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URBANIZATION DYNAMICS AND LAND USE PATTERN IN BIRNIN KEBBI, NIGERIA

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The purpose of this research work is to critically examine the effects of urbanization dynamics on land use pattern in Birnin Kebbi, Nigeria. In the study, a survey was carried out using questionnaire and oral interview. One set of structured questionnaire was designed and administered for the collection of primary data used for the study. 340 questionnaires were administered on the household heads in the urban fringes in Birnin Kebbi and subsequently used for analysis. Likert scale, urban growth rate formula and lands at imagery were used to analyze the primary data collected for the determination of the causes of urbanization and its effects on urban fringe land use pattern in the study area.

Investigation indicated that the study area experienced urban expansion and this has affected the urban fringes. The effects are among others, the reduction in urban farm activities, increase in the cost of infrastructural development and transportation cost.

The study provided vital information with respect to: provision of cost effective transportation to ease the problems of commuters, establishment of pragmatic institutions that will see to the effective land use control and management at the urban centres and peri-urban area, effective crime control mechanism at both urban centres and fringe areas so as to discourage the use of urban fringes as hideout for criminals.

Research work on the subject of urban land uses in Nigeria mostly concentrated on the urban centres. This study extended the frontier of knowledge in this field by empirically assessing the effects of urbanization dynamics on the urban fringe land use pattern in Birnin Kebbi, Nigeria.

Keywords: Urbanization, Urban fringes, Land.

Introduction

Urbanization can be defined from different perspective but in whatever form it is described, it is related to population. Urbanization is a complex process in which a country's organized communities become larger, more specialized and more independent (Bertaud, 1989). Urbanization is as a result of many variables – economic, technological, demographic, political, environmental factors and it is inevitably accompanied by changes in society. The extension of the urban environment in terms of territorial

coverage and population has remained a common experience all over the world (Vestry & Krupa, 1997). The world has been urbanized rapidly for a long period of time and shows every sign of continuing to do so. Study revealed that more than 40% of the world's populations today are urban dwellers, and this poses complex management problems (Angotti, 1993).

As population and affluence increased, we need more land for many uses. Since one land cannot grow except at the expense of another, there is inevitable conflict between those desiring the same land use for different purposes. Therefore, the growth of metropolitan areas brings into bear agricultural land use conflicts (Hailu, 2002).

An urban fringe which is the peripheral parts of urban areas is facing a lot of pressures due to urban growth and in this regard most of the activities that are being carried out are increasingly facing some threat. One of the natural resources facing demographic, economic and technological pressures is agricultural land. Consequently, today there are growing concerns and issues around land use systems and preservation. Historically, land has been a critical input defining economic and social life in almost all parts of the world. Its significance ranged from defining community identity and political territory to the very basic provision of a way of life for agrarian societies and transformed economies.

The World Resource Institute, in its 1996-97 land conversion assessment, reported that .although the amount of land converted to urban uses may be small globally, a trend is emerging in both developed and developing countries; cities from Los Angeles to Jakarta, Indonesia, are rapidly expanding outward, consuming ever greater quantities of land. This urban sprawl, characterized by low-density development and vacant and derelict land, leads to the wasteful use of land resources, higher infrastructure costs, and excessive energy consumption and air pollution because of the greater use of motorized transport. In the course of this investigation therefore, it becomes pertinent to provide answers to the following questions: What are the indicators of urbanization? What is the trend of urbanization? How does urbanization affect urban fringes? These are the questions, which this study intends to provide answers.

Literature Review

Land in any form may be use for one or all of the following:

Residential; Agricultural; Industrial; Commercial; Recreational; Institutional land uses

- Residential land use- Land put into the development of the most common type of property development which production or development is most often related to availability of land, population growth rate and the level of housing need in the society.

- Agricultural land use – The use of land for the cultivation of crops and rearing of animals e.g. farmland, farmhouse, ranches, orchards e.t.c.

- Industrial land use – land use for the development of Industrial properties. Industrial properties refer to every class of property primarily used for the production of goods and services. Decree 88 of 1992 has also defined industrial property as any use of land, building and development for the purpose of extracting or production from another substance, processing any mineral and repairing or working on any mechanical equipment. Examples of such properties include: furniture, mining, factories and warehouses.

