at urbanization through the lens of modernization, first, the present state of urbanization in a given society is set by its initial state at the onset of modernization. Secondly, technology is fundamentally more important than a society's social organization in shaping urbanization. Finally, the path and pattern of urbanization within and between developed and developing countries are most likely to converge through cultural diffusion, despite breeding inevitable social disequilibria (Kasarda and Crenshaw, 1991).

The intellectual underpinning of modernization view on urbanization in developing countries could be traced to an even earlier theoretical paradigm, namely, human ecology. While developed to describe the structure and evolution of American city, primarily Chicago in the 1920s-1930s by Robert Park and others, human ecology is based on strong assumptions about the interactive role of population dynamics, market competition, material technology (e.g. transport infrastructure), and the built environment in making and remaking urban life (Orum and Chen, 2003). These assumptions became the predictive elements in how modernization theory would view subsequence developing-urbanization as being driven by industrialization, technological progress, information penetration and cultural diffusion. This optimistic prospective view was very developmental in heralding the more positive outcomes of accelerated urbanization in the developing world, but only to be challenged by more depressing reality of economic and spatial inequalities, as well as other social problems from urbanization in poor countries (Smith, 1996). As modernization theory fails to account for both the conditions and consequences of urbanization in developing counties, it opened the door to a compelling theoretical alternative; the dependency/world-system perspective on urbanization.

2.3.3 Dependency/World-System Theory

Dependency/world-system theory links changes in the roles and organizations of economies of developing countries to the growth and extension of capitalism world system. From this world system perspective, urbanization can be seen as an internal location response to global economy. First, dependency theorist assume that a uniquely capitalist development pattern exists, asserting that capitalism is a unique form of social organization. Second, capitalism requires a certain social structure, which is characterized by unequal exchange, uneven development, individual social inequality, core-periphery hierarchies, and dominance structure. Finally, dependency theory models social organization, technology and population dynamics as endogenous factors in development and urbanization that are constrained by exogenous forces (Timberlake, 1987). The spread of capitalism to and its entrenchment in the developing world is the most recent stage in the development of capitalism as a world economic system. It is a result of changes in the ways in which wealth is accumulated and the evolution of the world system of nations. Dependency theory also suggests that underdevelopment is a result of the

plunder and exploitation of peripheral economies by economic and political groups in the core areas (Peng, Chen and Cheng, 2009).

View from the dependency/world-system perspective, urbanization in developing countries, to the extent it occurs and at what speed, is a major spatial outcome of global capitalism and its own spatial organization. This is an inherently uneven process leading to geographic disparities between urban and rural areas and between cities, particularly if taking into account the unequal condition at the start of urbanization. Empirical studies, whether explicit from this theoretical perspective or not, have borne out the serious undesirable consequences of rapid urbanization in developing countries as rural-urban imbalance, lopsided city hierarchy, housing segregation, and income inequality both within and across nation (Chen and Parish, 1996); (Findley, 1993); (Smith, 1996). Besides challenging directly, the basic assumptions and predictions of modernization theory for urbanization, the dependency/world-system theory goes a long way in accentuating the external and often negative impact of the capitalist global economy on domestic urbanization in the developing countries. This powerful insight from the 1970s laid the ground work for a more systematic global perspective on urbanization, especially on the rise of networked world or global cities in the 1990s and beyond.

As the debate between modernization and dependency/world-system theories on urbanization continued from the 1970s into the 1980s, world-wide urbanization itself began to take on the striking feature of a growing number of megacities becoming functionally influential and structurally linked. This prompted geographer John Friedmann to advance a research agenda for world cities in the early-mid 1980s (Friedmann, 1986), suggesting that world cities are a small number of massive urban region at the apex of the global urban hierarchy that exercise worldwide control over production and market expansion. With their global control directly reflected in the structure of their production sector and employment, world cities also are major sites for the concentration and accumulation of international capital. The new focus on world cities marked a theoretical extension from the world-system perspective by highlighting the study of individual or a network of cities for the understanding broader urbanization trends and tendencies.

The globalization of urbanization theories did not stop there, (Sassen, 1991), brought definitive touch to the study of global city through a sharp conceptualization and a systematic comparison, three of such cities. According to Sassen, global cities function as; highly concentrated command points in the organization of the world economy; key locations for finance and specialized services, which have replace manufacturing as the leading industries; innovative sites of production in these leading industry (Chen, 2009).One major weakness of the global city perspective may be that its theorizing and analysis are based primarily on a few dominant and heavily studied cities in Western industrialized countries (rum and Chen, 2003).

2.3.4 The CBD and Sub-centres

According to (Murphy,1971) a Central Business District (CBD) is also known as downtown, a central commercial district, retail business section, downtown business district, or central area. Amongst the many features a CBD, according to Murphy, include the following: (i) it is central, at least in terms of accessibility, (ii) it has a greatb concerntration of tall buildings than anty other region of the city's offices and largest retail stores, (iii) it is the area where vehicular and pedestrian traffic are likely to be most concerntrated, (iv) it averages higher assessed land vaves and taxes paid than any other part of

the city, and (v) it draws its business from the whole urban area and from all ethnic groups and classes of people.

One should, however, not have the impression that Central Business Districts (CBD) typically displays a high degree of uniformity. It is true that retail business and office uses predominate and give the district its primary character, but there are marked variations in the concerntration these activities within the CBD. From the point or area of maximum business activity and land values, there is, ordinary an uneven gradation outward towards an indefinite boundary. The edge of the district is more a zone than a line, and the fact that every Central Business Districts (CBD) boundary is conceptual rather than real adds to difficulties of CBD research (Murphy,1971).

It has also been noted that the central place theory applies on different scale i.e. there is a hierarchy of retail areas within cities, so that CBD is only one of the central places recognizable in an urban area. Thus, in the middle 1930s (Malcom Proundfoot cited in Murphy, 1971) published a classification of retail structure of the city that has five grades – CBD, outlying business centre, principal business thoroughfare, neighbourhood business street, and isolated store cluster. Smilarly, Hans Carol has applied the central place hierarchy idea to the city of Zurich, Switzerland. He distinguished four levels, viz: local business district (considered the lowest order), neighbourhood business district (low order), regional business district (middle order) and the CBD (high order).In addition, the work by (Onokerhoraye, 1982) has noted that a detailed examination of the functional and physical characteristics of identified commercial centres suggested that there were three distinctive types, thus: the neighbourhood centres, which were emerging in the various residential districts, the principal thoroughfares, with concerntrations of retail activities and finally the central business districts, which was the major commercial nucleation in the town.

The central place theory, in a way, enhance our understanding of city commercial structure by enlarging the foundations provided by the concernttric zone, sector, and multiple nuclei theories. Again, since several studies have highlighted the effect of CBD on land value, it is to be assumed that residential property value would also be influenced by other subsidiary business districts, such as the sub-centres or CBDs. This is a key issue that this current research was set to determine.

2.3.5 Urban Rent Theory

This theory is als known as the urban structure approach to land price, and it has been the dominant in the philosophy of land value behavior. The work of (Wingo, 963 and Aloson, 1964) have dwelled so much on this issue. They treated differences in location by varying the price which consumer s are prepared to pay for the product of the land. This approach concerntrate on one major factor as the determinant of land price, which is accessibility to the CBD or city. (Aloson, 1964) also used transportation costs as the main variable to explain urban land values for different land uses using a simplified city, he built up a bid – rent function model. The bid rent theory is a geographical economic theory that refers to how the price and demand for real estate change as the distance from Central Business District increases. It states that the different land users will compete with one another for land close to the city centre. The well – known geographical economic theory in real estate circles known as the bid – rent theory, which is dates back many decades – it was derived from a Recardian theory on the most productive agricultural land. In the simplest term, the original theory and bid- rent curves implied that prices and demand for property was highest within the concentric ring located closest to the Central Business Districts (CBD) and decreased the further away from that central point

you travelled. Location theories holds that centrally located land is commonly worth move as retailers aim to maximize profitability and therefore will ‘‘bid’’ more for land close to the city. Land on outer is often deemed to be more viable for industriak use and demand is lower. Meanwhile, as different land uses compete, residents (so the theory went) were also prepared to pay the highest rent for land close to the Central Business District (CBD) where work and entertainment was traditionally located. For instance, Austrilia’s major capital cities were located on water and therefore the ring would not spread uniformly outwards from the centre of the city, even if the bid – rent theory held completely true.

All else being equal, therefore prices could be highest in the inner city and gradually recede the further from that middle ring suburbs and the outer locations. High prices central locations also encourages a higher density of buildings compared to the lower density, more sparsely populated location further from the city’s centre. Over time, it should be expected that improved transportation links can increase demand from higher income earners further from the centre of the city , in particular increasing demand in the well – located middle ring suburbs. Despite the obvious limitations, is some reasonably sound logic behind the bid – rent theory, for one thing, simple geometry shows that when looking at concentric ring (or something approximately there to) there must be far less land in the inner zone. Correspondingly, there is a significant greater supply land available to be developed in the outer.

The study of Ameyah (ibid), also focasted that rent would become higher and higher but in different magnitudes, depending on location. The study also revealed that 49% of households lived in single room apartments, while 29% lived in one room bedroom apartment or what is called ‘chamber and hall’ in Ghana (or what is some times called ‘room and parlor’ in Nigeria). This was linked to poverty, as many could not afford apartments with more rooms whih cost a lot more, Finally the study recommended, among other things, the need to formulate and enforce housing policies, provision of basic facilities should be ensured by the rent control department and new structures should meet housing standards.

2.4 Literature Review

2.4.1 Major Determinants of Urban growth

Several studies been conducted to analyzed urban growth as well as its determinant factors (such as Ujoh, Kwabe, and Ifatimehin, 2011) analysed urban expansion and vegetal cover loss in and around Abuja with the use of Landsat imageries between 1987 and 2006. The study showed that while built-up area increased, vegetation cover decreased at an alarming rate. Using population figures of the study area for 1987, 2001 and 2006, the Land Consumption Rate (LCR) and Land Absorption Coefficient (LAC) were determined. Increasing population and expansion in the Federal Capital City (FCC) resulted in land degradation including loss of vegetal cover, indiscriminate waste disposal, contamination of surface water. This will go a long way in achieving objejective one in such a way that increase in population will invariably leads to the demand for shelter which will signifies urban landuse expansion.

Others include: (Adebayo, 2009) also determined the impact of urban land use change on property values in metropolitan Lagos. A set of questionnaire was randomly distributed to estate surveyors and valuers. Eventually, it revealed that factors of demand and supply were the major influences on land use in the area, and among the major changes was the conversion of Victoria Island

from residential to commercial uses. Consequently, the increase in demand and supply for commercial use in turn brought problems such as traffic congestions and overstretching of infrastructural facilities.

Study of (Olaleye, 2012) investigated landuse changes between 1965 and 2003 in the northern part of Kaduna metropolis using Remote Sensing (RS) and Geographic Information System (GIS) techniques. Air-photos of 1965, 1977 and 1992 were used. The air photos were of different scales but the use of the "dot grid" method helped to consistently identify, sample and estimate proportions of each air photo year mosaic that had specific landuse types model by model. Landuse changes between 1992 photo-year and 2003 were obtained through digital mapping techniques using Global Positioning System instrumentation (GPS) "Magellan 315". The results of the study showed that between 1965 and 1977, and 1992 landuses changed from rural features to those of urban development indices and very rapidly. Urban residential landuses for example leaped from 62.5ha in 1965 to 202has in 1977 to 392has, and from 1992 to 507ha in 2003. Similarly staggering rises were observed in government owned institutional lands and commercial services landuses. The rises were rapid and higher between 1992 photo year and the digital mapping of year 2003 than any previous successive photo years and ranged from 84% for urban road/highway development; for residential it was 122% to 268% for commercial services. The trend was clearly from rural to urban landuse development. However, the increases were complex 72 and confused with ever threatening risks of high magnitude disaster on the leading edge of urban landuse.

Other studies include that of (Adepoju, Millington, and Tansey, 2006) who examined the land use/land cover change detection in Metropolitan Lagos (Nigeria): 1984 -2002 using Remote Sensing & GIS. The result of the study showed that, forest, low density residential and agricultural land uses were mostly threatened: most land allocated for these uses were legally or illegally converted to other land uses within and outside the metropolis. The urban/build-up had 35.5% increases, bare soil nearly doubled its size with 96.3% increases from the initial area coverage in 1984. There was an increase of 1.6% in water bodies which was attributed due to sensor difference or canalization project in the study and there was 57.8% decrease in the forest and agriculture land cover.

2.4.2 Spatial Pattern of the Residential Property Value

A number of empirical studies have been conducted to determine the spatial and temporal pattern of land value . The study of (Dung- Gowom and Rikko, 2006) tried to determined the spatio – tempral pattern of land values in peri – urban area of Jos , Plateau state. It used a questionnaitre survey, field observation, measurements as well as interviews and the data so collected were analyzed using descriptive statistics and diagrams. The result shows that there was a continous increase in land value through the years of study in all the sampled areas, from 1990 to 2005. The area called Rayfield had the highest land value with ₦110 per square metre in 1990, but increased to ₦ 763.60 in 2005, while the lowest land value was recorded in Fudawa with ₦ 30 per square metre at the beginning of the period of study and ₦40 square metre at the end. The factor identified as being the presence of medium and high income earners as well as retired senior military officers etc, as well as good security due to the presence of government house, the official residence of the state governor in the area.

Also (Ameyah, 2013) examine the factors determining residential rental values in Accra, Ghana. Three different localities in the city were compared and 100 hundred household were selected proportional to the population. Transect walk was undertaken and interview method was used. ANOVA was performed to determine the existence of a significant difference in mean rental price across the

three locations. Thte result show that East Legon, which is sparsely populated and largely occupied by high income earners group, had a rental charge that was approximately three times that of Chokor, which is densely populated and occupied by low income earners. The result of ANOVA showed that location significantly affect rental price. And that such prices are positively skewed; meaning that majority of rents are on the increasing side.

2.4.3 Effect of Urban growth on Residential Property Value

Several studies have been conducted to determine the effects of infrastructure provision and land use on land value. The work by (Adebayo, 2006) is one of them, essentially on effect of urban infrastrure on property values in Lagos. Data collected through a questionnaire survey was analyzed using descriptive statistics. Results of the study revealed that the presence of essential infrastructural facilities and services was a major determinant of property value, and that property values tend to peak in those areas that enjoys easy accessibility (through road network, electricity, pipe – borne water and efficient drainage. (Li, 2011) have also confirmed the importance of infrastructure and services in influencing land value in Freetown, Sierra Leone. Likewise, (Amenyah, 2013) has noted the role of amenities in determining rental values in Accra, Ghana.While stable power supply from NESCO was one of the factor s that help to explain land value variation in Jos, as explain by (Rikko and Dund-Gwom, 2006).

Also (Oyebanji, 2003) reported that a number of factors affect property values in Nigeria. These include population change, also in agreement with (Kabba and Li, 2011). Change in fashion and taste, institutional factors (culture, religious belief and legislation), economic factors location, complementary uses, transportation and planning control. Other factors identified by (Sada, 1968) include the effects of political factors on geography of the study area, nothing that the emergence of Lagos as a liveably city was as a result of political decision that made it a capital city in 1914. Further more, (Amenyah, 2013) has noted that the main factors responsible for the pattern of rental value are closeness to work places, security (or a good security due to the presence Government house) and location.

A study of (Cloete and Chikafalimani, 2001) on property industry in Malawi was in agreement with (Stratton, 2008) which identified eight factors that affect property value, which are architectural design, quality of finishing, maintenance of the property, size of the property, security, condition of the street, and location. (Hendon, 1971) studied the effect of a park on property value and found that the park had stabilizing influence on residential property values, especially among high – valued residential properties, and lower with less valued ones. The study of (Uju and Iyanda, 2012) has noted that time of land purchase was most important in Onotsha. On other words, an increase in the number of years when land is purchased would result in a decline in land value by 0.39%. Then, historical background of the Rayfield area in Jos as a neighbourhood for white miners was identified as one of factors for the high land value recorded (Rikko and Dung-Gowon, 2006).

2.4.4 Trend of the Residential Property Values Over Time

Cities world – wide are experiencing rapid growth (Liu, Zhan and Deng, 2005) identified demography and economies as the most important driving factors for urban expansion on the whole, urban built – up areas in the world consumed about 400,000 square kilometres in the year 2000 (about 0.3% of the total land area of the globe). This is projected to reach 1,100,000 (about 0.85% of the total land area of the globe) by 2030 if the same growth rate is maintained (Angel, *et.al*, 2005). According to

Angel, et.al cities in the less developed countries would account for more of this growth. For instance, the built – up environment in Kaduna city was reported to be expanding at the rate of about 167.hectares annually between 1990 and 2000 (Ishaya, Ifatimehin and Okafor, 2008) such rapid urban expansion could lead to uncoordinated growth and consequently environmental problems may occur if proper planning and monitoring strategies are not adopted tto control the growth.

Further more, (Ade and Afolabi, 2013) monitored urban sprawl in the Federal Capital Territory of Nigeria Using Remote Sensing and GIS Techniques. Multi-date Satellite images of 1987, 1999 and 2007 (Landsat TM, Landsat ETM+ and Nigeria sat -1 were acquired National Space Research and Development Agency (NASRDA), Abuja and were used in analysing the physical expansion of the city over time. Using supervised classification algorithm, the images were classified into built up, rock-outcrop, vegetation and water bodies and used to carry out change detection or time series analysis. The result showed that the built-up area increased from 8% in 1987 to 22% in 2007, rock-outcrop decreased from 74% to 37%, vegetation decreased from 40% to 17%, while the area occupied by water body has remained constant overtime. Also projection was done for population in the next nine (9) years and 1,925,464.089 figures which are about 37% is expected. To support this increase in population and physical growth rate observed, constant monitoring of the urban growth is required to be sustained by anthropogenic activities.

Also (Bisong, 2007) examine the process of land use conversion and rate in common and public lands in South-Eastern Nigeria between 1972 and 2001, the result showed that deforestation was higher in publicly controlled lands than in communal lands. Agricultural land use characteristics, such as farm types and the nature of croplands/fallows, correlated strongly and significantly with deforestation rates. Similarly, (Idoko, Bisong, Bisong and Okon, 2008) analyzed satellite imageries of 1987 and 2004 for the Federal Capital Territory, Abuja for land use change. The imageries were characterized into five classes using maximum likelihood algorithm. The classes were vegetation, built-up, rock outcrop, water body and farm land. The two classified imageries were compared to identify any changes. Also, a spatio-temporal change in land use type was obtained in quantitative terms. The analysis revealed that vegetation cover reduced by 85.22 per cent between 1987 and 2004. Again, the built-up area increased by 21.99 per cent and farm land increased by 0.14 per cent.

2.4.5 Knowledge Gaps Identified in the Literature

From the studies accessible to the researcher and reviewed above, it is evident that: Previous studies considered either Spatial pattern of urban residential land value, Factors influencing urban land values, spatio- temporal pattern of land values and dynamics of global urban expansion. The present study analyzed the effect of urban expansion on residential property value. This, it is believed, will enable us to compare the emergent levels of urban expansion across the various land uses as well as its consequential effect to residential property value.

