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Appraisal Of Landuse /Land Cover Conversion In Alimosho Local Government Area, Of Lagos State, Nigeria

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Abstract
All of man's activities are based on land, it is the single most important resource man owns and it is limited in supply, which is why this research work carried out an appraisal of land use conversion in Alimosho local government of Lagos State to examine the extent of land use changes, driving factors, effects and roles of urban planning authorities, to provide information on creating a sustainable and more balanced environment. The land concept was adopted for the study. Primary and secondary sources of data were used. The primary source used a questionnaire which was administered by the residents. The total number of buildings per square kilometer was determined and 5% of it was used, having 194 questionnaires that were administered in all the wards of the local government. The sampling procedure for this research was systematic random sampling where we picked a building from each quadrant of the housing building map for each ward in the Alimosho Local Government area. The secondary source used was a list of wards and Landsat images of Alimosho LGA. The Landsat was acquired for three epochs; 1990, 2004, and 2018 obtained from the Global Land Cover Facility (GLCF), an earth science data interface. Findings revealed that in Alimosho Local Government, 7.6% was deep vegetation, 14.4% was leafy vegetation while the built-up areas took up a significantly large part of up to 77.4%. Within the 28 years of understudy, there was a loss of 20 square kilometers of deep vegetation cover. Leafy vegetation suffered the most with 54 square kilometers lost to development, with urban areas gaining 94 square kilometers in expansion. The ordering of factors that influence the land use conversion as identified by the respondents with the use of the Likert scale was urbanization with a mean of (4.73), land as capital stock (4.72), and peri-urban agriculture (4.55) while the effects of land use conversion included outmigration and disruption to existing economic structure. The planning institutions had a role in giving approvals for building conversion and demolishing unapproved conversion developments. There should be a collaborative effort in enforcing planning regulations, government needs to work more with residents, educate them, and enlighten them on the disadvantages of arbitrary building conversion.

Keywords: *Landuse, urban development, landcover, urban areas*

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I. Background Of The Study

Land is the single most important resource to man, as all human activities are land based. Land with its spatial attributes provides the needed support for human activities both in terms of location and provision of materials needed for its conduct (Surya,2015). The use of land and its organization varies from city to city but it commonly includes provision of shelter, recreation, extraction and processing of materials among others. Therefore, the use and management of urban land have both beneficial and detrimental impacts on the sustainability of cities. Although cities serve as engines of economic growth, centres of innovation and social interaction; however, it is important that their development should not destroy land resources and biodiversity. Over the years, landuse has been very dynamic due to a variety of factors such as economic, environmental, socio-political and legal among others. Population increase and human activities intensity make the quantum of developable land available to continue decrease daily (Adepoju and Adepoju, 2016).

Landuse conversion is fast becoming a common event in urban centres due to the high rate of urbanization. The situation is more pronounced in the cities of Third World countries where physical planning is often reactive and piecemeal *(*Okeke, 2016). According to United Nations (2014), the world is now in the 'Century of the Cities' as more than half of the world's population are already living in urban areas. Hence, urbanization did not just increases urban population but also expands cities' size; which if not well planned, leads to haphazard development and illegal conversion of land use. This phenomenon, if left uncheck, pose a great threat to sustainability of urban planning, and the achievement of goal 11 of the Sustainable Development Goals which aims at making cities inclusive, safe, resilient and sustainable.

Globally, cities face the challenges of overpopulation, lack of adequate housing and infrastructure, and pollution; with over 3.6 billion people. The pressure placed on urban land and its resources by these challenges had led to the fast rate of land conversion in cities. For instance a study conducted by a group of researchers in Colombia University reveals that in 1980s, urban areas all over the world only covered 1.8% of the earth surface. This figured increased to 2.7% by the year 2000; and also increased again to 3.2% in 2017. The study also revealed that most of the growth in cities resulted from the conversion of hitherto farmland, water bodies and vegetation covers (UN, 2017). In spite the fact that urban areas cover relatively small portion of the earth's land surface, they utilize about 60 – 80% of the world's energy consumption. Thus, city planning and management become paramount.