- Commercial land use - This relates to land use for the development of properties that are basically used for trading (buying and selling). This is broadly divided into shops and office premises. It is the use of land for shop or retail shops, office space, hotels, night clubs, guest houses, restaurant and roadside stall, warehouses and other storage building or facilities, an open or lock-up market and any development related to the above mentioned uses. Most of these commercial buildings are largely concentrated in the business district centers of most cities.

- Recreational land use – land use for the development of properties use for any activity that is not work or sleep or any activities that one involves himself in during ones free time or to amuse or educates on his own free will or interest. Recreation and Leisure activities are necessary for the well-being of human life.

- It is important to note that residential, agricultural and industrial land uses are more pronounce in the urban fringes.

Study Area

Birnin Kebbi town is the administrative centre of Kebbi State which was created on August, 1991. It is located on Latitude 10° 8' North and Longitude 3° 31' of Greenwich Meridian in North –western part of Kebbi State. It is approximately 140 kilometers from Sokoto Metropolis and about 300 kilometers to Kontangora, a town in Niger State as indicated in figure1

Fig.1. Map of Nigeria showing Kebbi State.

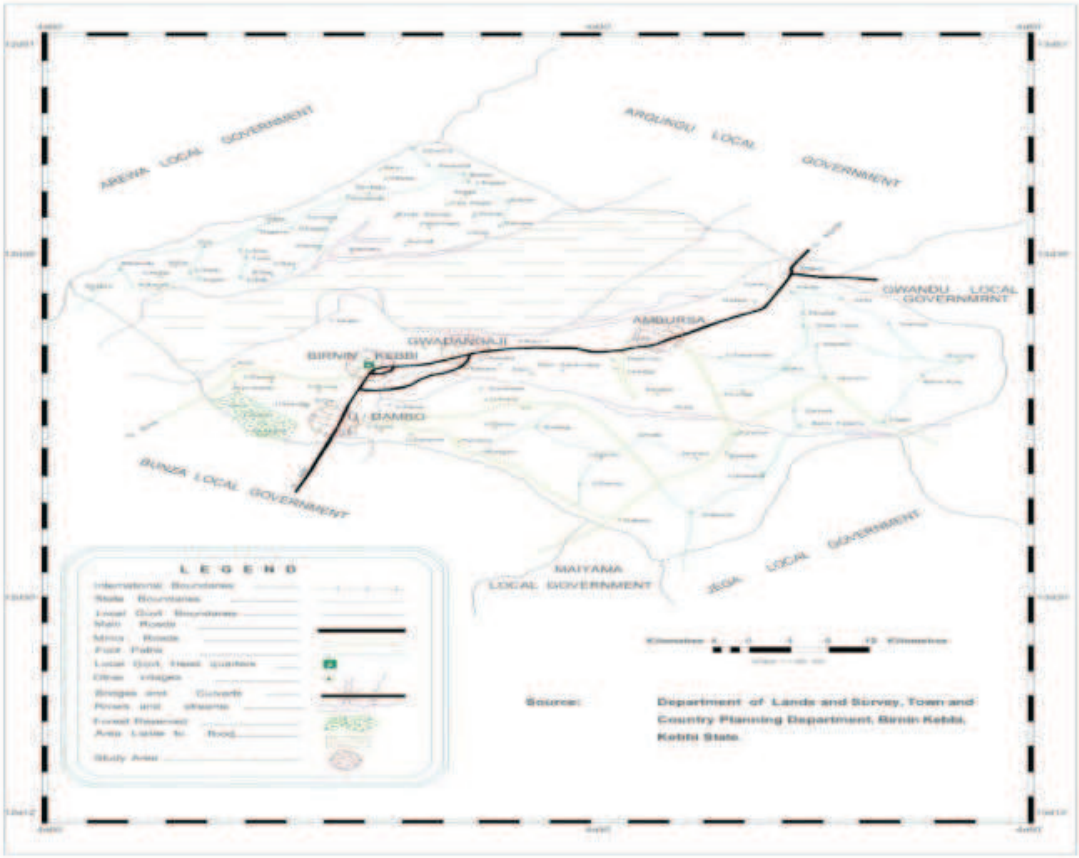

Fig. 2 Birnin Kebbi, the study area.
Source: Kebbi State Ministry of Lands, Housing & Urban Development