2.5 Factors of Urban Growth

Urban growth refers to an increase in the absolute size of a country or region's urban population (UN- Habitat, 2006). According to (Mathew, 2010) Urban growth refers to the relative or absolute increase in number of people who live in towns and cities. The term urban growth is often confused in both academic and policy cycle, but it is important to recognize the difference between them. What constitutes an '' urban'' area is conceptually ambiguous. Broadly speaking, urban settlement are

defined as demographically large, relatively densely populated, built- up areas. In practice countries classify settlements for enumeration purposes using a variety of criteria. The pace of urban population growth depends on the natural increase of urban population and population gained by urban areas through both net rural – urban migration and the reclassification of rural settlement into cities and towns (Mathew, 2010), and urbanization and city growth are caused by factors such as rural – urban migration, natural population increase and annexation (Mathew, 2010).

2.5.1 Population of the Study Area

According to the 2006 census, Chikun L.G.A. has a population of 255,562 and was projected to 568,763 in 2016 (NPC, 2006). Multiple ethnic groups, major among who are Hausa, Fulani Gbagyi, Kadara, Ikulu and Nimzom.There are two components of urban population growth: natural growth of urban population, rural-urban migration, the reclassification of areas previously defined as rural. natural increase provides a base for urban population growth rates, and rural-urban migration and reclassification supplement this growth. Any how the natural increase of the population in the city often declines sharply together with the urbanization process that has happened (Stutz and Desouza,1998).

2.5.2 Economic Dynamics

Economically, it is important to point out that opportunities facing the people of Chikun Local Government Area has been determine by its agricultural economic base. (Field work, 2016). Expansion of economic base (such as higher per capita income, increase in number of working persons) creates demand for new housing or more housing space for individuals (Boyce, 1963; Giuliano,1989; Bhatta, 2009). This also encourages many developers for rapid construction of new houses. Rapid development of housing and other urban infrastructure often produces a variety of discontinuous uncorrelated developments. Rapid development is also blamed on lack of time for proper planning and coordination among developers, governments and proponents.

Establishment of new industries in countryside increases impervious surfaces rapidly. Industry requires providing housing facilities to its workers in a large area that generally becomes larger than the industry itself. The transition process from agricultural to industrial employment demands more urban housing. Single-storey, low-density industrial parks surrounded by large parking lots are one of the main reasons of sprawl. There is no reason why light industrial and commercial land-uses cannot grow up instead of out, by adding more storeys instead of more hectares. Perhaps, industrial sprawl has happened because land at the urban edge is cheaper (Bhatta, 2010).

The differences in standard of living are major issues when considering factors that encourage urbanization. Higher living standards and higher salaries in the city attract people to move to the cities. As long as the income gap between rural and urban areas is big, people tend to move to the cities. Economic factors and employment are the main reasons for migration. Sometimes the employment in rural areas is non-existing. In these cases moving to the city, even for very low salaries, is more profitable than staying in the countryside (Sajor, 2001); (Brookfield and Byron, 1993). Political and social factors are also better in the urban areas and they are one reason for migration. In the city, health care and social relations are much easier to organize which makes the inhabitants feeling more secure. In the city people can easily have their voices heard by joining different political or pressure groups and by this poor people can require better living standards and services (Bhatta, 2010).

2.5.3 Environmental Quality

The importance of environmental quality to the socio-economic activities of man cannot be overstated. Little wonder that a number of studies have found that environmental quality also influences the value of properties. In a study by (Bello and Ajayi, 2010) the effect of waste dump sites on land value in parts of Lagos metropolis was examined. Data were collected from a sample of occupiers of residential properties within 1000 metres to waste dumpsites and for comparative analysis, some samples were also taken from a neighbourhood not close to waste dumpsite. Using what is called "Relative Satisfaction Index" (RSI), ANOVA and correlation coefficient, it was found that RSI of the areas close 47 to the dump sites was rather low. In other words, the closer the property to the dump sites, the lower the satisfaction derived. The correlation results show that there is a weak linear relationship between rental value and the satisfaction of occupants in the area. This weak relationship, which is contrary to expectations, was attributed to the situation where demand was higher than supply. In such situations, there are tendencies that occupiers may not get value for their money, since it is a sellers" market – so the "beggar" may therefore, have no choice. The study, therefore, recommended that planning authorities should strictly enforce regulations concerning building line setback so that people should not build close to certain areas; and that investors should avoid business in properties close to waste dumpsites.

Study of (Kakulu, 2007) attempted a study on the observed distortion of land value trend in the oil rich Niger Delta area of Nigeria. Results show that the land value pattern exhibited by different communities was based on their proximity to the oil well locations and processing plant. Consequently, land values around communities close to the flow station generally exhibited the lowest values. In addition, (Oni, 2009) observed that where a building is located will determine how easy it will be to attract customers or how easy it will be for employees to get to work. Buildings within city limits are more valuable than those outside the city and those

closer to the center of town and major roadways are worth more than those on small or obscure side streets. The neighbourhood within which such buildings are located also determines the value and profitability of the real estate. Potential income of an office space is another factor. An investor will calculate the amount of money that a property is likely to bring each month from renting the property. This is an important part of the commercial property analysis.

Others include; the biggest environmental pressure for rural people is the lack of profitable land. The land inherited from the parents is divided among children. At last the land per farmer becomes so small that it is unprofitable to farm. On the other hand, erosion and land deterioration makes farming even more difficult. Even when poor farmers have enough land space they can not always afford and compete for non water resources or fertilizers. Water is sometimes much polluted and regulations forbid the use of that kind of water because of food contamination. This gives no opportunity to the poor farmers. They can either continue farming with contaminated water and get caught with the contamination of crops or try to find some other livelihood. This is the problem in lower basins of many rivers in developing countries (Sajor, 2001). Water shortage increases social inequality. Poor farmers cannot sink boreholes to the necessary depths to extract water. Wealthier farmers can benefit by moving inland to buy up more land or water. The only way to survive for these poor farmers is to move to cities to find some non agricultural livelihood (UNEP, 1999).

Transportation routes open the access of city to the countryside and responsible for linear branch development. The construction of expressways and highways cause both congestion in the city and rapid outgrowth (Harvey and Clarke, 1965). Important to realize that transportation facilities are essential to cities and its neighborhoods. Development of urban economy and thereby job opportunities are directly dependent on the transportation facilities. Therefore, transportation facilities can never be suppressed; rather, initiatives to impede linear branch development by means of government policies and regulations should be practiced.

2.5.4 Challenges of Urban growth

Urban growth, only in the United States, is predicted to consume 7 million acres of farmland, 7 million acres of environmentally sensitive land, and 5 million acres of other lands during the period 2000–2025 (Burchell, Downs, McCann and Mukherji, 2005). This case is enough to visualize the world scenario.

Provincial tax and land-use policies combine to create financial pressures that propel farmers to sell land to speculators. Low prices of farm commodity in global markets often mean it is far more profitable in the long term for farmers to sell their land than to continue farming it. In addition, thousands of relatively small parcels of farmland are being severed off to create rural residential development. Collectively, these small lots contribute to the loss of hundreds of hectares of productive agricultural land per year.

The loss of agricultural land to urban sprawl means not only the loss of fresh local food sources but also the loss of habitat and species diversity, since farms include plant and animal habitat in woodlots

and hedgerows. The presence of farms on the rural landscape provides benefits such as green space, rural economic stability, and preservation of the traditional rural lifestyle.

2.6 GIS and Remote Sensing Techniques in Urban Studies

One of the most important paradigms in Geography and related disciplines that manage or use spatial data, associated with methodological changes is the advancement in satellite Remote Sensing and Computer aided Geographical Information System and the availability of satellite imageries. Remote sensing technology has been the subject of research in a variety of contexts and situations and has been successfully introduced as sole, complementary or corroborative source of data for many applications (Batty, 2000).

Remote Sensing technology has great potential for acquisition of detailed and accurate land use information for management and planning of urban regions. However, the determination of land use data with high geometric and thematic accuracy is generally limited by the availability of adequate Remote Sensing data in terms of spatial and temporal resolution and digital image analysis techniques (Herold *et. al.,*2005). The technique of Remote Sensing provides a powerful tool for studying urban issues, like land use/cover changes, urban growth modelling, urban sprawl etc. Remote Sensing image classification is one of the important application aspects for Remote Sensing technique, through computer processing with specific software, like ERDAS Imaging 9.2, the results of the classification of land use can be auto-patted (Li, Feng, 2009), and for decades the visual interpretation of aerial photography of urban area has been based on the hierarchical relationships of basic image elements.

The spatial arrangement and configuration of the basic elements were combined to give higher order interpretation of features, that are significant for urban areas and urban land use (Bowden, 1975). The great strength of Remote Sensing is that it can provide spatially consistent data sets that cover large areas with both high detail and high temporal frequency, including historical time series. Mapping of urban areas has been accomplished at different spatial scales e.g. with different spatial resolutions, varying coverage or extent of mapping area and varying definitions of thematic mapping objects (Herold *et. al.*, 2005). Global and regional scale studies are often focused on mapping just the extent of urban areas (Schneider *et. al* ,2008). One of the basic difficulties of mapping urban area from remotely sensed data is that of indistinct demarcation between urban and rural areas on the edge of the city. Remote Sensing provides additional information that more closely respects the actual physical extent of a city extent. But still remains problematic and individual studies must determine its own rules for differentiating urban from rural land (Clarke *et. al,* 1998).

CHAPTER THREE
STUDY AREA AND METHODOLOGY

3.1 The Study Area

3.1.1 Location and Size

The area under investigation is geographically located between Latitudes 10^0 0' 0"N and 10^0 50' 0N" of the Equator and between Longitudes 6^0 40' 0"E and 7^0 40' 0" East of the Greenwich Meridian. It is bounded to the north by Birnin-Gwari and Igabi L.GA, to the east by Kajuru L.G.A., in the west and southeast by Kachia L.G.A., while in the west and southwest by Niger State, (see Figure 3.1). The study area occupies land area of approximately 4,478.699 Kilometre squares (451,090.76Has) (NPC, 2006).

3.1.2 Climate

Chikun L.G.A. lies within a region which has the tropical continental climate (Aw), with distinct wet and dry seasons, the wet season occurring in the high – sun period. The rainfall is seasonal in character and about 90% of it fall between April and October, with the heaviest recorded in July and August. Further more, the climate of the area is largely control by two major air masses, namely tropical continental and tropical maritame air masses from Atlantic and the Sahara Desert respectively. The study area has a mean monthly temperature that reaches about of 29^0C in March and drops to about 23.3^0C in December with an annual mean of about 19.45^0C. The mean annual rainfall in the area is about 300mm and the length of the rainy season period is about 200 days which range from 0.0mm in November through February to 825.0mm in August, which is the wettest month, the seasonal character of rainfall in the study area has influenced the vegetation which turns evergreen during the wet season and pale brown in the dry season respectively. This determined to large extent agricultural activities in the area. (Aboh, 2009).

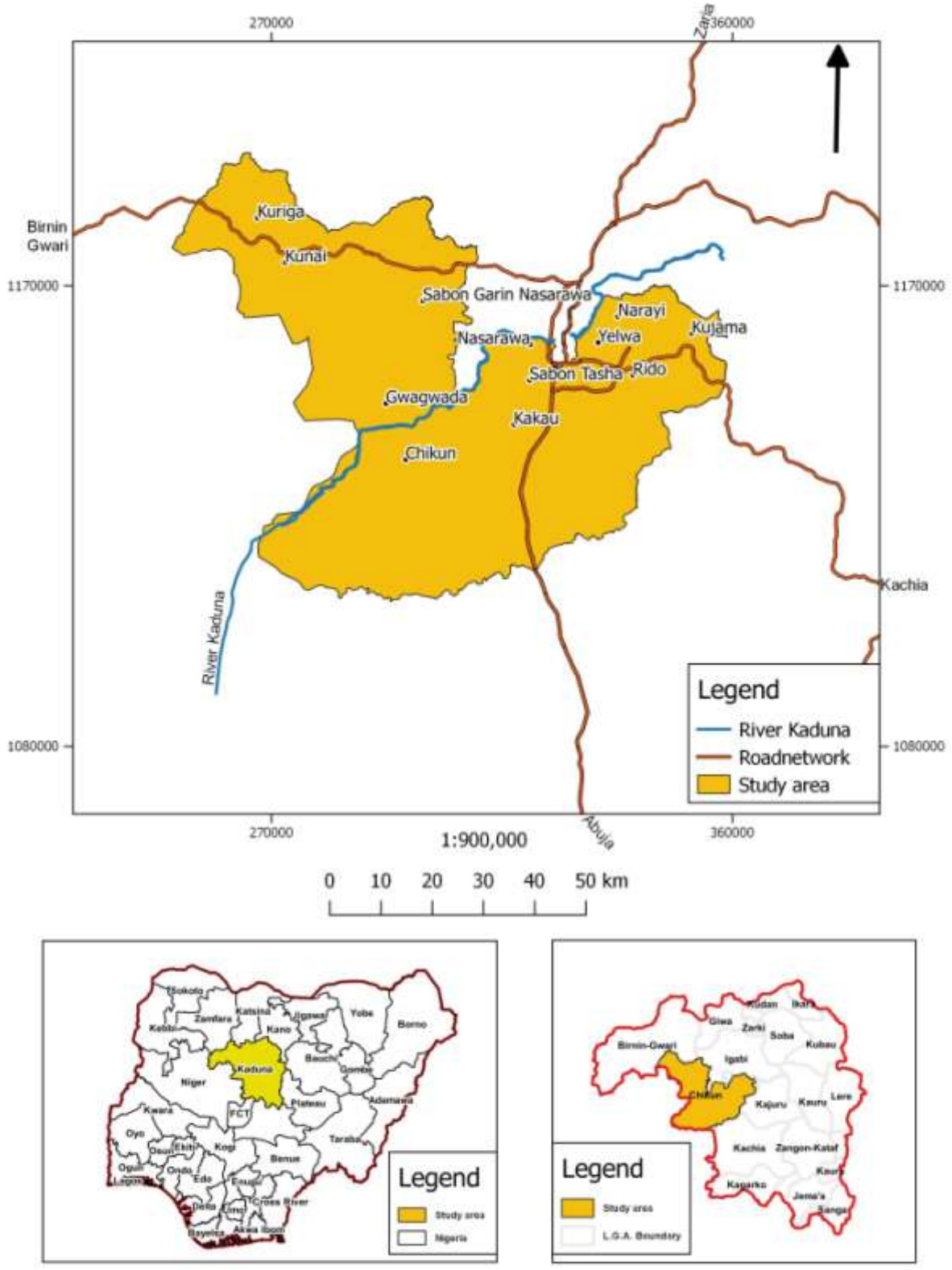


Figure 3.1 The Study Area
Source: KADGIS and Modified from the Topo Sheet 144 S.E, 144 S.W. 122 S.E and 123 S.E.

3.1.3 Soils and Vegetation

The soils in the study area have been classified according to Hoores classification scheme for Africa as tropical ferruginous soil. The soils developed under climatic regimes with appreciable but seasonal rainfall of 300-1200mm and cover nearly half of Northern Nigeria (Oguntoyinbo, 1983). The soil material consists of several feet of deposited silt sand overlaying sedimentary decomposed rock. The soil is poorly drained because of the high percentage of fine textured materials in the upper layers, which results to water logging especially during the rainy season and tends to dry out and cracks during dry season. Alluvial soil is formed along riversides (fadama). It is made up of several feet of grey white loamy coarse sand with layers of grey heavy molten occurring at varying depths within the profile. The alluvial soils are usually under intense cultivation of sugarcane and vegetables year-in year-out and as a result in farmers resort to using fertilizers to improve soil fertility.This will enhance agricultural activities like poultry production among others.

The vegetation of the study area is of the typical Guinea Savannah type which according to (Udoh,1982) has a characteristic mean annual temperature of 29^{0c} and mean annual rainfall of 300mm. Further more, the area has shrubs savannah which interspersed with orchard bush which represent a degradation of natural vegetation. Thus, the dominant species are *parkland, Isoberlina Doka, Dodoneaspp,* and grass communities consist of Hyperhenia and Andropgon species. In the city proper, the vegetation is characterized by Silk cotton, Baobab and other protected trees. However, man have greatly affected the vegetation formation in the area through his activities like; bush burning, cultivation of crops, grazing, lumbering, urbanization and industrial activities among others. The vegetation formation varies and associated with distinct ecological sites with due to the nature of the soil (Oguntoyinbo, 1983).

3.1.4 Topography of the Study Area

In terms of landforms, the dominant topographic feature is the alluvial plain of the small tributaries of River Kaduna which dot the area and streams across and up to river Kudenda and Romi on the northern flank. These alluvial plains gently rise into the consolidated lateritic hills and inselbergs formed around the Nasarawa and Kudenda (Udoh,1982).

3.1.5 Drainage Systems

The drainage network is dominant river Kaduna flowing southwest to join river Niger (Ishaya *et.al*, 2008) The main topographic feature is the alluvial plain of the small tributaries of river Kaduna which dot the area and stretches across and up to rivers Kudenda and Romi on the northern flank. These alluvial plains gently rise into the consolidated lateritic hills and inselbergs found around the Nassarawa and Kudenda village axes. The dominant River Kaduna control the course of most of the rivers and streams in this area.

Most of the water required for domestic and agricultural uses is sourced from seasonal streams and riverlets which exist in the area as well as from shallow hand-dung wells. These sources most often do not provide the needed good quality supply as they are prone to contamination by human and animals.

3.1.6 Population Growth

First it should be noted that there are four discernible types of migration flows in Nigeria: rural – rural, rural – urban, urban – rural and urban – urban migrations (Oyeniyi, 2013). More so, the foremost reason of urban growth is increase in urban population, and the rapid growth of urban areas is the result of two factors: natural increase in population which is resulted from excess of birth over deaths and migration to urban areas which can be through long- term relocation of individual, household or group to a new location outside the community of origin. In general, cities are perceived as places where one could have better life, because of better opportunities, higher salaries, better services and better lifestyles. The perceived better conditions attract poor people from rural areas. People move into urban areas mainly to seek economic opportunities.

The population of the study area is about 268,763 persons (NPC, 2006) with an estimated growth rate of 3.8% per annum. However, population of the study area comprises the following major ethnic groups; Hausa, Fulani, Gbagyi, Kadara, Ikulu and Nimzom. Field work (2016). Islam and Christianity are the major religion.

3.1.7 Economic Activities

There are a number of manufaturing industries in and around the study area (such as Nigerian National Petroleum Coorporation (NNPC), Kaduna Refinary and Petrol Chemical (KRPC), Coca-Cola plant and Indomie factory among others) as a result of this and many other development in the area, the study has found that between 1986 and 2016 the area under investigation has been transformed from mere agrarian community to rapidly growing economic base due to higher per capita income, increase in number of working persons which creates demand for new housing (Boyce, 1963: Giuliano, 1989: Bhatta, 2009). Economically, it is vey important to note that the study area is blessed with rich agricultural land, water resources, rocks and minerals, this implies that the opportunities facing the people of Chikun Local Government Area have been determined principally by its agricultural based activities. More so about 80% of the population are engaged in peasant farming for household food and other commercial purposes. Some of the main crops grown in the area include; yam, cassava, cocoayam, maize, cowpeas, guinea corn and millet. Cash crops such as cotton, ground nut and soya beans are grown in commercial quantities. (Field work, 2016). It is pertinent to note that all these attract humam population that would result to commercial and residential needs.

3.1.8 Land Use Pattern

Despite observed decreased in the total land coverage over the study periods, agriculture remains the major land use activity in the study area. Both rainfed cultivation as well as irrigation are very significant in the area. Due to developmental and other human activities agriculture in 2016 had its land area measurement increased to 2,207.8km^2 unlike in 1986 where the land occupied by agriculture was 2,086 equivalent to 47.5% and 44.5% respectively.