In Nigerian urban areas, land conversion by developers, from its originally approved plan, has been manifesting itself as an unabated consequence of urbanization. In cities like Lagos, Ibadan and Port Harcourt, land use conversion is encouraged by the economic potential derivable from such conversions, not minding the fact that such actions are contrary to the development plan; and have some attendant environmental challenges to the sustainability of the cities. However, land is practically limited in supply and the awareness of land as an irreplaceable finite resource has made its use and management to require extreme care (Agbola, 2004). Also, in most urban centres in Nigeria, housing, industry, commerce and the need for open spaces for leisure are locked in competition for land (Adeniji, and Ogu, 1998). In the absence of any effective land use planning and management, industrial and commercial concerns can develop in residential areas with little or no control and this is one of the causes of the poor quality of life in many Nigerian cities.

This has further brought about a new beginning to transformation, change and new development processes in the built up urban environment. As a result, it can be seen that a piece of land serves as many purposes at the same time ranging from residential to commercial or industrial which makes it difficult to define clearly the use to which a land is put. Hence, it becomes possible to find a piece of land used as residential and also commercial such as a shop or office. Setbacks, drainages, roadsides and streets have also not been left out, but have also been converted for commercial purposes, thereby falling short of the initial planned purpose (Ogungbemi, 2012). As a direct consequence of this, if proper check is not put in place, a great threat is being posed to urban economy at large. Particularly, the characteristic feature of the cities such as the natural landscape, road network system and most importantly, housing stock is under great risk. Therefore, there is need to examine the extent, factors , effects of landuse conversion and the activities of planning authorities in improving the landuse management. This becomes becomes imperative to carry out an appraisal of indiscriminate landuse conversion in Lagos State. Alimosho Local Government Area best represents Lagos State, as it is the largest and most populous and thus provides the best representation for this.

II. Landuse Concept

Landuse change is a noticeable feature of any growing society since the advent of human civilization. Landuse is only one such aspect, but knowledge about landuse and landcover has become increasingly important as many nations plan to overcome the problems of haphazard and uncontrolled development,

deteriorating environmental quality, loss of prime agricultural lands, destruction of important wetlands, and loss of fish and wildlife habitat (Turner *et al*., 1995). Landuse can be defined as the total arrangements, activities, and inputs that people undertake in a certain land cover type (FAO/UNEP, 1999). Landuse is the human use of territory for economic, residential, recreation, conservation, and governmental purposes.

Landuse activities are usually defined as the transformation of natural landscapes for human use or the change of management practice on human dominated lands (Foley et al., 2005). Land is the stage on which all human activities are conducted and the source of the materials needed for this conduct (Briassoulis, 2000). Human use of land resources gives rise to ‘‘land use’’ which varies with the purposes it serves, whether for food production, provision of shelter, recreation, extraction and processing of materials, and so on, as well as the bio-physical characteristics of land itself. Hence, landuse is being shaped under the influence of two broad sets of forces which are ‘‘human needs’’ and ‘‘environmental features and processes’’. Neither one of these forces stay still; they are in a constant state of flux as change is the quintessence of life (Briassoulis, 2000). These land use changes can be substantial but are difficult to grasp when they occur incrementally.

Landuse is about relationship of man to the environment and how man act upon the environment. The landuse concept is closely intertwined with human community development. Landuse should be viewed more as a process than an output. Landuse is a general term for the human modification of the earth’s terrestrial surface. Although humans have been modifying land to obtain food and other essentials for thousands of years. Current rates, extents and intensities of landuse ,driving unprecedented changes in ecosystems and environmental processes at local, regional and global scales are far greater than ever in human history. Currently, monitoring and mediating the adverse consequences of landuse while sustaining the production of essential resources has become a major priority of researchers and policy makers around the world .