The rate of migration into Birnin Kebbi has been on the increase right from the time the State was created (Kebbi State Bulletin, 2006). Movements of people have been from all fronts - movement from other parts of the country, outside the shore of the country and within the State. This situation has triggered upsurge in population as indication shows that population continuing to grow at a fast rate. The 1991 National Population Census puts the population of Birnin Kebbi at 151,457 while the 2006 National Housing and Population Census recorded a figure of 268,420. This shows an annual growth rate of 3.45%. (Kebbi State Bureau of Statistics, 2007).

As the population increases so also the human economic activities spread in diverse directions. Many infrastructural developments have been on board since the past decades such as new State secretariat, Adam Aliero Housing Estate, Diary Industry, Plastic Industry, New Road Developments, Private Housing developments, Kebbi Airport, etc. All these had eaten deep into urban fringes and the effects of these urban expansions into the fringes formed the policy thrust of the research work.

Materials and Methods

In this study, the research methodology was designed to obtain data on the effects of urbanization on urban fringes in Birnin Kebbi Township. Data were collected on the indicators of urbanization, rate of urban expansion and effects of urbanization on urban fringes. The data were later processed to give the

overall assessment of the effects of urbanization on urban fringes as well as forming the basis for making recommendations that would improve the urban management in Birnin Kebbi town.

Data collected in the pursuit of this study were from two main sources. These are primary sources and secondary sources. The primary data were sought from the field surveys conducted through the administration of one set of questionnaire. The set of questionnaire was designed for the household heads in the study area.

The questions in the questionnaires among others probed into the causes of urbanization, effects of urbanization on urban fringes. A total of 340 questionnaires were distributed based on the numbers of household heads selected. Secondary data used in the study area include Landsat image of Birnin Kebbi Township, maps of Kebbi State and Birnin Kebbi town and its environment. The analysis of the data collected from the household heads in the urban fringes was done using likert scale. The likert scale is capable of handling the respondents' level of agreement to questions and thereafter ranks these statements after collation to determine the relative importance of each statement. Weighted mean score was also used to analyze the respondents' perceptions. This is done on a 5-point Likert scale with the view to estimating the mean score, where numerical values are assigned to respondents rating. For the purpose of this study, mean score is determined as follows:

$$\frac{5n_5+4n_4+3n_3+2n_2+1n_1}{N}$$

$$\text{Mean score} = \frac{n_5+n_4+n_3+n_2+n_1}{}$$

Where n_5= number of respondents who answered strongly agreed

n_4= number of respondents who answered agreed

n_3= number of respondents who answered undecided

n_2= number of respondents who answered disagreed

n_1= number of respondents who answered strongly disagreed.

N = total numbers of questionnaires retrieved

Results and Discussions

Extent and Growth Rate of Birnin Kebbi Town: Visual Image of Rate of Urban Expansion of Birnin Kebbi Town

The visual image of the Birnin Kebbi town revealed the extent of urban expansion as shown in fig. 3, 4 and 5