Residential land uses occupy the largest area, this consists of low, medium and high residential neighborhoods that fall into different Local Climatic Zones (LCZ). The major residential areas include;

Maraban-Rido, Sabon Tasha, Nassarawa, Kakau, Narayi, Kujama among others. These neighborhoods are a combination of modem and traditional categories (Ali, 2004). The road and Agricultural land uses cut across all categories of slope. However, agricultural land uses are found majorly along the route (Kaduna State Government, 2012).

3.2 Methodology

3.2.1 Reconnaissance Survey

A reconnaissance survey and physical field observation of the study area was conducted in December 2015 and January 2016 respectively. This reconnaissance visit enabled the researcher to be familiar with the study area in terms of scope, that is its extent, location of points (localities), checking and updating what is on the existing maps. It was during this reconnaissance visit that the researcher was able to plan the actual field work in terms of sampling method adopted during the field work.

3.2.2 Types of Data and Sources

The types of Data utilized are:

(a) An inventory of residential property (rental houses) identified and selected in the study area

(b) The amount paid as rental charges per annum. This includes information about the past and present situation which was used to determine trends

(c) Data on the factors determining factors of urban growth

3.2.3 Sources of data

Data for this study were collected from both primary and secondary sources.

3.2.3.1 Primary Source of Data

The primary source was through field surveys that included the administration of questionnaires, and observations. It also include; three (3) sets of satellite imageries viz: Landsat Thematic Mapper (TM) of 1986 with spatial resolution of 30m, Landsat Enhanced Thematic Mapper Plus (ETM+) of 2000 with spatial resolution of 30m and Landsat(8) images of 2016 with spatial Resolution of 30m. All these satellite imageries were obtained from United States Geological Surveys Website (USGS Website). Field observation, information from residents of rental properties and land owners were also obtained.

3.2.3.2 Secondary Source of Data

The Secondary data used for this study include; Kaduna State administrative map, Government official gazetted population figures of 1991 and 2006 from Kaduna State Geographic Information Service (KADGIS) and National Population Commission respectively. Other secondary information sources were sourced from relevant dissertations, journals, papers, textbooks and internet. Table 3.1 presents the data used and their sources.

Table 3.1 Data acquired for this study their Sources and Uses

S/N	Data Required	Sources of Data	Uses
1.	Landsat Thematic Mapper (TM) of 1986 with spatial resolution of 30m	Obtained from USGS Website	For identifying and digitizing,various clases of built- up and non built-up areas
2.	Landsat Enhanced ThematicMapperPlus (ETM+) of 2000 with spatial resolution of 30m	Obtained from USGS Website	For identifying and digitizing various clases of built- up and non built -up areas
3.	Landsat(8) images of 2016 with spatial Resolution of 30m	Obtained from USGS Website	For identifying and digitizing various clases of built- up and non built- up areas
4.	Topographic map of the study area	Obtained from KADGIS	For generating study area boundary
5.	Coordinate Points	With GPSmap76CSx	For Locations

6..	Journal,Textbooks, internet,materials, unpublished thesis etc	Geography departmental library ABU, Zaria and internets	Literature review

Source: (Adopted for the study, 2016).

3.4 Sample Size and Sampling Techniques

The study area is Chikun L.G.A. in which some part of it falls within metropolitan Kaduna, they include: Sabon Garin Nasarawa, Sabon Tasha, Nasarawa, Narayi, Rido and Yelwa.While those outside the metropolitan area are: Chikun, Gwagwada, Kakau, Kujama, Kuriga and Kunai). Furthermore, the number of selected residential property used was based on the population of the residential (rental) properties of the respective selected areas using both purposive and clustered method of selection.

. To determine the sample size (SS) for this research, Yamane (1964) method of determining sample size was adopted; which indicates that 400 copies of questionnaires were administered using the following formula:

$$SS = \frac{N}{1 + N(e)^2}$$

Where:

SS = Sample Size

N = Total population of the selected household

e = level of significance (0.05)

The projection of the population is based on the population growth rate of 2.8% NPC (2006) using Mehata (2004) method as follows:

$$Pn = Po \frac{(1 + R)^n}{100}$$

Where:

P_n = Population (Household) of the current year (i.e. 2016)

P_o = Population (Household) of the base year (i.e. 1991)

R = Growth rate 2.8%

n = Number of intermediary years (1991 - 2016) 25 years

The proportion of the respondents that was taken from each of the twelve (12) political wards is presented in Table 3.2 below:

Table 3.2 Sample Population of the Rental Houses and the Sample Size

S/N	Locality/ Political ward	Residential Property (No. Of Rental Houses)	Sample Size (Household)
1.	Chikun	26,060	40
2.	Gwagwada	10,175	17
3.	Kujama	23,395	37
4.	Kakau	10,491	16

5.	Kunai	10,364	16
	Kuriga	2,542	20
6..	Nasarawa	30,781	46
7.	Narayi	40,164	60
8.	Rido	20,164	32
9.	Sabon Garin Nasarawa	30,184	40
10.	Sabon Tasha	41,121	60
11.	Yelwa	10121	16
12.	**Total**	**255,562**	**400**

Source: (Field work Adopted for the study, 2016).

Furthermore, In selecting the respondents, purposive sampling was undertaken whereby all sub-centres that were identified and the CBD constituted the population/ Households of the localities for the study. From each of these localities, at least three (3) sampling areas, radiating in different directions, were selected for the purpose of questionnaire administration. The level of growth/ density was the criterion for the selection of the direction of the three (3) selected areas from the central point of each urban sub-centre. In other words, areas around each urban sub-centres where growth / intensity was high were deliberately selected for questionnaire administration. The total number of areas so selected were thirty six (36) that is, three (3) from each of the twelve (12) political wards that made up the study area as shown on both Table 3.3 and Figure 3.2 below:

Table 3.3 List of the Sample Areas

S/No	Political Wards	Selected Areas
1.	Chikun	Chikun, Gadani and Katarma
2.	Gwagwada	Audu Jangwam, Dutse and Kasami
3.	Kujama	Danbushiya, Danhono (I) and Kajuma
4.	Kakau	Kakau, Gayan and Tsohon Gayan
5.	Kunai	Buruku, Kasaya and Uduwa
6.	Kuriga	Unguwar Barau, Kuriga and Tashan Tsintsiya
7.	Nassarawa	Unguwar Doka Kadi, Unguwar Gabas and Nassarawa
8.	Narayi	Narayi, Bayan Dutse and Unguwar Namegero
9.	Rido	Babban Sauran, Marabar Rido and Rido Gari
10.	Sabon Garin Nassarawa	Kudenda, Sabon Garin Nassarawa and Tirkania
11.	Sabon Tasha	Unguwar Boro,Unguwar Gimbiya and Ung. Sunday
12.	Yelwa	Gbagyi Villa, Romi and Yelwa

Source: (Field work, 2016).

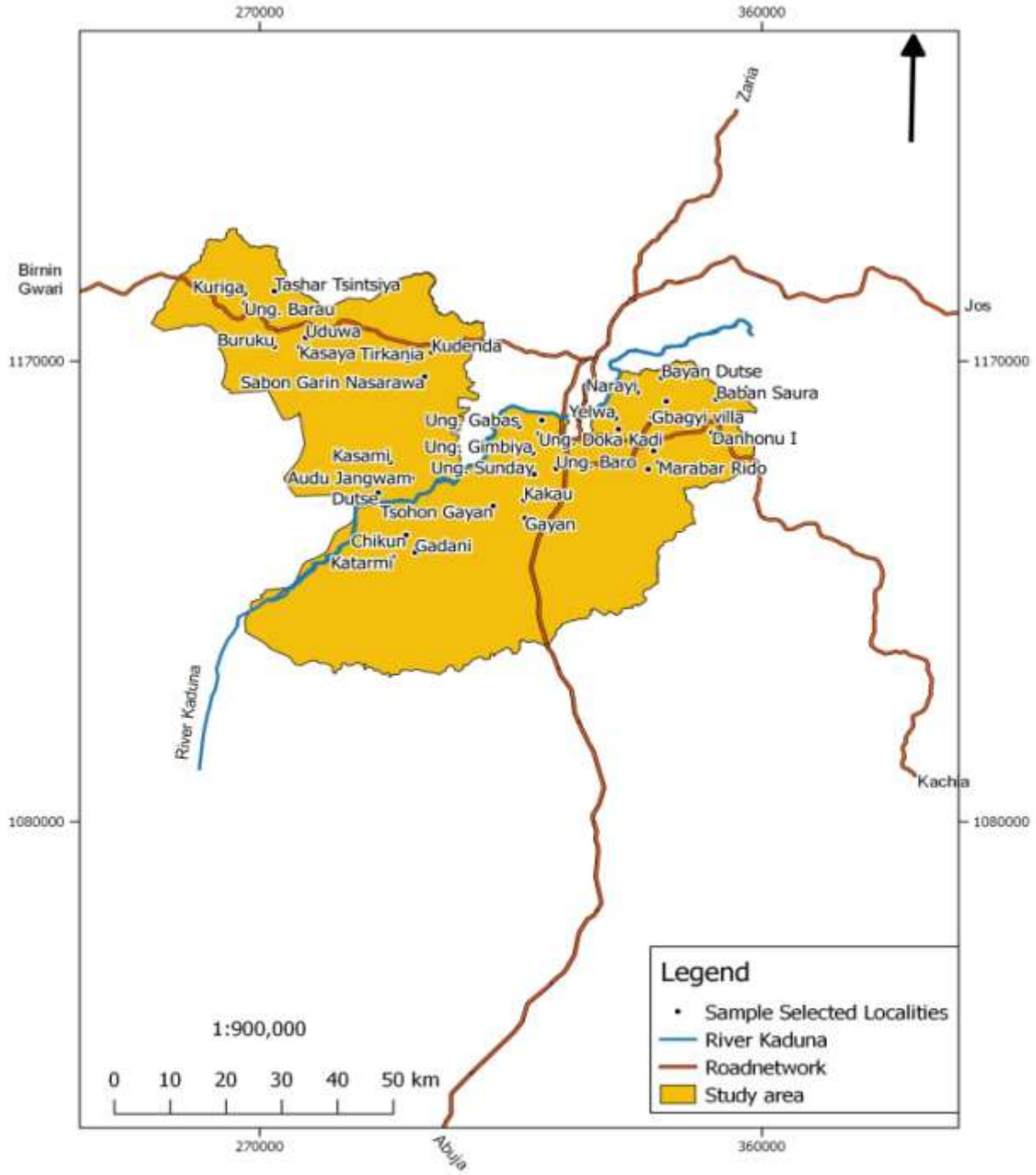


Figure: 3.3 Sample Areas for the Study Area

Source:KADGIS and Modified from the Topo Sheet 144 S.E, 144 S.W. 122 S.E and 123 S.E.

Table 3.4 List of the Number of Administered and Retrieved Questionnaires

Wards	Administered	Retrieved
Chikun	40	39
Gwagwada	17	16
Kujama	37	35
Kakau	16	16
Kunai	16	16
Kuriga	20	20
Nasarawa	46	44
Narayi	60	57
Rido	32	31
SabonGariNasarawa	40	40
Sabon Tasha	60	55
Yelwa	16	15
Total	**400**	**384**

Source: (Field work, 2016).

As indicated in Table 3.4, a total of 400 questionnaires were administered during the period of field survey which lasted for three (3) weeks out of which 384 was retrieved. The researcher was assisted by three (3) research assistants who are conversant with the area and the peoples'culture. Sixteen (16) questionnaires were not properly filled or the information supplied were of doubtful authenticity.

3.5 Data Processing

3.5.1 Image Processing of Remotely Sensed Data

Pre-processing functions involve those operations that are normally required prior to the main data analysis and extraction of information, and are generally grouped as radiometric or geometric corrections. Radiometric corrections include correcting the data for sensor irregularities and unwanted sensor or atmospheric noise, and converting the data so that they accurately represent the reflected or emitted radiation measured by the sensor. Geometric corrections include correcting for geometric distortions due to Sensor-Earth geometry variations, and conversion of the data to real world coordinates (e.g. latitude and longitude) on the Earth's surface. Since the data used were ortho-rectified, there is no need for geometric and radiometric correction to be performed on them. However, the data sets were geo-referenced or geo-coded that is, registered to a geographic coordinate system (Minna / UTM Zone 32 North).

3.5.2 Image Geo- referencing

The datasets (the three sets of satellite imageris) along with Topographic map were geo-referenced or geo-rectified (registration) to a geographic coordinate system. The images were imported into ERDAS Imagine 9.2 environment where they were rectified to a common projection (Universal Traverse Mercator). According to (Wilford, 1977), the UTM projection unlike the Geographic Coordinate System (latitude/longitude) is more reliable since its measurements are cited in linear, decimal units, rather than in angular, non-decimal units. This was done to translate the images real world coordinateto digital format so that it can be matched with other relevant and related maps that were used in this study.

Geo-referencing which involves registering data to the real world was carried out by assigning geographic information like location and position, to the data sets (images). This helped in defining the existence of those data sets in physical space as well as establishes their location in the real world (Minna / UTM Zone 32 North).

3.5.3 Image Classification

The classification adopted for this research was limited to basically two clasess which are:

1. Non Built –up Areas: This includes vegetation, farmland, water body and bare land

2. Built – up Areas: The study focused mainly on residential property

The classification was achieved using maximum likelihood supervised classification techniques (MLC) in classifying the images into various classes. This technique enabled generation of training classes based on the actual land-use/land-cover themes present within the study area and helped in curtailing ambiguity that is associated with the unsupervised technique of image classification according to (Liu, Skidmore and Oosten, 2002). The MLC is the most widely and commonly used with remotely sensed data, and is proven to yield the best classification result (Jensen, 1996). The attribute and statistics from the classification result were generated and used for post-classification comparison between the years.

Based on the prior knowledge of the area and reconnaissance survey, a classification scheme after (Anderson, Hardey, Roach and Witmer, 1976) was adopted for this study. In this study however,

the classification scheme has been modified to present Built-up land, vegetation land, crop land, water and bare ground as shown in Table 3.6 below:

Table 3.5 Land use classification scheme

Code	Landuse/LandcoverClasses	Descriptions
1	Built-up land	Land use for settlement and building of urban infrastructures such as schools, roads, etc.
2	Vegetated land	Land covered with natural vegetation such as grasses, Herbs, shrubs, grass like-plants and natural forest.
3	Crop land	Land used as orchard, cropland, agricultural farmland etc.
4	Water body	Rivers, streams, Springs ponds and dams.
5	Bare Ground	Land devoid of vegetation cover and exposed soils.

Source: Modified from (Anderson, Hardey, Roach and Witmer ,1976).

3.6 Methods of Data Analysis

For successful analysis of the results the following steps were followed:

3.6.1 Use of GIS

The GIS method was used to produce Vector maps to depict extent of the study area in terms of growth. This was also used to achieve part of the objective one and two respectively.

3.6.1.1 identifying the major determinants of urban growth in the study area

In order to achieve objective one, each of the image sets were broadly classified using GIS software (ArcGIS 10.1 and ERDAS Imaging 9.2) into five (5) different categories (polygons) viz: built – up land, vegetated land, crop land, water body and bare ground. After the image classification, the area coverage (extent) of each land use cover theme for each period of study was measured in square kilometres, which was used to determine the level of urban growth over the period of study (1986 – 2016).

In summary, the period of change was divided in to three (3) epochs based on data available and changes that took place 30 years ago (10 years) interval. The change detection was carried out using supervised classified image statistic to differentiate the changes. While urban growth areal extent was measured by digitizing the three (3) different set of imageries and also converted it into vector GIS (shapefiles) data for precise area measurement.

3.6.1.2 analyze the spatial pattern of residential property values in the study area

This objective was achieved through describing the results obtained from the questionnaire responses of the agents, valuers and vendors of residential properties. The statistical tool adopted for the data analysis was frequency count and percentage. The responses in the questionnaire were tallied into tables and the percentage compound into the formula given asfollows

$$\frac{TR1}{TR2} X \frac{100}{1}$$

Where: TR_1 = total responses

TR_2 = total respondents

A benched mark was agreed on, that positive responses below 50% were good or statistically significant responses, also negative responses below 50% were considered as statistically insignificant or bad. and also gives more understanding of the data analysis and makes it easier for the data to be analyzed.

3.6.1.3. examine the effect of urban growth on residential property values in the study area

This objective was achieved through questionnaire administered to people in the twelve (12) political wards. The result gathered was coded in Microsoft Excel and displayed on tables using description statistics.

3.6.1.4 examine the trend of residential property values in the study area

This objective was achieved through questionnaire administered to people across the twelve (12) political wards and the data gathered were then entered into Microsoft excel for analysis and presentation of results in tables for further discussions using description statistics.

CHAPTER FOUR
RESULTS AND DISCUSSION

4.1 Introduction

This chapter deals with presentation, interpretation and discussion of results. The chapter was structured into five sections (i) demographic and socio – economic characteristic of the respondents (ii) determinant factors of urban land use expansion (ii) spatial pattern of residential property value in the study area (iv) effect of urban expansion on residential property value in the study area (v) the trend of the property value in the study area. For the purpose of capturing information on urban expansion identification visually, the area under study was observed at different spatial and temporal scales. This is made possible by the availability of dated and recent satellite imageries at relatively good resolutions that enable visual analysis and interpretation. And 450 copies of questionnaire were administered, out of which 384 were returned and utilized for analysis.

4.2 Demgraphic and Socio - Economic Characteristics of the Respondents (Household)

The result presented in Table 4.1 below shows the composition of the respondents (Household) by sex (gender), marital status, age, educational level and occupation. Out of the three hundred and eighty four (384) respondents of the questionnaire, two hundred and ninety two (292) respondents (Household) that constitute 76.04% were male. While the remaining ninety two (92) of the respondents (Household) that constitute 23.96% were females. This could be attributed to the fact that more male respondents were encountered during the questionnaire administration and more so they are the once likely to be engaged in outdoor work and businesses in most of the study area. Again Table 4.1 below revealed that about three hundred and thirty two (332) of the respondents (Household) constituting 86.5% were married. While about fifty two (52) of the respondents (Household) constituting 13.5 % were single, This

implies that married people responded more than single, This further shows the predominance of married people in most socio – economic affairs in Chikun Local Government Area.

4.1 Socio – Demographic Characteristics of Respondents (Households)

Items	No. of Households	Percentage
Male	292	76.04
Female	92	23.96
Total	**384**	**100**
Marital Status		
Married	332	86.5
Single	52	13.5
Total	**384**	**100**
Age (Years)		
18 – 27	80	20.83
28 – 37	105	27.34
38 - 47	86	22.40
48 - 57	58	15.10
58 – 67	45	11.72
68 and Above	10	2.60
Total	**384**	**100**
Educational Level		
Informal Education	52	13.54
Primary Education	84	21.88
Tertiary Education	94	24.48

Total	154	40.10
	384	**100**
Occupation		
Commercial/ Trading	125	32.55
Farming	80	120.83
Civil Servant	103	26.82
Rent Collectors	80	20.83
Others	04	1.04
Total	**384**	**100**

Source: (Field work, 2016).

Table 4.1 also presents the age distribution of the respondents (Household), about eighty (80) of the respondents representing 20.83% were between the age bracket of 18 – 27years, one hundred and five (105) of the respondents representing 27.34% were between the age bracket of 28 – 37years, eighty six (86) of the respondents representing 22.40% were between the age bracket of 38 – 47years, fifty eight (58) of the respondents representing 15.10% were between the age bracket of 48 – 57years, fourty five (45) of the respondents representing 11.72% were between the age bracket of 58 – 67years. While ten (10) of the respondents respresenting 2.60% were between the age bracket of 68 and above. This shows that the respondents have the requisite ages to give reliable information about the subject matter. The educational attainment of respondents (Household) was also requested.