III. Literature Review

In Nigeria for instance, most land for urban development is supplied outside the regulatory frameworks. No single city in Nigeria has created an effective urban growth management strategy (Ikejiofor, 2006). Development of land such as housing and physical infrastructure is majorly carried out by individuals and the private sector whose behaviours are not different from the simplified version of rational economic behaviour and allocation efficiency (Agbola, 2004), everything is viewed from the prism of how much money could be made or making smart economic decisions. Ineffective development control is another constraint as most developing cites do not have control guides for the use of land, buildings and properties, while in areas with such guides, it is either they are unavailable, weakly implemented or primitive (Odunola and Odunjo, 2015). It has also been discovered in areas where development control measures are strong that the need to generate revenue for the government is often deemed more important than maintaining urban sanity, hence developers are asked to pay a premium to effect changes they want on their land most times at the detriment of the environment.

This is increasingly seen as a problem, several research works have been carried out Olayinka (2012) examined the factors influencing change of use and its attendant problems in Ogba, Lagos, and the study relied on both primary and secondary data sources. Findings revealed that property owners respond mainly to demand but the effects of their activities was found to be far reaching. The study however, was carried out in Ogba not close to Alimosho which is the largest local government area in Lagos State. The study however did not fully examine the scope of Landuse conversion. Also, Adepoju and Adepoju (2016) examined the dimensions of landuse conversion in Ado Ekiti, the study revealed that there was a portends significant impact on housing provision as rent continues to be on the increase. The study was limited on the examination of conversion to economic factors.

Also, Oduwaye (2013), examined the urban planning implications of landuse structure in metropolitan Lagos, it was revealed that infrastructure and economic factors are the major factors influencing landuse in Lagos. Further findings revealed that significant distortion of the Lagos Metropolitan master plan has taken place which has led to the unforeseen physical landuse structure problems. The study adopted a view of what the ideal situation should look like and did not focus extensively on what it is. Following from this, this research therefore focus on the appraisal of indiscriminate **l**anduse conversion in Alimosho local government. Alimosho local government is the largest and most populous local government in the state and is predominantly residential; however in recent years the local government has been changing and gradually evolving to accommodate various types of land uses thus leading to landuse conversion.

IV. The Study Area

Alimosho Local Government Area is one of the twenty local government area of Lagos State (Fig.1) and is adjudged as the most populous local government area in Lagos and in Nigeria with 1,288,714 inhabitants, according to the official 2006 Census, even though the figure was disputed by the Lagos state Government which claimed the Local Government area had over 2 million residents.

Alimosho Local Government Area was carved out of Ikeja Local Government Area during in the year 1991 with a total Landed area of about 183 square kilometres and situated at 6 36'38"N, 3 17' 45"E coordinate (Fig 2). The Local Government Area is bounded by Ado Odo Local Government Area of Ogun state in the Northwest, part of Lagos Abeokuta expressway in the Northeast/East, Muritala Muhammed International Airport, Amuwo Odofin, and Ojo Local government areas. It has now been subdivided into several Local Community Development Areas (LCDA). The six sub-divisions created out of the old Alimosho are Agbado/Oke-odo, Ayobo/Ipaja Alimosh, Egbe/Idimu , Ikotun/Igando and Mosan Okunola LCDA. The LGA contains the urban area of Egbeda/Akowonjo.