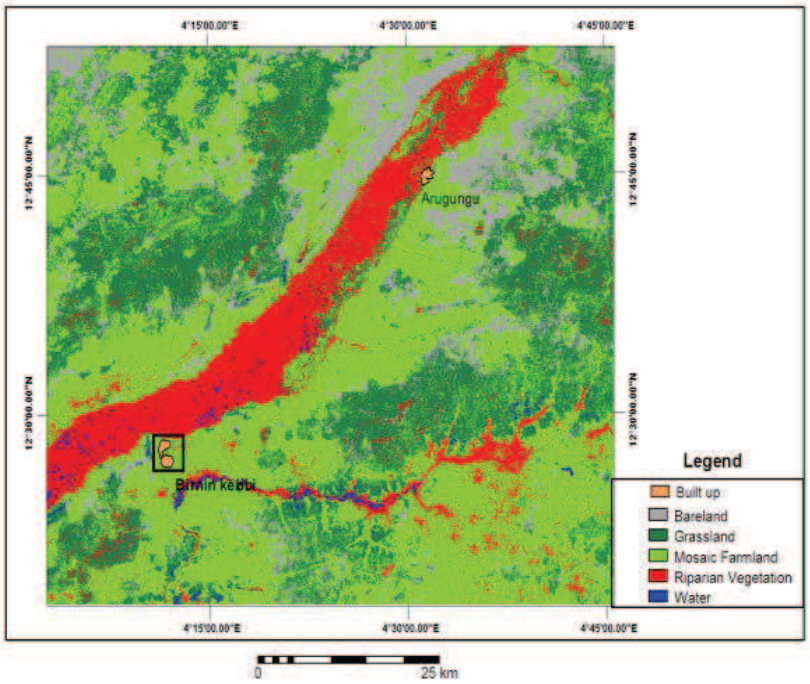

Fig. 3. Classified Landsat ETM (1986) Image of Birnin Kebbi and Environs.
Source: RECTAS, OAU, Ile- Ife, Nigeria

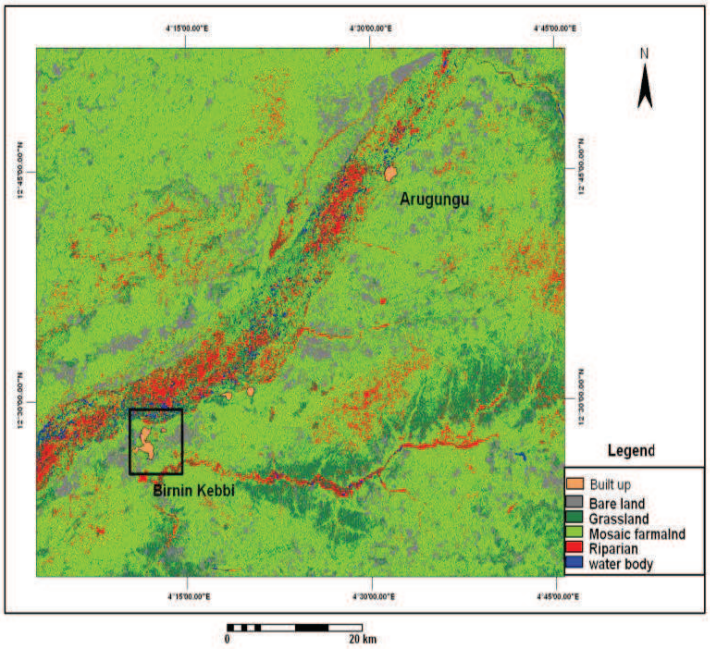

Fig. 4. Classified Landsat ETM (2000)Image of Birnin Kebbi and Environs.
Source: RECTAS, OAU, Ile- Ife, Nigeria