Table 4.1 above revealed that about fifty two (52) of the respondents which constitute 13.54 % had informal education. The next category were those that hold primary schools certificate, that is about eighty four (84) of the respondents which constitute 21.88%, and they were followed by those who had secondary school certificate that is, they are ninety four (94) representing about 24.48% of the total questionnaire respondents. While one hundred and fifty four (154) of the respondents representing 40.10% had tertiary education. This has really assisted in response to the research questionnaires. Furthermore, Table 4.1 above shows that, about seventy two (72) of the respondents (Household) representing 18.75% of them were into commercial / trading, one hundred and twenty five (125) of the respondents constituting about 32.55% were farmers, one hundred and three (103) of the respondents which constitute 26.827% were into civil service, eighty (80) representing 20.83% were rent collectors, while four (4) of the respondents constituting of about 1.04% were others (Artisans). This pattern of response somehow reflects the predominance of commercial / Trading around the centres and sub-centres that formed the corner stone of this study, this is followed by farming, and lastly civil Service.

4.3 Determinants of Urban growth in the Study Area

This section addresses the first objective of the study, that is, identification of the major determinant of urban growth in the study area. This was achieved using base map (Topographic and

Kaduna State Administrative map) of the study area and the researcher's knowledge of the entire selected sample areas. The identification of places that has high concerntrations of economic activities was done by means of an intensive field work in 2016. Therefore, the area was combed which resulted in the identification of the Central Business Districts (CBD) and sub-centres as the major commercial centres as shown in figure 4.1 with the big and small reddish colour circles portraying CBDs and sub-centres respectively. Further questionnaire was administerd to solicit for information as revealed on Table 4.2 below:

Table 4.2 Determinants of Urban growth in the Study Area

Factors	Household's opinion	Percentage
Planning regulation	20	5.2
Development of infrastructures	31	8.1
Agglomeration of business activities	80	20..8
Population size	62	16.1
Accessibility	36	9.4
Capital investment	21	5.4
Government policies	10	2.6
Commercial and industrial sub- centre	22	5.7
Socio-Economic status	30	7.8

Security		
	72	18.8
Total	**384**	**100**

Source: (Field work, 2016).

The results in the Table 4.2 revealed the determinants of urban growth in the study area. First and foremost, planning rules and policies are constantly changing depending on which government or politicians are in power at the time and also depending on which beaurect have drafted the legislation. More over development time frames are often longer than life time of a planning policies and fashion, from the initial conceptualization to completion. Changing policies and changing rules in this respect are a big problem (Kaiser, 1972). Another manner in which planning renders the development process more difficult is in the blanket application of all comprehensive standard rules and regulations. While it is important to know the rules before hand, planners should appreciate the uniqueness of each site. To attempt to draft all comprehensive rules and regulations which are applicable to every situation and every site would definitely tantamount to short sightednesses but when exceptions are allowed abuse sets in (Kaiser,1972).

Planning regulation is also identified as a key factor and its negligence or improper planning, mismanagement and development control from the side of Planning Authourities, Planning Agencies, Planning Board etc result to urban growth as it can be seen from the Table 4.2 above that, twenty (20) respondents of the questionnaire representing 5.2% of the respondents were of the opinion that poor planning have contributed to the emergence of urban expansion in most of the areas such as: Sabon Tasha, Sabon Garin Nassarawa, Narayi among others areas under investigation.This also go along way in showing the importance of planning, which is clearly manifested in countries where proper planning policy is not enough or adhered to, which invariably lead to unsuccessful enforcement of land – use plans. Lack of consistent and well – experimented planning policies may also cause urban expansion. For instance a city may be planned with exclusive zoning policies; this means separation of residential,commercial, industrial, office, institutional, or other land uses. Completely separate zoning created isolated islands of each type of development. In most cases, the automobile had become a requirement for transportation between vast fields of residentially zoned housing and separate commercial and office strips, creating issues of automobile dependency and more fossil fuel consumption and thereby pollution.

Further more, the urban growth in Chikun Local Government Area is closely associated with its close proximity to the Kaduna metropolis which has a number of tertiary institution and some industries such as indomie and staff training college among others that attracted a number workers/ students who prefer to stay close to their working place/ institution.

The myriad of infrastructure problems in developing societies emanates from the fact that government are incapable of handling the efficient provision of basic infrastructure and amenities principally due to economic challenges and level of technology in their society (Beauregard, 2001). Table 4.2 above revealed that, thirty one (31) of the respondents constituting 8.1% believed that

development of infrastures such as pipe-borne water, good quality roads, electricity and other social amenities is the major determinant of urban expansion in the study area. This is in agreement with (Bhatta , 2010) cities have experienced an increase in demand for public services and for the maintenance and improvement of urban infrastructures.

Also (Barnes *et. tal*., 2001) opined that public service such as fire- service stations, police stations, schools, hospitals, roads, water mains and sewers are highly needed since urban expansion require more infrastructures. Further more, majority of cities in developing societies are confronted with series of problems such as housing, finance, infranstructure, access to land and security challenges. The continued growth of small munipalities create likelihood of physical, economic and social breakdowns in such cities (Beauregard, 2001). In developing countries, it is difficult to provide the minimum social services such as housing, water supply, sanitation, education and medical facilities in the rapidly growing urban areas, or to absorb an ever expanding labour force into struggling urban economies. This results in a deterioration of environmental quality and emergence of unplanned built environment with far reaching implication on serviceability and liveability of urban dwellers (Adeyemo, 1989).

It is also in agreement with the work of (Kabba and Li, 2011) that confirmed the importance of infrastructure and service influencing land value in Freetown, Sierra Leone. (Amenyah, 2013) has also noted the role of amenities in determining rental values in Accra, Ghana. While stable power supply from NESCO was one of the factors that help to explain land value variation in Jos, Plateau State (Rikko and Dung – Gwom, 2006).

Table 4.2 above depicts results regarding agglomeration of business activities in the study area, it is also revealed that about eighty (80) of the responbdents constituting 20.8% believe that, agglomeration of business is a major determinant of urban growth in the study area. This is in agreement with the work of (Boyce, 1963; Guiliano, 1989). More so, economic base expansion also encourages many developers for rapid construction of new houses, and rapid development of housing and other urban insfrastructure often produces a variety of discontinuous uncorrelated development. Furthermore, the cultural agglomeration theory proposed that households may prefer to remain in a particular neighbourhood even if their income has improved. That is, cultural factors are important as people may not want to maintain congenial friendly relations. In such a way people can agglomerate based on social desires. As a result, residential property values in those areas may be on the high or low depending on the attitude of the predominant people of the area. This can therefore, be a factor that can help to explain pattern of urban growth. Another theory is the maximum housing expenditure theory, it also advocate that house buyers would attempt to acquire a house as expensive as they can afford with the maximum mortagage, which they can raise in the area of their choice. This too can influence urban expansion because the more the availability of mortgage facilities, the more the demand for land. Consequently, the higher the land value.

On the issue of Population Size as a determinant of urban growth, the result revealed that above sixty two (62) of the respondents constituting of about 16.2% were of the believed that population size is the major determinant of urban expansion in the study area. This is in agreement with the United Nation report (UNFPA, 2012) the number and proportion of urban dwellers will continue to rise quickly, in other word urban global population will grow to 4.9 by 2030. In comparison, the world's rural population is expected to decrease by 28 million between 2005 and 2030. At the global level, all future population growth will thus be in towns and cities, most of which will be in developing countries.

In any a case a mixed land – use policy is preferred to fight against urban growth / sprawl. As has been earlier noted from respondents, the observed nature was as a result of the combination of many factors such as population increase in the study area. This is in agreement with (Kironde, 2000) observed that rapid urbanization on continent has generally been accompanied by a failure on the part of the public authourities to provide sufficient land to meet the needs of the burgeoning population.

The urban population of Africa and Asia is expected to be doubled between 2000 and 2030. This huge growth in urban population may force to cause uncontrolled urban growth resulting in expansion. The rapid expansion of cities strains their capacity to provide services such as energy, education, health care, transportation, sanitation and physical security. Since government have less revenue to spend on the basic upkeep of cities and the provision of services, cities become areas of massive sprawl and serious environmental problems.

Regarding accessibility as one of the identified determinant of urban growth. According to (Harvey, 1999) opined that, general accessibility refers to nearness to rail termini, bus stations and motorways transfort facilities, labour, customers and service facilities such as banks and post office. Acessibility exist when complimentary uses are in close proximity to each other. Therefore, the result of this study shows that thirty six (36) of the respondents constituting of about 9.4% agreed with the assertion that accessibility is the major factor of urban expansion in the study area. This is also in in agreement with the work of (Kironde, 2000) who estimated that residential ownership in Nigeria is less than 25% as compared with the international benchmarks of 75%. It is therefore concluded that housing issues would remain one of the primary social focus in the country for the next 20 years or more despite the occurance of urban expansion across the entire country at large. It is also in agreement with the work of (Oyebanji, 2003) which stated that, good spread of net work has a tendency to increase accessibility with certain areas becoming less accessible as a result of traffic congestion, thereby causing value to shift to areas that are accessible.

Regarding Capital investment. In a study conducted in UK, (Singh, 2005) found that commercial activities that there is positive relationship between capital investment and residential property values. The result of findings revealed that twenty one (21) of the respondents constituting of about 5.4% were of the believed that capital investment contributed to the urban growth in the study area. Chikun originally have fertile land, which makes agricultureal farm produce to grow better yield and in large quantity. The people of Chikun do produce both food and cash crops such as maize among others. In many developing countries, residents of the core city lack sufficient living space, and this scenarior encourages countryside development for more space, therefore people tend to buy more living space in the countryside. However, consumption of more living space not always causes sprawl / urban expansion but population density is the major concern in this issue. (Acioly and Davidson, 1996) opined that higher per capita consumption of built – up area (or living space) is desired in many instances. In such cases, higher per capita consumption of living space may indicate better and extended living facilities within the cofines of confines of urban growth. However, if the demand of more living space forces rapid low – density development in the countryside then it must be on indication of expansion.

On the issue of Government policies. That is, government policies about future growth (expansion on things like transportation network, estate development etc.) may cause premature expansion without proper planning (Clark and Harvey, 1965). Also (Oyebanji, 2003) opined that, a number of factors affect property values in Nigeria, these include institutional factors such as culture, religious

belief and legislation. It is revealed from the research findings that ten (10) respondents constituting of about 2.6% were of the opinion that government policy (in terms of establishing new layout a long side existing settlements) is one of the major determinant of urban expansion in the study area. Further more, several political election manifestos may also encourage people speculating the direction and magnitude for future urban expansion, though speculation is sometimes blamed for sprawl (growth) in that speculation produces withholding of land for development which is one reason of discontinuous development. This suggest that more settlement will emerge as an increase to the existing ones.

Commercial and industrial sub - centres: The population of Chikun is increasing every day, the demands, human wants and their needs however increases, as it can be seen from the Table 4.2 above that, twenty two (22) respondents constituting of about 5.7% were of the opinion that, having commercial and industrial sub – centres were the engine room for economic development and would subsequently lead to human and capital development. Unsuccessful enforcement of land use plans is one of the reasons of urban expansion in developing countries Nigeria inclusive, since the enforcement is often corrupt and intermittent in these countries. In terms of maintaining good and serene environment, enhanced planning policies would be one of the possible determinant factors of urban expansion in the study area.

Regarding Socio-economic status: thirty (30) respondents representing 7.8% of the questionnaire are of the view that socio-economic status contributed a lot to urban growth in the study area. This could be attributed to the fact that Chikun L.G.A. originally have fertile land, which makes their agricultural farm produce to grow better yield and in large quantity. The people of Chikun Local Government Area do produce both food and cash crops such as maize, guinea – corn, millet, rice, ground- nut, vegetable among others. Moreover, the formation of small, medium and large scale industries in the study area has boost the economy.

On the issue of security of the Area: It is revealed that seventy two (72) respondents constituting of 18.8% agreed with the assertion that that security is the major determinant factor of urban growth in the study area. This result is in agreement with the work of (Ade and Afolabi, 2013) which they analysed urban expansion in Abuja and their result showed that the extent of growth increased not just inward but outwards as a result of adequate and sufficient security..

In summary, the analysis showed that agglomeration of business activities constitute about 20.8% as the key determinant of urban growth in the study area, followed by security with 18.7%. Population size increase was also identified to be one of the determinant factors with 16.1% among other contributing factors. This agreed with the study of (Emmanuel, Zahari, and Yusoff, 2015) that examined the factors influencing Land Use Changes and the consequential impact of such changes in Land Use on residential property values in Kaduna metropolis of Nigeria. The study found that Population Increase due to Intra-urban Migration, and Land Use Planning have a combined influence of 87% on Land Use Changes. While Land Use Changes affect Property Values by 27%, meaning that the balance of 73% is accounted for by other factors outside the scope of their study. Lastly, the result have revealed that the hypothesized relationship between and among the various variables are all significant with the agglomeration of business activities having the most influence on residential property values in the study area. This is attributable to the expansion of Kaduna Metropolis to cover some part of the selected Central Business Districts and urban Sub – centres of the study area as shown in figure 4.1 below (Field work, 2016).

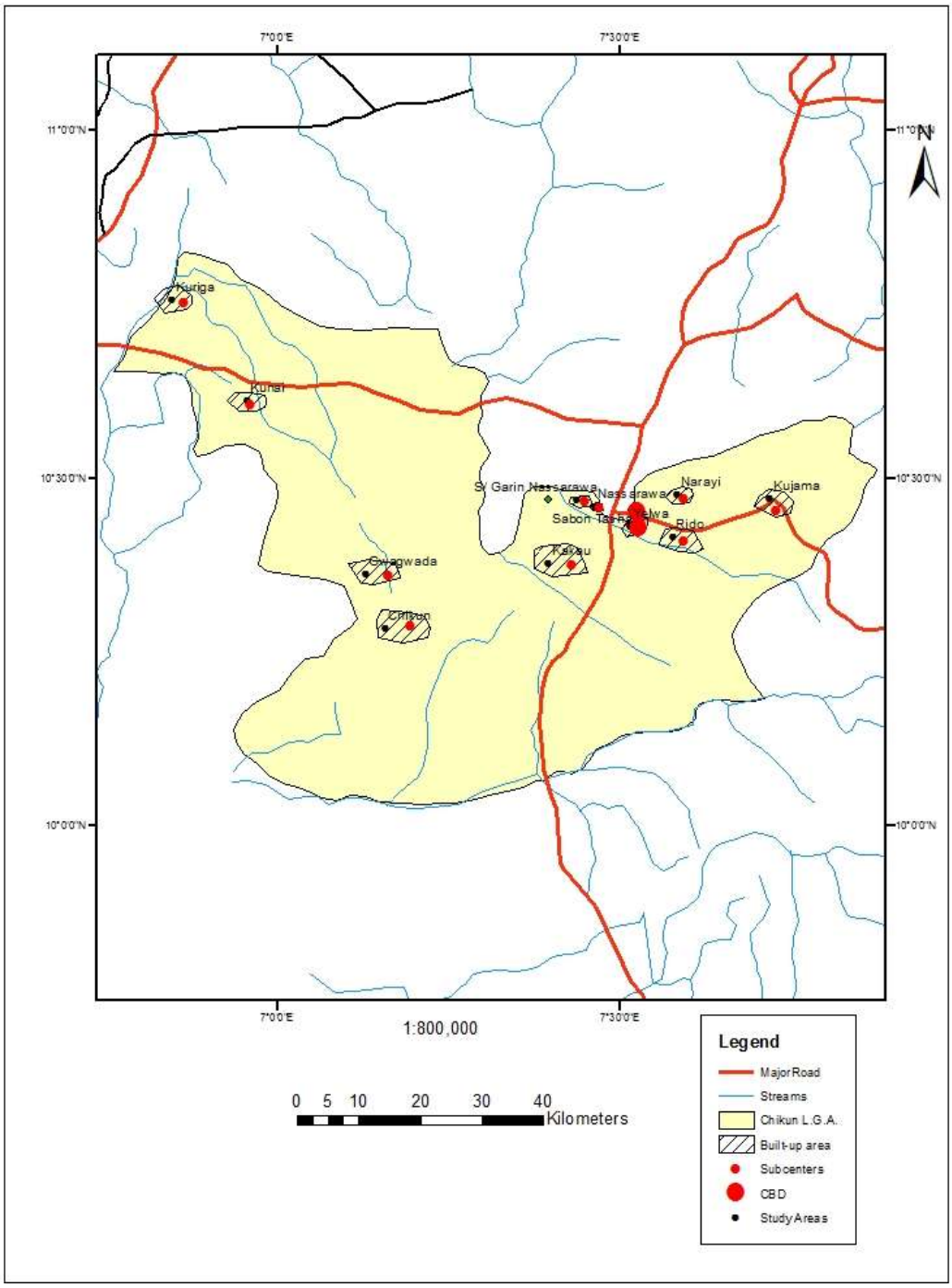


Figure 4.1 The study Area Showing the CBD and sub-centres in the Study Area Source:KADGIS and Modified from the Topo Sheet 144 S.E, 144 S.W. 122 S.E and 123 S.E.

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Table 4.3 Extent of Urban growth in the Study Area

Year	Urban Land (Km^2)	(%)
1986	149.2	3.2
2000	190.4	4.1
2016	271.5	5.8

Source: (Author's Analysis, 2016).

The figures presented in the Table 4.3 above therefore shows the extent of urban growth in the study area throughout the study period (1986 – 2016) using Landsat Thematic Mapper (TM) of 1986, Landsat Enhanced Thematic Mapper (ETM+) of 2000 and Landsat 8 image of 2016. The year 1986 had an area extent of 149.2km² (3.2%). This was preceded by the years 2000 (14 years later) where the extent of urbanization rapidly increased to 190.4km² (4.1%). This rapid increase could however be accounted for by the increase in the construction housing facilities as well as the influx of the rural population coming to seek for a greener pasture in the urban area (agglomeration of business activities). More urban growth resulting from continuous dividends of democracy which increased administrative and commercial activities resulted in an increase in the extent of urban area to 271.5km² (5.8%) in 2016. This is also in agreement with the work of (Wisner *et.al*, 2004), who observed that high construction activities and its structural as well as functional development leading to a yearly increase in built-up areas, just as in the case of the urban areas of Chikun Local Government Area which is not exception. Figure 4.2 below depict the pictorial extent of urban built – up land through out the study periods (1986 - 2016) as derived from the satellite imageries acquired for the study.