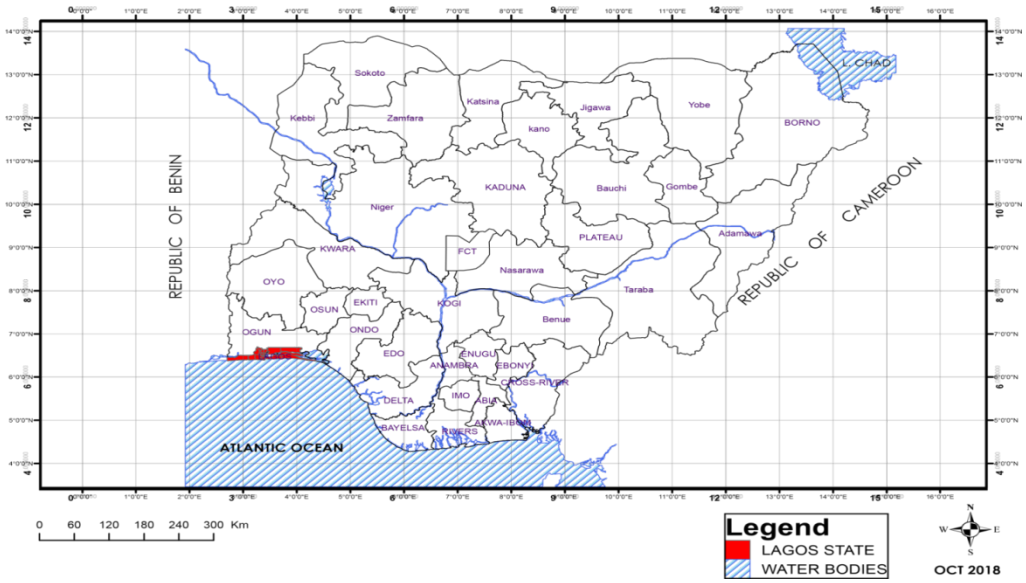

Fig 1. Lagos State in the Context of Nigeria
Source: Ministry of Land, Housing and Physical Planning, 2023

Fig 2. Alimosho Local Government Area in the context of Lagos Metropolitan Area Source: Ministry of land, housing and Physical Planning, 2023

V. Methodology

Data Types and Sources

This study made use of primary and secondary data. The primary data were obtained through questionnaires and interviews. The questionnaire was administered to the residents. The data obtained include socioeconomic characteristics, perception of the residents, natural and human-induced factors, effects of land use and land cover, and activities and contributions of planning authorities. These unveil their roles and activities in land use planning, development, and management.

Secondary data obtained include the number and list of wards in the study area, the number of houses in each ward, land use acquisition maps from the ministry of Land and survey, land use/landcover classes, land use and landcover trend, and magnitude of change between 1990 and 2018 were obtained from satellite

imageries**.** The availability of imageries that span the required years understudy for the study area were Landsat imageries captured in 1990, 2004, and 2018 respectively were acquired from the Global Land Cover Facility (GLCF) of the University of Maryland, United States. Also, existing land use maps of the study area were obtained from the Lagos State Ministry of Lands and Survey, the Lagos State Ministry of Physical Planning and Urban Development, and the LAGGIS department. The acquired satellite imageries provided land use and land cover change analysis of the Alimosho Local Government Area for 28 28-year period of the study owing to the availability of the Landsat imageries (Table 1).

Sampling Procedure and Sample Size

Alimosho Local Government area, being the study area, is divided into thirty-five wards based on administrative, economic, and social characteristics (Table 1). There is no further breakdown into administrative units of these wards nor were there recent census data where we can draw samples from for this research, however, conducted a small exercise by counting several building footprints from the housing footprint map (Appendix 1) of the study area for each ward of Alimosho Local Government area where representative samples were drawn. The result of the exercise is in Table 2.

The sample frame that was used was several buildings which was found to be disproportionate, however, the number of buildings per square kilometer was adopted since it was more proportionate and representative than several buildings. Therefore data from Table 2 was used to conduct the administration of questionnaires using 5% of the total number of buildings per square kilometre. A total of 194 questionnaires were administered in all the wards of the local government. The sampling procedure for this research was systematic random sampling where we picked a building from each quadrant of the housing building map for each ward in the Alimosho Local Government area. Each of the community leaders of this selected polling unit area assists in administering questionnaires for this research work.