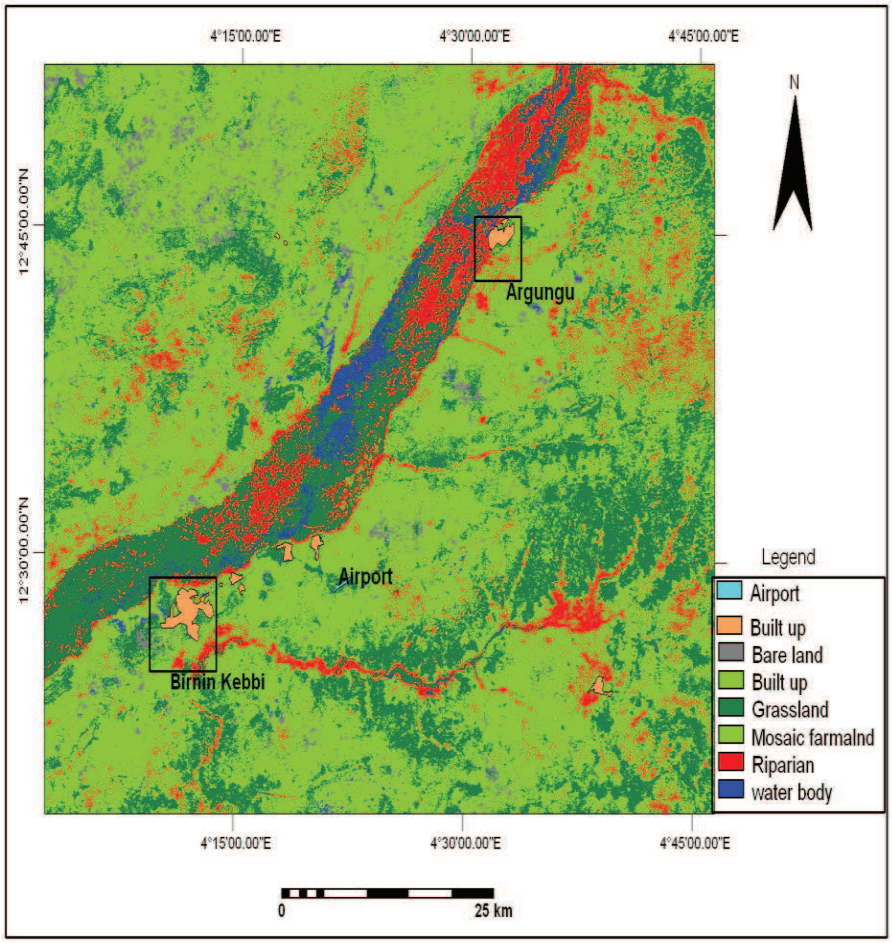

Fig. 5. Classified Landsat ETM (2008) Image of Birnin Kebbi and Environs.
Source: RECTAS, OAU, Ile- Ife, Nigeria

Fig.3, 4 and 5 are the land use maps of Birnin Kebbi and its environment where the urban expansion have turned vacant land into mostly residential land uses . The maps revealed the rate of urban expansion in the area. For example, Birnin Kebbi town the sit of Government grew in size from 3.92sq. Km. in 1986 (fig. 2) to 5.29sq. Km. in 2000 (fig. 3) and in 2008 the town expanded in size to 11.32sq. km. (fig. 4). These are shown in the built up areas in the land use map based on calculations by RECTAS digital database. This implies that the growth of the urban areas have encroached on urban fringe land uses. This is a threat to urban fringe land tenure security and causes land speculation, rising land values, high cost of transportation to dwellers of urban fringes and so on.

Percentage increase in land intake, urban growth rate and urban fringe encroachment

Growth rate determination: The growth rates of Birnin Kebbi town for different periods were obtained by growth rate formula given by Ayobami (1990).

$$r = \frac{DA}{nAo} \times 100$$

Where: r = Growth rate

DA = The change in the area extent between the base and horizontal years

Ao = Area extent in the base year and n = Number of years

(3) Percentage increase: The land intake for urban development in Birnin kebbi town for different periods were calculated adopting the CES Development Consortium (2005) formula, which is given as:

$$PI = \frac{Ao}{Tao} 100$$

Where: PI = Percentage increase,

Ao = Area extent in the base year

TAo = Total area extent in the periods under study

Table 1: Percentage land intake and urban expansion in Birnin Kebbi township.

S/No.	*Period(yrs)*	*Land intake (ha.)*	*Percentage increase (%)*	*Urban growth rate (%)*	*Population projection(1980-2010)*
1.	*Before 1980*	**623*	***10.25*	*Xx*	*71,246*
2.	*1980-1984*	**314*	***5.16*	***12.40*	*107,214*
3.	*1985-1990*	**500*	***8.22*	***16.40*	*144,206*
4.	*1991-1995*	**567*	***9.32*	***1.30*	*201,361*
5.	*1996-2000*	**1125*	***18.51*	***19.70*	*238,426*
6.	*2001-2005*	**1349*	***22.18*	***2.00*	*261,272*
7.	*2006-2010*	**1603*	***26.36*	***5.60*	*308,812*
ToTotal		*6081*	***100.00*		

Sources: *CES – Development Consortium, Kebbi State 2005 Master Plan.
**Calculated from formula.