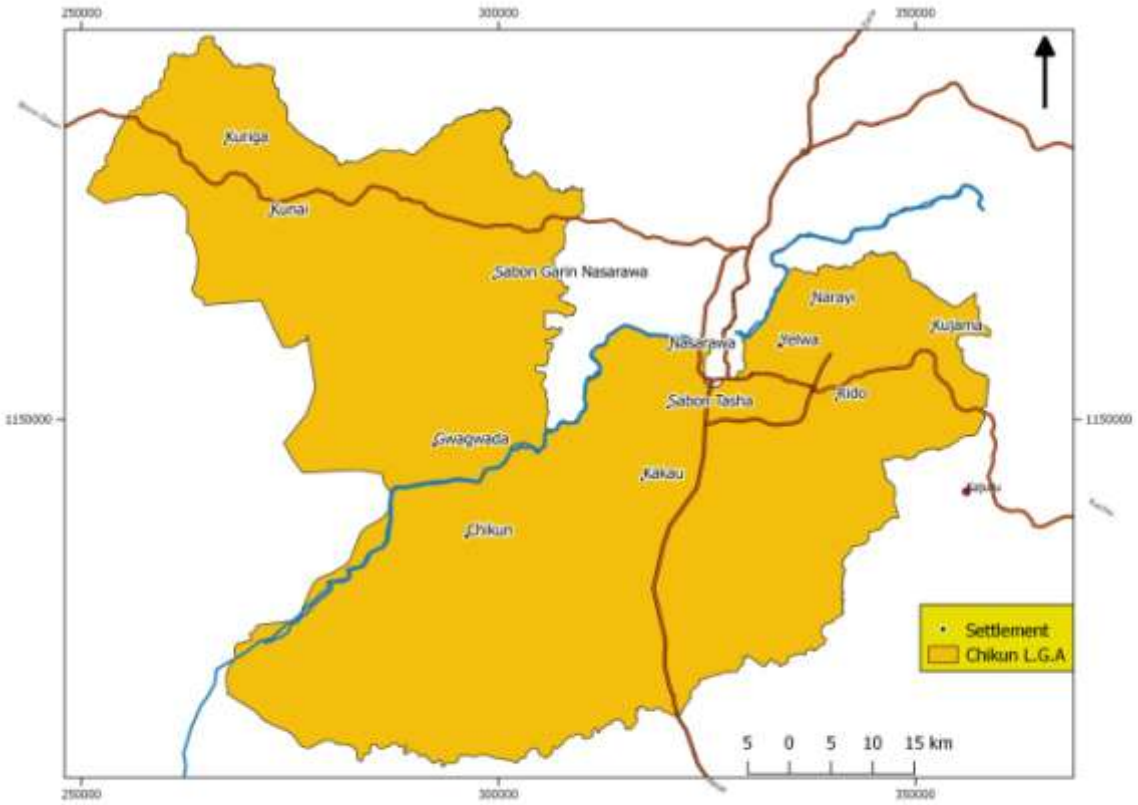


Figure 4.2 Extent of Urban Growth in the study area between 1986 and 2016
Source:KADGIS and Modified from the Topo Sheet 144 S.E,144 S.W. 122 S.E & 123 S.E.

4.4 Spatial Pattern of Residential Property Value in the Study Area

The second objective of the research is to analyze the spatial pattern of residential property values in the study area. Since our survey was centred on the twelve (12) political wards that also constitute both Central Business Districts (CBD) and the Urban Sub-centres as identified in the preceeding subsection, the data on residential property value were analyzed and presented in Table 4.4 below. Further more, the analysis was centred on the residential property values (rental values) of three (3) Bedroom apartments in comparism with piece of land measuring 50ft By 100ft. The three (3) Bedroom apartments were randomly selected from the twelve (12) selected political wards that constitute the study area, which were further more classified into twelve (12) categories i.e. from Category A to L., and in each category (political ward) three (3) localities were selected at random.

Table 4.4 Spatial Pattern of Residential PropertyValues in the Study Area.

S/No.	Category (Ward)	Areas (Localities)	Value in M^2 (50 X 100) ₦ 1986	Rental Value (3Bedroom) ₦

1.	A	Gbagyi villa, Romi and Yelwa	50,000	15,000
2.	B	Danbushiya, Danhono (I) and Babban Saura	15,000	3,000
3.	C	Ung. Gimbiya, Ung. Sunday and Ung. Boro Narayi, BayanDutse and Ung. Namegero	30,000	10,000
4.	D	Kudenda, Tirkania and Sabon-Garin Nassarawa Rido-Gari,Marabar Rido and Kujama	30,000	10,000
5.	E	Buruku, Kasaya and Uduwa Ung.Doka Kadi, Ung. Gabas and Nassarawa	25,000	8,000
6.	F	Kakau,Gayan Gari, and Tsohon Gayan	30,000	10,000
7.	G	Chikun, Gadani and Katarma Audu Jangwam, Dutse and Kasami	25,000	6,000
8.	H	Ung. Barau, Kuriga and Tashar Tsintsiya	5,000	2,000
9.	I		10,000	3,000

10.	J	5,000	2,000
11.	K	5,000	2,000
12.	L	5,000	2,000

Source: (Field work, 2016).

The results in the Table 4.4 above shows that, land value of a plot that measured 50ft By 100ft was recorded as ₦50,000, while that of residential property value in the study area (3Bedroom apartment) of Category A (comprises of Gbagyi villa, Romi and Yelwa localities) was recorded as ₦15,000 per annum in 1986. This is in comformity with the work of (Nzau, 2003) who noted that sub – centres in Nairobi, Kenya had some of the following factors: restaurant and bars, several small shps, few offices, clinic, entertainment parks and so on among other factors. Similarly, the higher the population of an area may be likely one of the factor that resulted to higher the charges for residential property, and also the more an area is close to areas of commercial land use the higher its residential property values

Further more, the result of Category B (comprises of Danbushiya, Danhono (I) and Babban Saura localities) revealed that, the land value of a piece of land measuring 50ft By 100ft stood at ₦15,000 and the residential property value of 3 Bedroom apartment was recorded as ₦3,000 per annum in 1986. This may likely be as a result of lack accessibility to the area (motorable roads). Further more, the foregoing analysis revealed that, access road could serve as one of the major determinant urban expansion that may also have positive effect on residential property value.

The result of Category C (comprises of Unguwar Gimbiya, Unguwar Sunday and Unguwar Boro localities) revealed that a piece land measuring 50ft By 100ft stand at ₦30,000 while that of residential property value of 3 Bedroom apartment was ₦10,000 per annum in 1986. On a general note, the result show that, the fact of a cosmospolitan ethnic composition as attracting high residential property value because of the fact that such areas tend to give the urban centre a truer colour of urbanity, with a good number of neighbours from different ethno – religious background, willing to pay for residential accommodation.

Further more, Table 4.4 above shows that the price of plot of land measuring 50ft By 100ft was recorded as ₦30,000 while rental value of category D (comprises of Bayan Dutse, Narayi and Unguwar Namegero localities) of 3 Bedroom apartment was ₦10,000 per annum in 1986. This findings are in line with

some of the factors associated with a CBD by (Murphy, 1971) who identified things like composition of largest retail stores, offices, vehicular and pedestrians traffic as marks of CBD, and of course this may likely resulted to higher land and the corresponding residential property values.

The result of Category E (comprises of Kudenda, Tirkania and Sabon Garin Nassarawa localities) revealed that, a piece of land measured 50ft By 100ft was recorded as ₦25,000 while the residential property of 3 Bedroom apartment in the area study was recorded as ₦8,000 per annum in 1986. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property.

The result of Category F (comprises of Rido-Gari, Marabar Rido and Kujama localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦30,000 residential property values was ₦10,000 per annum in 1986. This may not be unconnected to the fact that area enjoys the presence of NNPC and some other retail activities, and also it could be attributed to its proximity to Kaduna metropolis.

The figures in the Table 4.4 above shows that, a piece of land measuring 50ft By 100ft was recorded as ₦25,000 while the rental value (3 Bedroom apartment) of category G (comprises of Buruku, Kasaya and Uduwa localities) stood as ₦ 6,000 per annum in 1986. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size due to the presence of fertile agricultural land. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The results in the Table 4.4 above revealed that, the price pf a piece of land measuring 50ft By 100ft was recorded as ₦5,000 while that of residential property value (3 Bedrooms apartment) of category H (comprises of Ung. Doka Kadi, Unguwar Gabas and Nassarawa localities) was recorded as ₦2,000 per annum in 1986, It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The Table 4.4 above further shows that a piece of land measuring 50ft By 100ft in the of category I (comprises of Kakau, Gayan Gari and Tsohon Gaya localities) of the study area was recorded as ₦10,000 while that of residential property value was ₦3,000 per annum in 1986. This can be attributed to the fact that, the area lack the basic amenities.

The result of Category J (comprises of Chikun, Gadani and Katarma localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦5,000 while the residential property value stood at ₦2,000 per annum in 1986. Thus, the area enjoys fertile agricultural land but yet attract low population, this may be connected to the lack of infrastructuaral facilities.

The result of Category K (comprises of Audu Jangwam, Dutse and Kasami localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦5,000 while the residential property value stood at ₦2,000 per annum in 1986. This implies that, the area lack social amenities that may likely attract more population.

The result of Category L (comprises of Unguwar Barau, Kuriga and Tashar Tsintsiya localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦5,000 while the residential property value was recorded as ₦2,000 per annum in 1986.

Based on the information in Table 4.4 above, it is clearly showed that out of the twelve (12) identified CBD and Urban sub-centres that correspond to the selected political ward for the study, only category H, I,J, K, and L which comprises localities like: Chikun, Gadani & Katarma, Audu Jangwam, Dutse, Kasami, Unguwar Barau, Kuriga, Tashar Tsintsiya among others had recorded low in both land value and residential property values within the period of study. This is similar to the outcome of (Uju and Iyanda, 2012) who show that residential land values decay away from the CBD land value in Onitsha, Nigeria. Further more, following the example of (Majumdar *et. al*, 2006), the residential property values used in the present study were expressed in Naira per annum. Onces again, the areas around CBD recorded higher residential property values (rental values) than others. In a nutshell, it is clear that the land value, in the form of rental charges, have been consistently higher over the period under study within the Urban centres when the two are compared. This is in line with many studies (Alonso, 1964; Zheng, 2003; Ai, 2005). But when the facets under investigation were compare in terms of the rate of increase in land value, it revealed that at the initial stage, residential land values as earlier stated, several factors that affect land value were identified from the literature, local knowledge of the study area as well as from discussions with stakeholders in real estate business.

Table 4.5 Spatial pattern of Residential PropertyValues in the Study Area.

S/No.	Category (Ward)	Areas (Localities)	Land Value in Feet (50 X 100) ₦ 2000	Rental Value (3Bedroom) ₦
S/No.	Category	Areas	Land Value	Rental Value

	(Ward)		(50X 100) ₦ 2000	(3Bedroom) ₦
1.	A	Gbagyi villa, Romi and Yelwa	100,000	25,000
2.	B	Danbushiya, Danhoni(I) and Babban Saura	20,000	5,000
3.	C	Ung. Gimbiya, Ung. Sunday and Ung. Boro		
		Narayi, BayanDutse and Ung. Namegero	60,000	6,000
4.	D	Kudenda, Tirkania and Sabon-Garin Nassarawa		
		Rido-Gari,Marabar Rido and Kujama	60,000	6,000
5.	E	Buruku, Kasaya and Uduwa		
		Ung.Doka Kadi, Ung. Gabas and Nassarawa	50,000	10,000
6.	F	Kakau,Gayan Gari, and Tsohon Gayan	70,000	12,000
		Chikun, Gadani and Katarma		
7.	G	Audu Jangwam, Dutse and Kasami	50,000	10,000
8.	H	Ung. Barau, Kuriga and T/Tsintsiya		
			15,000	3,000

9.	I	15,000	3,000
10.	J	10,000	2,000
11.	K	10,000	2,000
12.	L	10,000	2,000

Source: (Field work, 2016).

The results in the Table 4.5 above shows that, land value of a plot that measured 50ft By 100ft was recorded as ₦100,000, while that of residential property value in the area (3 Bedrooms apartment) of Category A (comprises of Gbagyi villa, Romi and Yelwa localities) was recorded as ₦25,000 per annum in 2000. This can be attributed the positive relationship between the factors of urban expansion such as agglomeration of business activities, security, population increase (size), infrastructural development (provision of pipe borne water, electricity) among other factors. Similarly, the higher the population of an area may likely one of the factor that resulted to higher the charges for residential property, and also the more an area is close to areas of commercial land use the higher its residential property values

Further more, the result of Category B (comprises of Danbushiya, Danhono (I) and Babban Saura localities) revealed that, the land value of a piece of land measuring 50ft By 100ft stand at ₦20,000 and the residential property value of 3 Bedroom apartment was recorded as ₦5,000 per annum in 2000. This also

show that there is positive relationship between provision of infrastructural facilities (road network, pipe borne water, electricity) among others factors as revealed by the respondents, and these are apparently attractive.

The result of Category C (comprises of Unguwar Gimbiya, Unguwar Sunday and Unguwar Boro localities) revealed that a piece land measuring 50ft By 100ft stand at ₦60,000 while that of residential property value of 3 Beddroom apartment was ₦6,000 per annum in 2000. The result show the fact of a cosmospolitan ethnic composition as attracting high residential property value because of the fact that such areas tend to give the urban centre a truer colour of urbanity, with a good number of neighbours from different ethno – religious background, willing to pay for residential accommodation.

Further more, Table 4.5 above shows that the price of plot of land measuring 50ft By 100ft was recorded as ₦60,000 while rental value of category D (comprises of Bayan Dutse, Narayi and Unguwar Namegero localities) of 3 Bedroom apartment was ₦6,000 per annum in 2000. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property.

The result of Category E (comprises of Kudenda, Tirkania and Sabon Garin Nassarawa localities) revealed that, a piece of land measured 50ft By 100ft was recorded as ₦50,000 while the residential property of 3 Bedroom apartment in the area study was recorded as ₦10,000 per annum in 2000. The increased in the land and residential values may be as a result of establishement of Kudenda Light industrial layout by government in the area.

The result of Category F (comprises of Rid-Gari, Marabar Rido and Kujama localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦70,00 residential property values was ₦12,000 per annum in 2000. Close proximity to Kaduna metropolis may be the likely reason why for the increase in both land and residential property values in the study area.

The figures in the Table 4.5 above shows that, a piece of land measuring 50ft By 100ft was recorded as ₦50,000 while the rental value (3 Bedroom apartment) of category G (comprises of Buruku, Kasaya and Uduwa localities) stood as ₦ 10,000 per annum in 2000. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The results in the Table 4.5 above revealed that, the price pf a piece of land measuring 50ft By 100ft was recorded as ₦15,000 while that of residential property value (3 Bedroom apartment) of category H (comprises of Unguwar Doka Kadi, Unguwar Gabas and Nassarawa localities) was recorded as ₦3,000 per annum in 2000, It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The Table 4.5 above further shows that a piece of land measuring 50ft By 100ft in the of category I (comprises of Kakau, Gayan Gari and Tsohon Gaya localities) of the study area was recorded as ₦15,000

while that of residential property value was ₦3,000 per annum in 2000. This may be due to the fact that, the area lack social amenities that will serve as attractive factor to teaming population.

The result of Category J (comprises of Chikun, Gadani and Katarma localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦10,000 while the residential property value stood at ₦2,000 per annum in 2000. This implies that the area enjoys low residential property value and it could be due to the lack of social amenites in the area.

The result of Category K (comprises of Audu Jangwam, Dutse and Kasami localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦10,000 while the residential property value stood at ₦2,000 per annum in 2000. Despite the fact that, the area had fertile agricultural land, but yet, both land and residential property values were low.

The result of Category L (comprises of Unguwar Barau, Kuriga and Tashar Tsintsiya localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦5,000 while the residential property value was recorded as ₦2,000 per annum in 2000. This may not be unconnected with the decline in the quality of roads as one move away from the main road and the small market around or liking the areas.

Based on foregoing analysis, it is clearly showed that out of the twelve (12) identified CBD and Urban sub-centres that correspond to the selected political ward for the study, only category H, I, J, K and L which comprises localities like: Unguwar Doka Kadi, Unguwar Gabas, Nassarawa, Kakau Chikun, Gadani, Katarma, Audu Jangwam, Dutse, Kasami, Unguwar Barau, Kuriga and Tashar Tsintsiya among others had recorded low residential property values within the period of study. This is in conformity with the finding of (Adebayo, 2006) that property values tend to peak in those areas that enjoy easy accessibility through the provision of good quality road network, and also that of (Oni, 2009) that the neighbourhood within which buildings are located also determines the value and propitability of the real estate.

Table 4.6 Spatial pattern of Residential PropertyValues in the Study Area.

S/No.	Category (Ward)	Areas (Localities)	Land Value in Feet (50 X 100) ₦ 2016	Rental Value (3Bedroom) ₦
S/No.	Category (Ward)	Areas	Land Value (50 X 100) ₦ 2016	Rental Value (3Bedroom) ₦
1.	A	Gbagyi villa, Romi and Yelwa	250,000	15,000
2.	B	Danbushiya, Danhono(I) and Babban Saura Ung. Gimbiya, Ung. Sunday&Ung. Boro	15,000	3,000
3.	C	Narayi, BayanDutse and Ung. Namegero	180,000	10,000
4.	D	Kudenda, Tirkania and Sabon-Garin Nassarawa Rido-Gari,Marabar Rido and Kujama	50,000	10,000
5.	E	Buruku, Kasaya and Uduwa		

		Ung.Doka Kadi, Ung. Gabas and Nassarawa	200,000	20,000
6.	F	Kakau,Gayan Gari, and Tsohon Gayan	150,000	10,000
7.	G	Chikun, Gadani and Katarma Audu Jangwam, Dutse and Kasami	100,000	6,000
8.	H	Ung. Barau, Kuriga and Tashar Tsintsiya	50,000	2,000
9.	I		50,000	3,000
10.	J		50,000	2,000
11.	K		50,000	2,000
12.	L		50,000	2,000

Source: Field work, 2016.

The results in the Table 4.6 above shows that, land value of a plot that measured 50ft By 100ft was recorded as ₦250,000, while that of residential property value in the area (3 Bedroom apartment) of Category A (comprises of Gbagyi villa, Romi and Yelwa localities) was recorded as ₦15,000 per annum in 2016. This can be attributed the positive relationship between the factors of urban expansion such as

agglomeration of business activities, security, population increase (size), infrastructural development (provision of pipe borne water, electricity) among other factors. Similarly, the higher the population of an area may likely one of the factor that resulted to higher the charges for residential property, and also the more an area is close to areas of commercial land use the higher its residential property values

Further more, the result of Category B (comprises of Danbushiya, Danhono (I) and Babban Saura localities) revealed that, the land value of a piece of land measuring 50ft By 100ft stand at ₦15,000 and the residential property value of 3 Bedroom apartment was recorded as ₦3,000 per annum in 2016. This also show that there is positive relationship between provision of infrastructural facilities (road network, pipe borne water, electricity) among others factors as revealed by the respondents, and these are apparently attractive.

The result of Category C (comprises of Unguwar Gimbiya, Unguwar Sunday and Unguwar Boro localities) revealed that a piece land measuring 50ft By 100ft stand at ₦180,000 while that of residential property value of 3 Bedroom apartment was ₦10,000 per annum in 2016. The result show the fact of a cosmospolitan ethnic composition as attracting high residential property value because of the fact that such areas tend to give the urban centre a truer colour of urbanity, with a good number of neighbours from different ethno – religious background, willing to pay for residential accommodation.

Further more, Table 4.6 above shows that the price of plot of land measuring 50ft By 100ft was recorded as ₦50,000 while rental value of category D (comprises of Bayan Dutse, Narayi and Unguwar Namegero localities) of 3 Bedroom apartment was ₦10,000 per annum in 2016. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property.

The result of Category E (comprises of Kudenda, Tirkania and Sabon Garin Nassarawa localities) revealed that, a piece of land measured 50ft By 100ft was recorded as ₦200,000 while the residential property of 3 Bedroom apartment in the area study was recorded as ₦20,000 per annum in 2016. This could be attributed to the presence of light residential and indtral layout in the area.