The percentage land intake and rate of urban growth for Birnin Kebbi town have been calculated for different periods as revealed in Table 4.11. Before 1980 10.25% increase was noticeable and this fell to 5.16% between 1980 and 1984. Thereafter, the town started growing steadily. Between 1985 and 1990 a growth rate of 8.22% was experienced. However, the periods of 1990, 1995 and 2000 revealed a vast expansion in the rate of urban growth in the town. These periods coincided with economic boom era of the 1980s and the creation of States in Nigeria in the 1990s and Kebbi State inclusive. These phenomena enhanced urban land encroachment on the fringes as a result of urban expansion with the attendant effect of increase in land value, cost of urban infrastructure, transportation cost and so on.

Direction of growth of Birnin Kebbi town

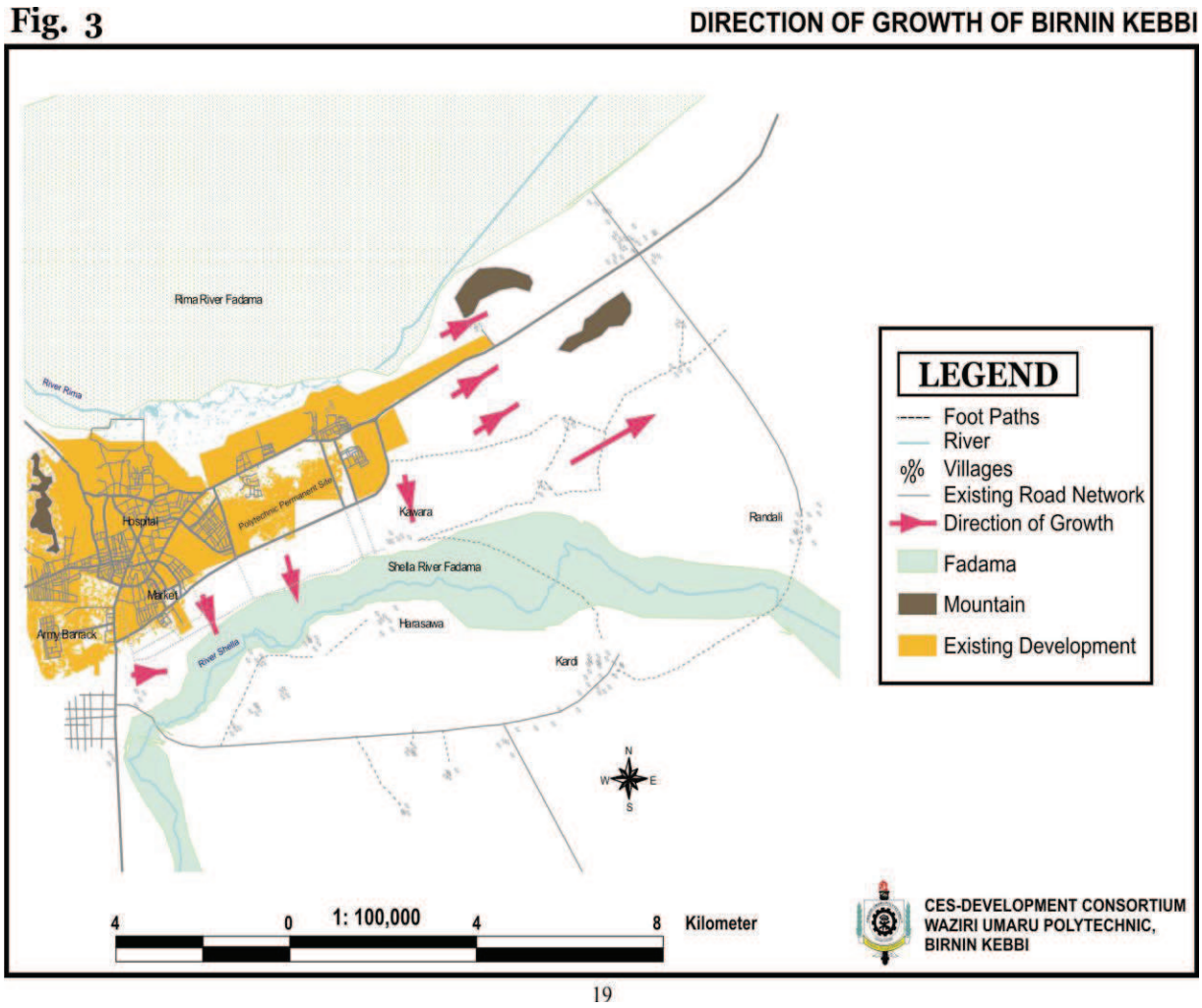

Fig. 6. Direction of urban growth in Birnin Kebbi town.
Sources: CES Development Consortium, Birnin Kebbi 2005 – 2015 Master plan.

From the land use map in fig. 6, the directions of urban developments are toward the major roads and the adjoining rural villages that are mainly agricultural lands. This direction of urban growth encroaches on urban fringe land uses and reduced the available land and increases cost of urban infrastructure in the study area.

Causes and Effect of Urbanization on Urban fringes in the Study Area

Table 2: Causes of Urbanization in the Study Area.

Causes of urbanization/Opinion	Strongly Agree x5	Agree x4	Undecided x3	Disagree x2	Strongly Disagree x1	Sum	Mean score	Interpretation (Consensus opinion)
Population changes; migration, birth rate increase, etc.	251	65	3	21	-	1566	4.61	Strongly Agree
Urban infrastructure developments	226	83	-	28	3	1521	4.47	Agree
Seeking urban opportunities; jobs, education, social env. Etc.	208	30	6	20	4	1582	4.05	Agree
High land/ property values in urban centres	140	150	-	50	-	1400	4.12	Agree
Changes in economic parameters of the town	212	102	-	26	-	1520	4.47	Agree

Source: Field survey, 2011.
Decision rule: Mean score: 1-1.5 = Strongly disagree, 1.51 - 2.49 = Disagree; 2.50 - 3.9 = undecided; 3.50 - 4.49 = Agree; > 4.50 = Strongly Agree

Table 2 revealed that all the variables are factors responsible for urban growth in the study area. However, population growth is the strongest variable as it has the highest mean score of 4.61.