The result of Category F (comprises of Rid-Gari, Marabar Rido and Kujama localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦70,00 residential property values was ₦12,000 per annum in 2016. This can be attributed to the presence NNPC and so some other small light idutries like Indomie among others.

The figures in the Table 4.6 above shows that, a piece of land measuring 50ft By 100ft was recorded as ₦100,000 while the rental value (3 Bedroom apartment) of category G (comprises of Buruku, Kasaya and Uduwa localities) stood as ₦ 6,000 per annum in 2016. It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The results in the Table 4.6 above revealed that, the price pf a piece of land measuring 50ft By 100ft was recorded as ₦50,000 while that of residential property value (3Bedrooms apartment) of category H (comprises of Unguwar Doka Kadi, Unguwar Gabas and Nassarawa localities) was recorded as ₦2,000 per

annum in 2016, It can be deduce that there is positive relationship between the factors of urban expansion such as population increase (size) provision of pipe borne water, security among other factors and residential property values. Similarly, the higher the population of an area, the higher the charges for residential property, while also the more an area is close to areas of commercial land use the higher its value.

The Table 4.6 above further shows that a piece of land measuring 50ft By 100ft in category I (comprises of Kakau, Gayan Gari and Tsohon Gaya localities) of the study area was recorded as ₦50,000 while that of residential property value was ₦3,000 per annum in 2016. This implies that residential values increases with distance from sub-centres.

The result of Category J (comprises of Chikun, Gadani and Katarma localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦50,000 while the residential property value stood at ₦2,000 per annum in 2016. The low rental value recorded in the area could be attributed to lact of social amenities.

The result of Category K (comprises of Audu Jangwam, Dutse and Kasami localities) revealed that a piece of land measuring 50ft By 100ft was recorded as ₦50,000 while the residential property value stood at ₦2,000 per annum in 2016. The low rental charges can be attributed to the lack of good motorable roads according to some of the respondents.

The result of Category L (comprises of Unguwar Barau, Kuriga and Tashar Tsintsiya localities) revealed that, a piece of land measuring 50ft By 100ft was recorded as ₦50,000 while the residential property value was recorded as ₦2,000 per annum in 2016. Lack of social and infrastructural development were partly some of the reason why the enjoys low rental charges.

Looking at the situation generally, it can be safely assume that attachment of monetary value to land (commercialization of land) is just a beginging to take root even in residential areas. So with time, all things being equal, those sub – centres will come to exert more influence on the value of residential land value around them. Based on the information in Table 4.6 above, it is clearly showed that out of the twelve (12) identified CBD and Urban sub-centres that correspond to the selected political ward for the study, only category H, I, J, K and L which comprises localities like: Unguwar Doka Kadi, Unguwar Gabas, Nassarawa, Kakau Chikun, Gadani, Katarma, Audu Jangwam, Dutse, Kasami, Unguwar Barau, Kuriga and Tashar Tsintsinya among others had recorded low residential property values within the period of study. This is similar to the outcome of (Uju and Iyanda, 2012) who show that residential land values do not decay away from the CBD land value in Onitsha, Nigeria. Further more, following the example of (Majumdar *et. al*, 2006), the residential property values used in the present study were expressed in Naira per annum. Onces again, the areas around CBD recorded higher residential property values (rental values) than others. This is in conformity with the finding of (Adebayo, 2006) that property values tend to peak in those areas that enjoy easy accessibility through the provision of good quality road network, and also that of (Oni, 2009) that, the neighbourhood within which buildings are located also determines the value and propitability of the real estate.

4.4.1 Factors Influencing Residential Property Values

As ealier stated, several factors that affect residential property value were identified from the literature, local knowledge of the study area as well as from the discussions with stakeholders in real estate business. In nutshell, it is clear that the residential property value, in the form of rental charges, have been consistently higher in the CBD than sub-centres over the period under study when the two are compared.

This is in line with many studies (Aloson, 1964; Zheng, 2003; Ai, 2005). Similarly, the higher population of an area, the higher the charges for residential properties, while also, the more an area is close to CBD (commercial land use), the higher its value. Again, areas that enjoys good infrastructural facilities tend to attract higher land values. This is in conformity with the finding of (Adebayo, 2006) that property values in Lagos tend to peak in those areas that enjoy easy accessibility (through good road network) and that of (Oni, 2009) that the neighbourhood within which buildings are located also determines the value and profitability of the real estate also in Lagos. It is gathered from the questionnaire that agglomeration of business activites was the most significant reason behind urban expansion as well as the high rate of residential property values, this so because eighty (80) of the respondents constituting 20.8% were of the opinion that urban expansion is associated to agglomeration of business activities and it invariable result to high residential property value.

In summary, the result analysis showed that areas such as Sabon Tasha, Sabon Garin – Nassarawa, Narayi and Yelwa had recorded high residential property value as a result of urban land use expansion due agglomeration of business activities, security and population size increase than other areas under study. While Kunai, Rido and Nassaarwa had recorded moderate residential property values. While Chikun, Gwagwada, Kakau and Kuriga had recorded the lowest residential property values during the period under study (1986 - 2016). In Figure 4.3 below the green colour portray the areas with high residential property value, this is especially so because of the cosmopolitan nature of the areas that have the tendencies of attracting high population and investment potential that invariably lead to the urban expansion. The pick colour depict moderate residential Property value, while the purple colour depict low residential property values this especially due to the poor accessibility and the absence infrastructural facilities associated with such areas.

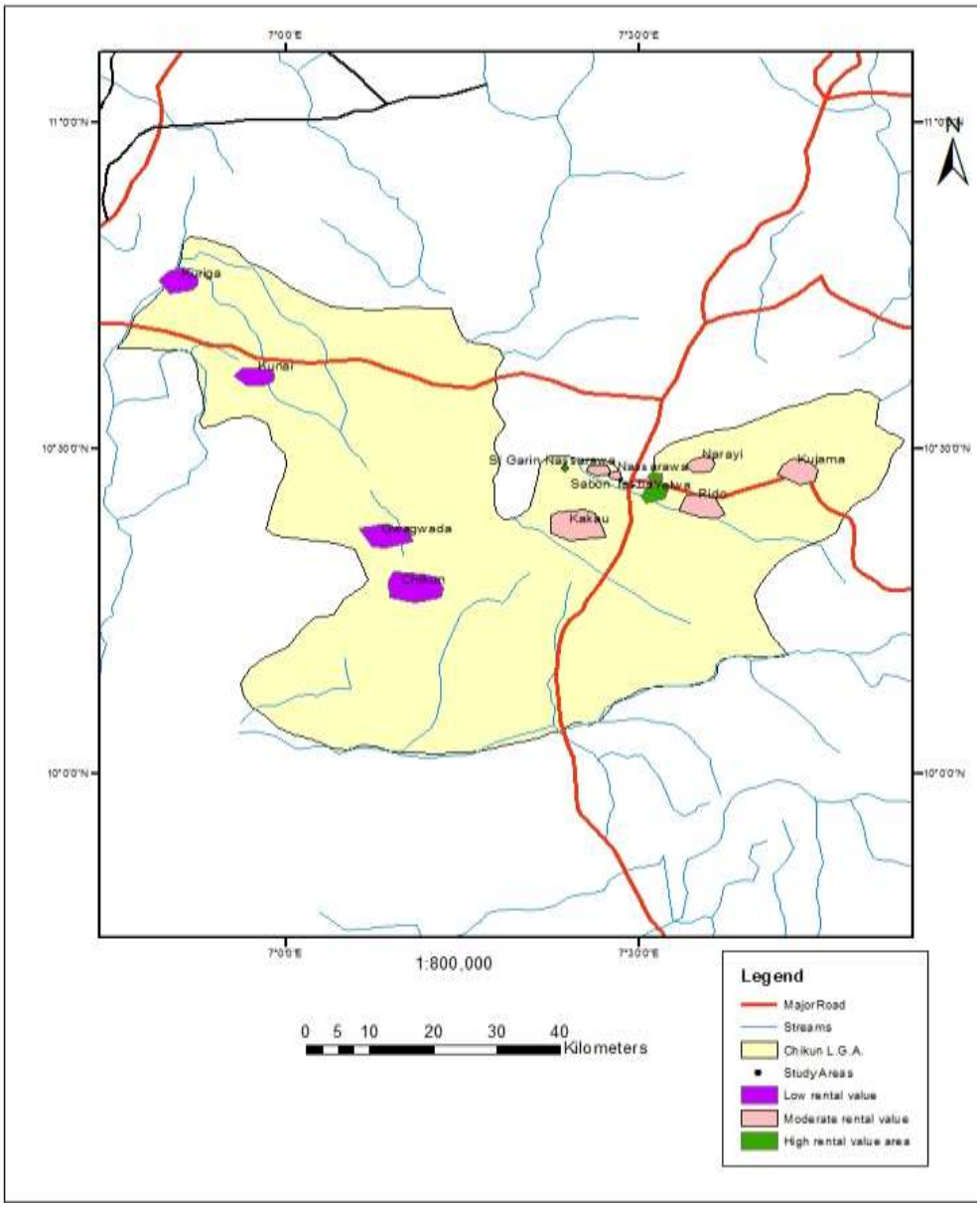


Figure 4.3 Spatial Pattern of Residential Property Values in the Study Area.
Source:KADGIS and Modified from the Topo Sheet 144 S.E, 144 S.W. 122 S.E and 123 S.E.

4.5 Effect of Urban growth on Residential Property Value in the Study Area

The third objective of this research is to examine the effect of urban growth on residential property value in Chikun L.G.A., and since the research was centred around twelve (12) selected political wards that the researcher further referred to as category A - L namely: Chkun, kunai, Gwagwada, Kujama, Kakau, Kuriga, Nassarawa, Narayi, Sabon Garin Nassarawa, Sabon Tasha and Yelwa.

Table 4.7 Factors affecting Residential Property Values in the Study Area

Responsible factors	Frequency	Percentage	Rank Order
Water quality	120	31.25	1st
Land degradation (Erosion)	98	25.52	2nd
Access Road	66	17.19	3rd
Fertlile agricultural land	65	16.93	4th
Security	35	9.11	5th
Total	**384**	**100**	

Source: (Field work,2016).

T he importance of water supply to any community cannot be overemphasized. And the fact that some parts of the urban area in the study area have continued to suffer the problem of pipe-borne water supply, make this factor to be quite relevant to the study. The results on Table 4.7 above revealed that, one hundred and twenty (120) of the respondents representing 31.25% of the respondents were of the believed that qualitative water supply would affect residential property value. This study is in agreement with the works of (Cloete and Chikafalimani, 2001) on property industry in Malawi, ant it was in agreemen toot with (Stratton, 2008) which identified eight (8) factors that affect property value, which are water supply, architectural design, quality of finishing, maintenance condition of property, size of property, security, condition of the street and location.

Regarding the issue of Land degradation (Erosion) which is define as a persistent decrease in the productivity of vegetation and soil (Warren and Khogali, 1992). It is also identified as a factor that can have an adverse effect on residential property value by the researcher as shown on Table 4.7 above which revealed that ninety eight (98) of the respondents representing about 25.52% were of the opinion that degraded land which is mainly caused by socio – economic and cultural forces driven by demographic variables such as population density and transmigration would attract less people especially high income earners and by implication only low income earners may likely be seen renting in such areas / places and of course would invariably attract lower rental value. This further implies that, huge growth in urban population may force to cause uncontrolled urban growth resulting in expansion. The rapid growth of cities / urban areas strains their capacity to provide services such as energy (electricity, transportation, sanitation, physical security) since government have less revenue to spend on the basic upkeep of cities and the provision of services at all levels. Further more, it is in agreement with (Ujoh *et.al*, 2011) who analyzed urban expansion and vegetal cover loss in and around Abuja with the use of Landsat imageries between 1987 to 2006.

On the issue of access road which is one of the most influential comfort indices of human being on earth according to (UN – Habitat, 2006). The quality of roads can also be a factor that affects the value of a place or property. Good roads would aid socio-economic activities, while the opposite can hamper them. The data in the Table 4.7 above shows that sixty six (66) of the respondents representing about 17.19% were of the opinion that good access road affect both the urban growth and the corresponding increase or decrease of residential property values. This is in agreement with the work of (Jacquin *et. al*, 2008). In general, urban centres are perceived as places where one could have a better life, because of better opportunities such as a better services and better lifestyle. The perceived better condition attract more people (UN- Habitat, 2006).

Regarding fertile agricultural land, which is define as any pieace of land that could accommodate the growth of both cash and food crops. Generally fertile land can describe as natural gift of nature. The figures in the Table 4.6 above revealed that sixty five (65) of the respondents representing about 16.93% were of the opinion that fertile agricultural land attract high population densities and by implication, this would affect the both the land and residential values of such as areas.

On the issue of security, civil or political unrest was a major problem that had seriously affected the residential property value especially because of the religious intolerance that had bedevilled Kaduna State in recent times. thirty five (35) respondents representing about 9.11% were of the believed that adequate and effect security outfit attract population and this invariably attract high population in the area. By implication both land and residential property value may likely increased in the area.

4.6 Trend of the Residential Property Value in the Study Area

The fourth objective of the research is to examine the trend of the residential property values in the study area. It was found from the preceding analysis that the areas that had recorded the highest residential property (rental) values for the period 1986 to 2016 were Category A, C, D, and E areas, the moderate residential property values were Category B, F, and G. While those areas that had recorded lowest fall within Category H, I, J, K and L areas. In order to shed more light on the observed trend of residential property value, Table 4.8 below presented the guideline for the analysis of trend nature of the residential property value in the study area.

Table 4.8 Trend Nature of Residential property Value in 1986 to 2016

S/No.	Year	Trend of Residential Value ₦ in thousands		
		High	Moderate	Low
1.	1986	50 – 25	10 – 15	5 - Below
2.	2000	50 – 100	15- 25	10 - Below
3.	2016	150 – 250	100 - 150	10 - Below

Source: Author's Analysis (2016).

In a similar manner, the study revealed that there has been a continous rise in the pattern of residential property values in form of rents paid for residential accommodation, though not uniform across the area within the period under investigation as presented in Table 4.9 below:

Table 4.9 Trend of Residential property Value in 1986, 2000 and 2016

S/No.	Categoy (Ward)	Areas	Trend of Residential Property Value throught the study period		
			1986	2000	2016
1	A	Gbagyi villa, Romi and Yelwa	Moderate	Moderate	High
2	B	Danbushiya, Danhono(I) and Babban Saura	Low	Moderate	High
3	C	Ung. Gimbiya, Ung. Sunday and Ung. Boro	Moderate	High	High
4	D	BayanDutse, Narayi and Ung. Namegero	Low	Moderate	High
5	E	Kudenda, Tirkania and Sabon Garin Nassarawa	High	High	High
6	F	Kujama, Rido Gari and Marabar Rido	Low	High	High
7	G	Buruku, Kasaya and Uduwa	Low	Low	Moderate
8	H	Kadi, Nassarawa and Nariya	Low	Low	High
9	I	Gayan Gari, Gonin Gora, and Tsohon Gayan	Low	Low	Low
10	J	Chikun, Gadani and Katarma	Low	Low	Low
11	K	Audu Jangwam, Dutse and Kasami	Low	Low	Low
12	L	Ung. Barau, Kuriga and Tashar Tsintsiya	Low	Low	Low

Source: Field work (2016).

Furthermore, the pie chart below presents the trend analysis of the residential property values in the selected ares of study in 1986 in form of percentages.

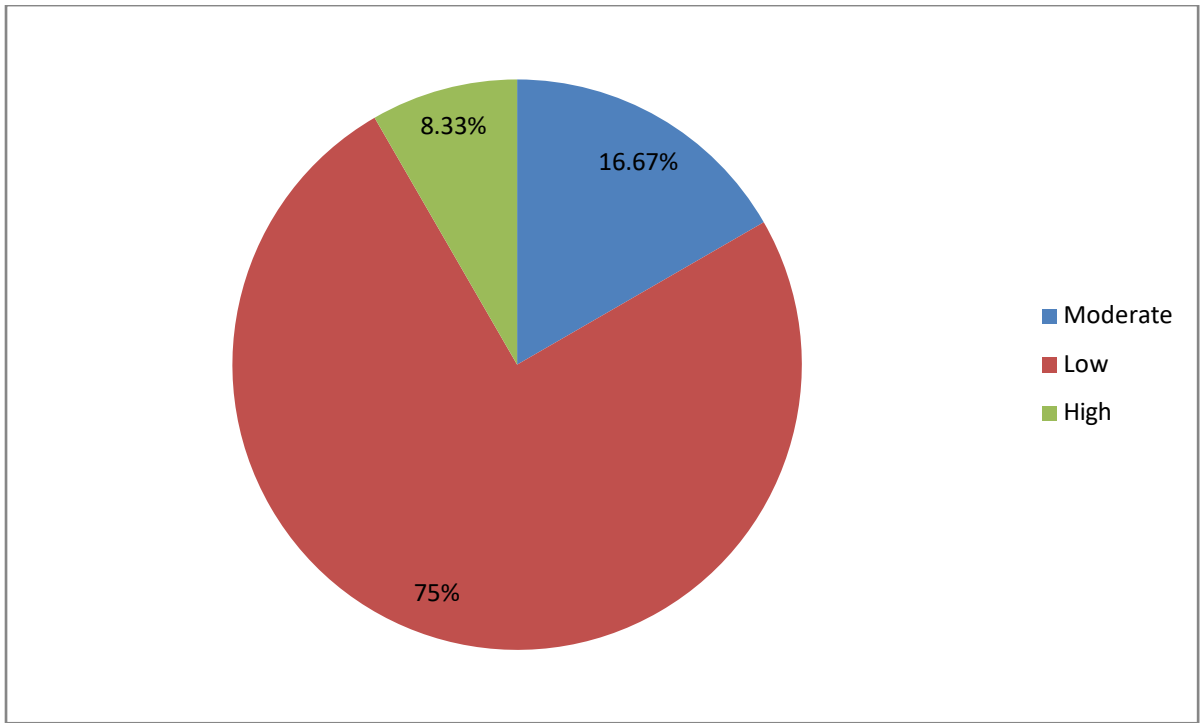


Figure: 4.4 Trend of Residential Property Values in the Study Area for 1986.
Source: Field survey (2016).

The pie chart above, depicted that 75% of the study area enjoys low residential property value, This may be connected with the fact that, most of the areas are not having social infranstructures such as good and accessible motorableways, potable drinking water, and also the issue of insecurity for businesses to prevail. This is in agreement with the work of (McQuid and Grieg, 2003). 16.67% of the study areas enjoys moderate rental fares. This could be attributed to the present of some social amenities such as the supply of electricity that encourages the development of some small business enterprises in the area. While 8.33% enjoys high residential property values (rental).

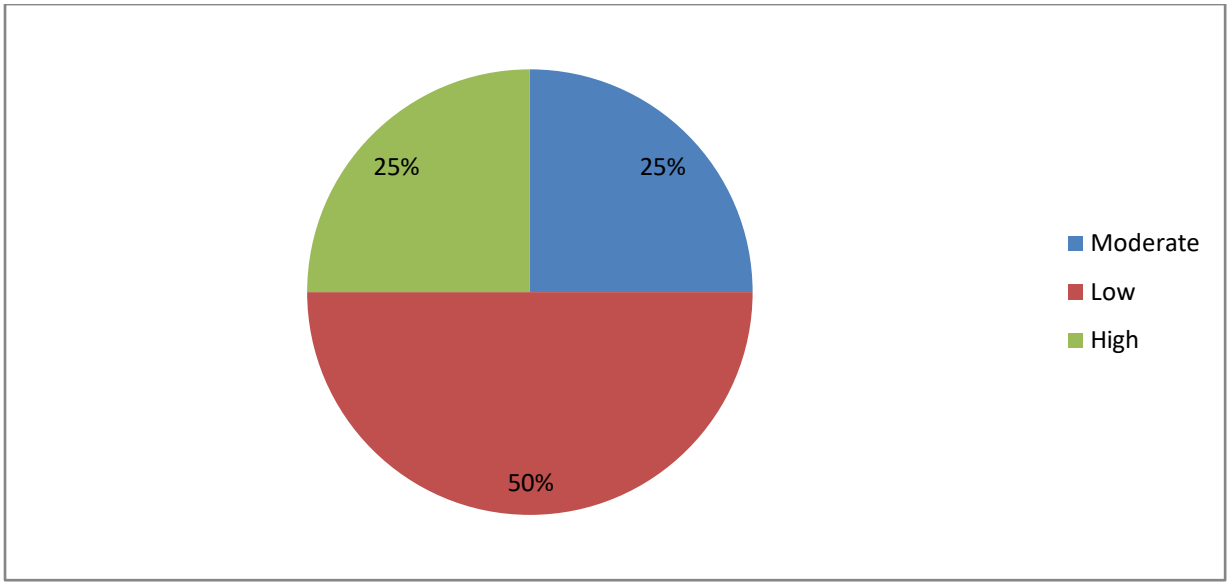


Figure:4.5 Trend of Residential Property Values in the Study Area for 2000.
Source: Field survey (2016).

The pie chart above, depicted that 50% of the study area enjoys low residential property value, This may be connected with the fact that, developed market that would encourage business agglomeration and also the issue of insecurity for businesses to prevail. This is in agreement with the work of (Harvey, 2003).

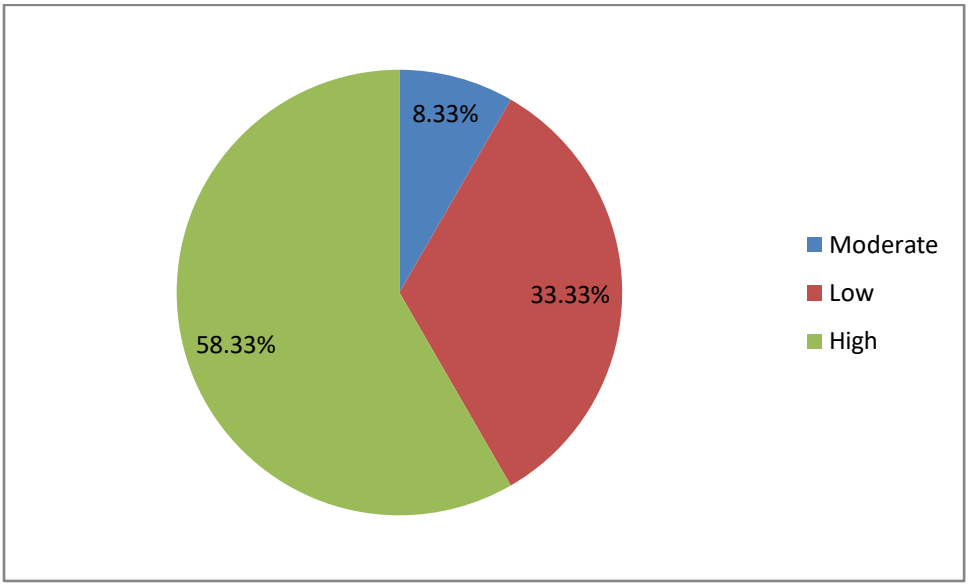


Figure:4.6 Trend of Residential Property Values in the Study Area for 2016.
Source: Field survey (2016).

The pie chart above, depicted that 58% study area enjoys low residential property value, This may be connected with the fact that, most of the areas are not having social infranstructures such as good and accessible motorableways, potable drinking water, and also the issue of insecurity for businesses to prevail. This is in agreement with the work of (McQuid and Grieg, 2003).

The results in the Table 4.9 above shows that category A in the study area enjoyed moderate residential property value in both 1986 and 2000 but high in 2016. This could be as a result of the development of private layout (Gbagyi villa) and neighbouring Yelwa which accommodate a lot of Christian faith due to the religious crisis and political unrestin Kaduna State from year 2000 to date.

Further more, Table 4.9 above had also revealed that Danbushiya (New Mellinnium City) Danhono (I) and Babban Saura that fall under category B of the study area recorded low residential property value in 1986, moderate in 2000 and high in 2016. This could be as a result of the establishment of Government layout (Millennium City Mixed Residential and Commercial Layout) in the area.

Unguwar Gimbiya, Unguwar Sunday and Unguwar Boro which fall under category C had recorded moderate residential property value (rental) in 1986 and high in both 2000 and 2016. This could be as a result of elite staus of the area coupled with good security the area enjoyed.

The results in the Table 4.9 above revealed that Bayan-Dutse, Narayi and Unguwar Namegero that fall under category D in the study area recorded low residential property values in 1986, moderate in 2000 and high in 2016. This trend could be attributed to the issue of religious crisis that engulf some neighbouring areas. In other word, it is attributed to security challenges.

The results in the Table 4.9 above revealed that Kudenda, Tirkania and Sabon Garin Nassarawa that fall under category E in the study area recorded high residential property values through out the periods under investigaons (1986, 2000 and 2016). This could be attributed to the presence of some institutions, firms and industries such as Federal Cooperative College, Chellco and flour mill among others. It is also revealed from the above Table 4.9 above that Kujama, Rido-Gari and Marabar Rido that fall under category F in the study area recorded low residential property value in 1986 and high in both 2000 and 2016. This could be attributed religious crisis insurgengy, coupled with the changed political atmosphere, occasioned by the uncertainty. In other wards, it is revealed that the major problem that has affected business in the area was civil or political unrest.

Further more Category G whch comprises of localities such as Buruku, Kasaya and Uduwa recorded low residential property values is low in both 1986 and 2000 but rose to high in 2016. The reason for low residential property (rental) value could be economic / political situation. This is largely because of security challenges that the area is facing, especially due to the arm robbery.

The results in the Table 4.9 above also revealed that Kadi, Nassarawa and Nariya that fall under category H in the study area recorded low residential property value both in 1986 and

2000, while high in 2016. This could be due to the poor accessibility and the absence of clear drainages associated with such area especially Kadi which is suffering from land degradation and serious flooding in almost every yearly wet season.

The results in the Table 4.9 above also revealed that Kakau, Gayan Gari, and Tsohon Gayan that fall under category I in the study area recorded low residential property value through out the period under investigation (1986 and 2000 and 2016). This may not be unconnected with fact that area is lacking most of the social amenities such roadnetwork, pipe borne water among others.

It is also shown from Table 4.9 above that Chikun, Gadani and Katarma that fall under category J in the study area recorded low residential property value through out the study periods, that is 1986, 2000 and 2016. This could be due to the lack of basic infrastructures in the area. This implies that such areas would attract low residential property values.

The results in the Table 4.9 also revealed that Audu Jangwam, Dutse and Kasami that fall under category K in the study area recorded low residential property values through out the study periods. It is however worthy to note that the area has it own hitches such as low business activities and lack of social aminities, and this would result into low population that invariably lead to low residential property value (rental).

Lastly, Unguwar Barau, Kuriga and Tashar Tsintsiya which fall under category L in the study area recorded low residential property values through out the periods under investigation. This could be due to the poor accessibility and the absence social aminities in the area. It is evident that the non – pecuniary motive of some land lords does not have an impact on the pattern of housing rental in the area. This is especially so in the more traditional areas of the selected localities.

The trend of the residential property values from the analysis could be as a result of variation in the quality of properties being rented by tenants and partly due to greed or lack of it on the part of property owners or land lords. Some tenants has revealed that in the same area different rents could be charged by different owners, either due to differences in structural qualities or desires of the owner.

In fact, there are situations where owners charged unusually very low rents. This was because their mission was not profit oriented, rather as assets meant for their heirs/offspring. However, an important issue to observe is that on the other hand , this study is in line with the conclusion of the classical studies (such as Wingo, 1963; Aloson, 1964) and some empirical studies (such as Jordan *et.al* 2004; Nzzau, 2003) on distance decay effect form the CBD, as far as commercial land values are concerned. That is, land values declined away from centre of the city.

On the other hand, this study has concluded that residential property value do not obey the law. The values rather influenced by things like agglomeration of business activities and security. Therefore, the general pattern of residential property values in Chikun L.G.A. is such that there are several peak values brought about by urban centres and sub- centres especially in the case of environmental qualities – notably neighbourhood and roads, particularly places such as Narayi high cost, Sabon Tasha Nassarawa and Yelwa.

In summary, the result implies that with the exception of the year 1986 the trend of residential property values is not uniform in all the areas under investigation across the periods of study (1986 - 2016). Nevertheless, there is rising cases in the residential property values with the highest record in 2016 in all selected areas under investigation. On the other hand, the more cosmopolitan areas have tended to attract high rental value. This means that investiments in real estate ventures would yield greater dividends if properties are developed or obtained around such areas.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

The study has among other findings revealed that build-up (urban) has been progressively increasing throughout the study period occupying 149.2 km² (3.2%) in 1986, 190.4km² (4.1%) in 2000 and 271.5km² (5.8%) in 2016. The result further showed that the extent and rate of urban growth in the study area increased appreciably, that is the period between 1986 and 2000 the study area expanded by 41.2km² (27.6%) at a rate of 2.0% each year. Between 2000 and 2016 the study area witnessed growh of 81.1km² (42.6%) at a rate of 2.7% annually. The overall period of the entire study (1986-2016), urban land has expanded by 82.0% at an annual rate of 2.7%. All these growth are attributed majorly due to agglomeration of business activities, security, population size increase, accessibility, among other identified determinant factors by the researcher.

In the case of spatial pattern of residential property value, it was found that the areas such as Narayi, Sabon – Garin Nassarawa, Sabon Tasha and Yelwa had recorded the highest residential property value for the period 1986 to 2016. Agglomeration of business activities, security and population size increase were some of the reasons adduced for the high values of residential property the areas enjoyed. While others such as Kujama, Rido, Kunai, Nassarawa, Chikun, Kunai, Gwagwada, Kakau and Kuriga enjoy moderate and lowest residential property values respectively, and the observed spatial pattern was in line with theories, such as that of Alonso (i.e. the land value theory).

On the effect of urban growth on residential property value, it was found that the majority of the respondents, to be precise one hundred and twenty (120) respondents constituting 31.25% were of the opinion that the provision of quality water (availability of water supply) would affect residential

property values (rental) either to increase or decrease. In other word, residential property values tend to rise where there is availability of qualitative water supply and vice vasa. Further more, it is revealed from the findings that the residential property values (rental values) estimated on the average shows increments in all the selected areas of study where there is qualitative water supply.

It is also established from the findings that, ninety eight (98) of the respondents (25.52%) have the believed that, land degradation affect residential property value (rental). In other word, areas that enjoy good topography tend to have high rental value than areas with poor topography (landslides, gullies,steep sidedness landetc). It was also revealed from the research findings that good access roads help in determining residential property values in the study area respectively.

The study identified the trend of residential property value as not uniform through out the entire study area (Chikun L.G.A.) with the highest recorded residential property values in 2016 and least recorded value in 1986. This is attributed to the uneven distribution of infrastructural facilities, agglomeration of business activities, accessibility, security among other determinant factors identified by the researcher.

5.2 Conclusion

The study has analyzed the effect of urban growth on residential property values in Chikun L.G.A.,Kaduna State, Nigeria. The study was limited to the investigation of the interrelationship between urban expansion and residential property values without dwelling on the sales value of residential properties.

The major findings are that agglomeration of business activities, security and population size have a combined influence of about 20.8%, 18.8% and 16.1% on residential property values respectively. While urban growth affect residential property values positively.

The findings of the study have further contributed to new knowledge in urban growth and residential property values. Firstly, the factors that determine urban growth were thouroghly analyzed and the effect of such on residential property values of the study area was demonstrated.

Secondly, this study employed Geographic Information System techniques for the analysis of data. This data analysis approach by the study is a fresh break through from the most of the earlier research studies on urban growth and property values in Nigeria which were undertaken solely with the aid of analytical and technical tools that have been found to have some limitations which may likely affect the quality of results and deductions made from the analysis of data collected for such studies.

Lastly, the findings of this research have contributed immensely to the body of knowledge of urban economics in general and residential property values in particular especially as it relate to cities in developing countries which have been grossly under – theorized and frequently under – emphasized in mainstream urban studies.

5.3 Recommendations

In view of all these. Today Chikun L.G.A. has experienced urban growth around several additional nuclei probably for is population size and there appears a significant increase in residential property values over time as well as a variation in pattern of residential property values over space in said Chikun L.G.A. with some areas exhibiting very high rental charges while others with low. As a result, there have been increases, not only in residential rental values but also in vacant lands around the study area. (Wikipedia, 2009) it is believed that understanding of land value and its spatial pattern in the study areas will be of importance in urban planning, management and development as well as anticipating future changes.

5.3.1 Policy Recommendation

The outcomes of this study have highlighted the importance of planning or design in an urban environment. That is, it has shown that areas that were planned for settlements (residentials) had the tendency to attract higher residential property value than those unplanned. This is apart from several beneficial values associated with planned areas. Based on the foregoing, the following are hereby recommended:

1) Since it has been found that owners of residential property arbitararily increase tenement rates, often too frequently, there is need for the Kaduna State Government to set certain limits of rent chargeably, based on the quality of areas and property quality.

2) There is the need to both formulate and enforce housing policies and also planning laws in order to allow for balance allocation of values uses.

3) Provision of basic Infrastructural facilities, such as good roads and pipe-borne water should be made available by the State Government in all nooks and corners of the study area and there should be periodic maintenance of such facilities.

4) Finally, it is certain from the result that Remote sensing and GIS can be use as a means for not only monitoring but planning of urban development in the study area and similar urban centres in the State. Further more, it has become imperative that Government Agency saddle with the responsibilities of planning should include in their toolkits particularly establishing functional GIS in their work domain since monitoring urban expansion can reduce serious threat to other per-urban farming activities and residential property values since most of the changed to built – up areas are farmlands and open space.

5.3.2 Recommendation for Further Research

One area for further research could be to examine extensively the nature of land use / land cover with emphasis on the pattern of agricultural land value in the area, especially as it relates to the activities of land speculators.

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Appendix

EFFECT OF URBAN GROWTH ON RESIDENTIAL PROPERTY VALUE IN CHIKUN LOCAL GOVERNMENT AREA KADUNA STATE, NIGERIA.

Department of Geography and Environment Management,
Faculty of Physical Sciences,
Ahmadu Bello University, Zaria.

Dear Respondent,

I am a M.Sc. student of the above University conducting a research on the Effect of Urban growth on Residential Property Values in Chikun Local Government Area, Kaduna State, Nigeria. Please, your sincere responses to these questions are required. Information supplied will be strictly for academic purpose. Your assistance and cooperation is highly appreciated.

SECTION A: Socio - Demographic Characteristics

1. Locational Office / Address----------

2. **Gender:** (a) Male ☐ (b) Female ☐

3. **Age:** (a) 18- 27 (b) 28 – 37 ☐ 38 – 47 (☐ -57 (e☐ 67 ☐

(f) 68 and above ☐

4. **Marital Status:** (a) Single ☐) Married ☐

5. **Educational Level :**(a) Informal ☐) Primary ☐ econdary ☐

(d) Tertiary ☐)others (specify): _____

6. **Occupation:** (a) Farming ☐ Commecial /trading (☐ vil Service ☐

(d) Rent collector ☐ Estate dealer (☐ hers, please specify----------

SECTION B: Determinant factors of urban growth in the study area

7. What are the factors that generally determined urban growth in Chikun L.G.A.? Please rank in order of importance (1 being most importance, 2 being next, then 3, 4 to the last)

S/N	Factors	Ranking
1	Planning Regulation	
2	Development of Infrastructure	
3	Agglomeration of business activities	
4	Population Size	
5	Accessibility	
6	Capital Investment	
7	Government policies	
8	Commercial and industrial sub -centres	
9	Socio - Economic status	
10	Security	

8. In the last thirty (30) years (from 1986 to 2016), has there been any difference in the residential property values (rental value) based on location ?

(a) Yes (b) No

9. if Yes to the above, what was the averag price of bunglow 3 bedroom (made of blocks) during the following stated periods in the areas listed?

Location	Average rental price per annum in Naira (#)		
Chikun	1986	2000	2016
Kunai			
Gwagwada			
Kujama			
Kakau			
Kuriga			
Nassarawa			
Narayi			
Rido			
Sabon Garin Nasarawa			
Sabon Tasha			
Yelwa			

9. What are the factors affecting Residential Property Values in the Study Area?

S/N	Responsible factors	Rating	
		Frequency	Percentage
1	Availability of Water quality		
2	Land Degradation (erosion & defforestation)		
3	Access roads		
4	Electricity supply		
5	security		

10. Which of the following location attrach the highest residential property value? Please rank in order of magnitude (1 being highest, 2 being moderate and 3 being lowest)

S/N	Location	Highest	Moderate	Lowest
1	Chikun			
2	Kunai			
3	Gwagwada			

4	Kujama			
5	Kakau			
6	Kuriga			
7	Nassarawa			
8	Narayi			
9	Rido			
10	Sabon – Garin Nassarawa			
11	Sabon Tasha			
12	Yelwa			

Thank you for your corporation.

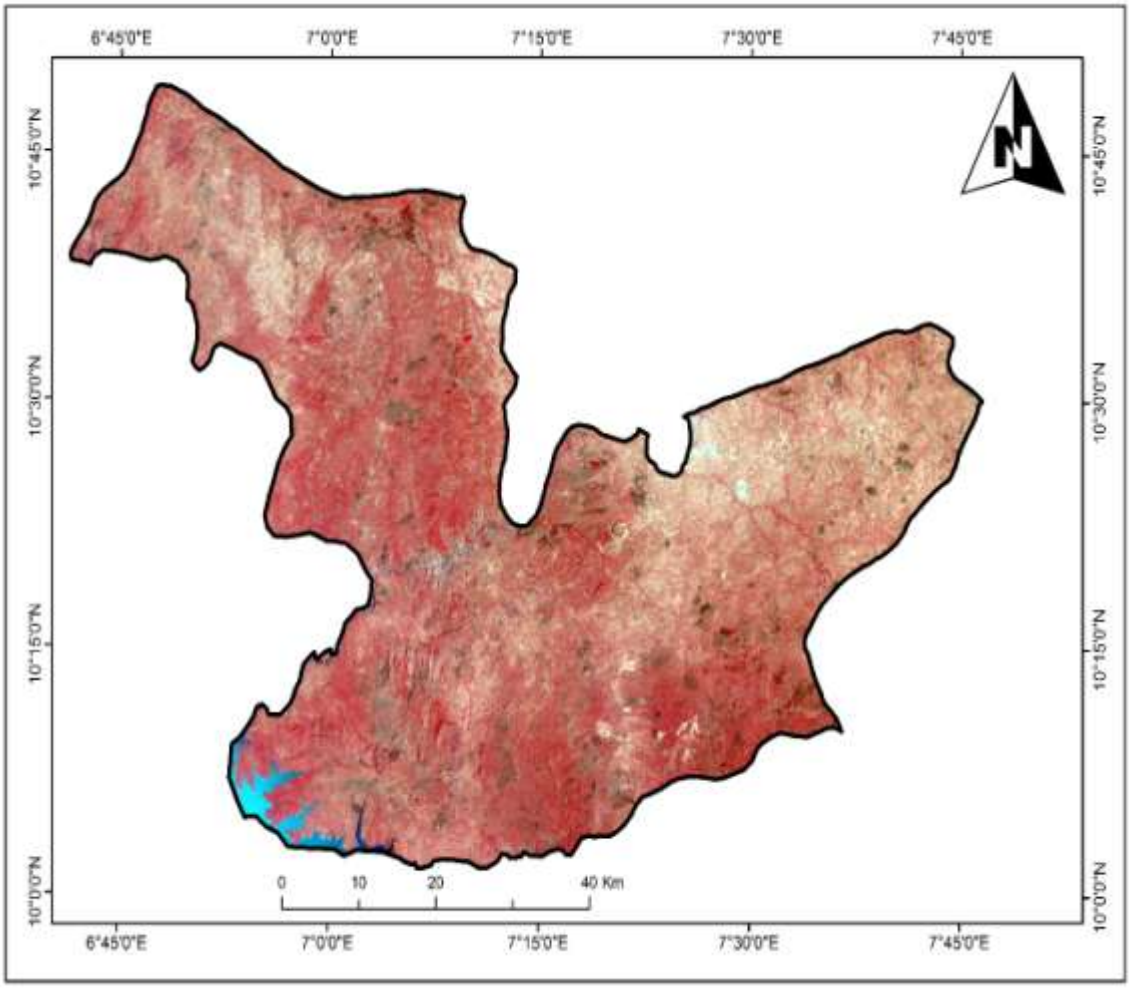


Figure 4.7 Landsat TM Imagery of Chikun Local Government Area, Captured in1986.
Source: United States Geological Surveys (USGS) (2016).