Table 3: Effects of Urbanization on Urban Fringes

Effects of on urbanization fringes	Strongly Agree X5	Agree X4	Undecided X3	Disagree X2	Strongly disagree X1	Sum	Mean score	Interpretation (Consensus opinion)
Rising farmland values	110	203	2	20	5	1213	3.57	Agree
Sharp practices in relation to land transaction	90	115	65	51	19	1226	3.61	Agree
Urban development encroaches on lands in urban fringes	251	88	-	28	3	1666	4.90	Strongly Agree
Cost of transportation for dwellers in urban fringes increases	243	81	2	11	3	1570	4.62	Strongly Agree
Cost of urban infrastructures increases	107	107	-	120	6	1209	3.56	Agree
Increase in urban crime	251	87	1	28	19	1581	4.65	Strongly Agree

Source: Field survey, 2011

Table 3, indicate that all the variables are factors that affects urban fringes as all the respondents agree with the listed variables with the exception of urban development encroaches on land in the urban fringes and cost of transportation for dwellers in urban fringes and urban crime increases which they feel are stronger factors.

Conclusion and Policy Implications

This paper used a detailed landsat and likert scale to investigate the effects of urbanization on urban fringes land uses. We find strong evidence that the urban growth is rapidly advancing in the direction of the urban fringes in the study area. This situation increases the problem of loss of land at urban periphery thereby increasing the cost of peri-urban land value, cost transportation and other allied infrastructures. If

this is allowed to persist, it will breed land speculations which could pave way for landownership contestation/disputes thereby resulting in violent conflicts.
From the above, we thereby recommend that;

1. Effective policies/legislation that will enhance the preservation of natural/cultural heritage should be put in place.
2. The establishment of pragmatic institutions that will see to the effective land use control and management at the urban centres and per-urban areas.
3. Provision of cost effective transportation system to ease the problems of commuters.
4. There should be effective crime control mechanism at both urban centres and fringe areas so as to discourage the use of urban fringes as hideout to criminals.

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