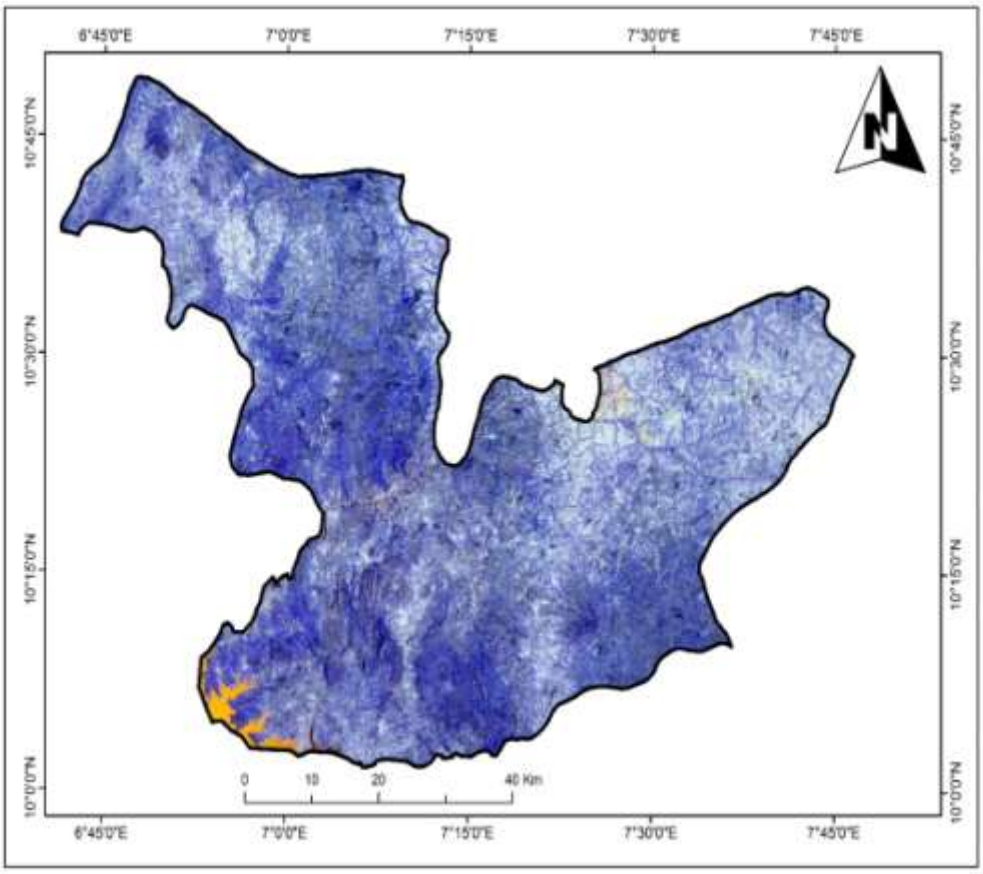


Figure 4.8 Landsat ETM+ Imagery of Chikun Local Government Area, Captured in 2000. Source: United States Geological Surveys (USGS) (2016).

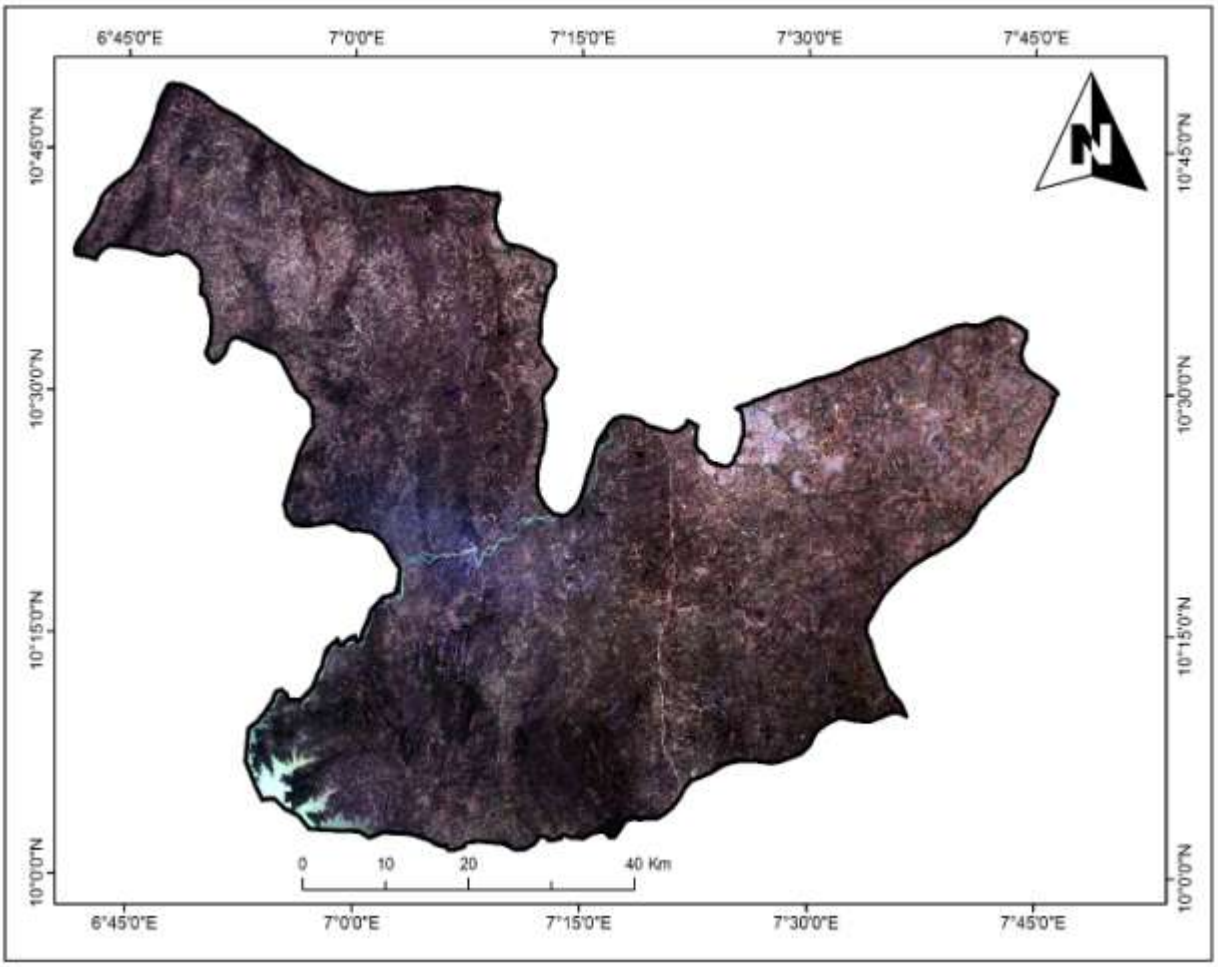
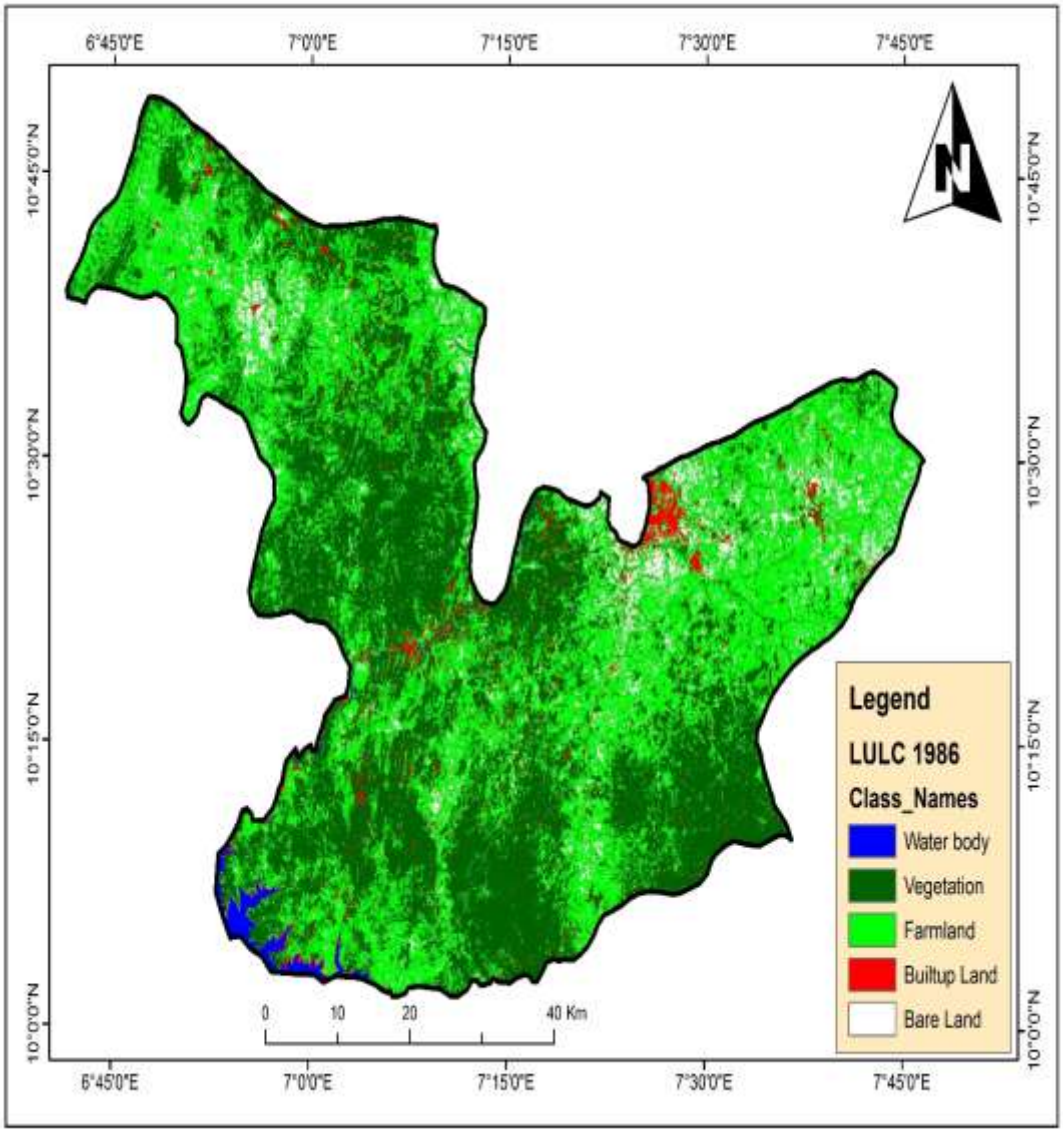
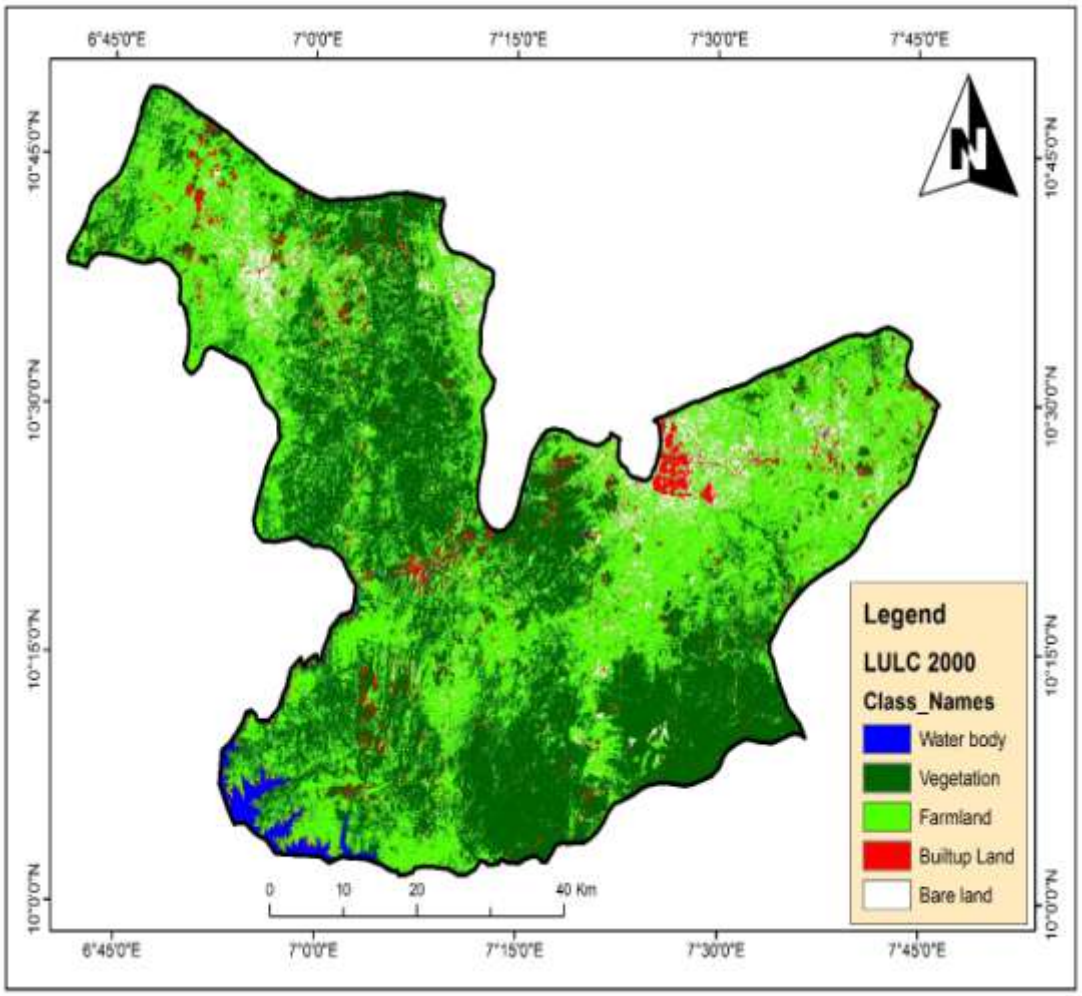


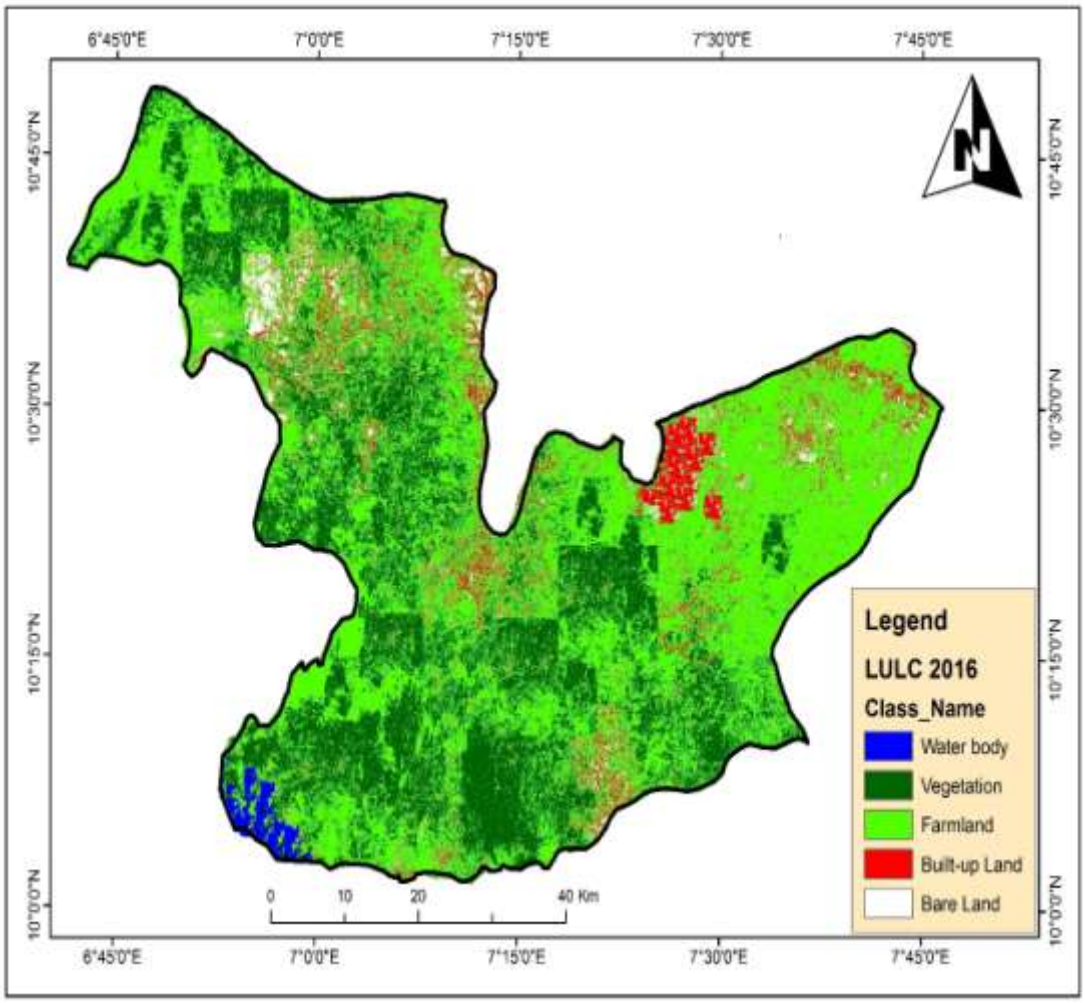
Figure 4.9 Landsat 8 Imagery of Chikun Local Government Area, Captured in 2016
Source: United States Geological Surveys (USGS) (2016).



Spatial Extent of built – up and non built – up areas in the study area in 1986
Source: Author's Analysis (2016).



Spatial Extent of built – up and non built – up areas in the study area in 2000
Source: Author's Analysis (2016).



Spatial Extent of built – up and non built – up areas in the study area in 2016
Source: Author's Analysis (2016).