Table 1: Alimosho Local Government Building Footprint Count

S/n	Wards	Land Area of ward (Sq. Kilometres)	Number of Building footprints	Number of Buildings per Sq. Kilometres
1	Agbado/Alakuko	8.935	10175	1138.780078
2	Agbelekale	8.202	9577	1167.642039
3	AbuleEgba	4.924	6578	1335.905768
4	Ajasa/Amikanle	10.051	10321	1026.862999
5	OkeOdo	4.598	5235	1138.538495
6	Aboru	4.06	4567	1124.876847
7	Ayobo	2.677	1997	745.9843108
8	Ipaja	3.016	2491	825.928382
9	Abesan 1 & 2	1.988	1726	868.2092555
10	Mosan/Akinogun	2.477	3279	1323.778765
11	Oki	0.949	1153	1214.963119
12	Baba Megida	19.631	14295	728.1850135
13	Atan	3.061	3254	1063.05129
14	Baruwa	4.441	3127	704.1206935
15	Gowon Estate	1.842	1842	1000
16	Alabata	0.709	1044	1472.496474
17	Alaguntan	1.027	1394	1357.351509
18	Omitutun–Olori	1.173	1013	863.597613
19	Santos –Ilupeju	0.782	954	1219.948849
20	Akowonjo	0.708	906	1279.661017
21	Egbeda	1.756	1977	1125.854214
22	Okunola	1.923	2120	1102.444098
23	Unity Estate	1.678	1856	1106.078665
24	Oguntade/Bameke	3.329	3599	1081.105437
25	Agbaka/ Ifoshi	3.704	3817	1030.507559
26	Idimu	2.198	1941	883.0755232
27	Isheri - Olofin	7.976	7377	924.8996991
28	Ikotun	5.911	6127	1036.54204
29	Egan - Igando	10.014	11203	1118.733773
30	Akesan	8.818	10102	1145.61125
31	Abaranje - Igando	12.23	19841	1622.322159
32	Egbe - Liasu	2.659	2161	812.7115457
33	Egbe - Agodo	3.819	5633	1474.993454
34	IsheriOshun	16.784	14834	883.8179218
35	Ijegun/Ijagemo	13.546	21540	1590.13731
	Total	**181.596**	**199056**	

Source: Author's Field Survey, 2023.

Table 2: Sample Frame and Sample Size of Number of Buildings

S/n	Wards	Number of Buildings per Sq. Kilometres	Sample Size 0.5%	Sample size to the nearest whole number
1	Agbado/Alakuko	1139	5.6939	6
2	Agbelekale	1168	5.83821	6
3	AbuleEgba	1336	6.679529	7
4	Ajasa/Amikanle	1027	5.134315	5
5	OkeOdo	1139	5.692692	6
6	Aboru	1125	5.624384	6
7	Ayobo	746	3.729922	4
8	Ipaja	826	4.129642	4
9	Abesan 1 & 2	868	4.341046	4
10	Mosan/Akinogun	1324	6.618894	7
11	Oki	1215	6.074816	6
12	Baba Megida	728	3.640925	4
13	Atan	1063	5.315256	5
14	Baruwa	704	3.520603	4
15	Gowon Estate	1000	5	5
16	Alabata	1472	7.362482	7
17	Alaguntan	1357	6.786758	7
18	Omitutun–Olori	864	4.317988	4
19	Santos –Ilupeju	1220	6.099744	6
20	Akowonjo	1280	6.398305	6
21	Egbeda	1126	5.629271	6
22	Okunola	1102	5.51222	6
23	Unity Estate	1106	5.530393	6
24	Oguntade/Bameke	1081	5.405527	5
25	Agbaka/ Ifoshi	1031	5.152538	5
26	Idimu	883	4.415378	4
27	Isheri–Olofin	925	4.624498	5
28	Ikotun	1037	5.18271	5
29	Egan - Igando	1119	5.593669	6
30	Akesan	1146	5.728056	6
31	Abaranje - Igando	1622	8.111611	8
32	Egbe - Liasu	813	4.063558	4
33	Egbe - Agodo	1475	7.374967	7
34	IsheriOshun	884	4.41909	4
35	Ijegun/Ijagemo	1590	7.950687	8
	Total	38539		**194**

Source: Author Field Survey, 2023.

Geographical Information System Used

For this study, Landsat imageries of Alimosho LGA were acquired for the three epochs; 1990, 2004, and 2018 were obtained from the Global Land Cover Facility (GLCF), an earth science data interface based on the availability (Table 3, Fig 4, Fig5, , Fig.6, Fig 7, and Fig. 8)

Table 3. Characteristics of the Image Data

DATA SET				
Code	**Data Types**	**Date of Production**	**Spatial Resolution**	**Source**
1	Landsat 4	1990/11/27	30m (MSS)	GLCF
2	Landsat 7	2004/10/24	30m (ETM+)	GLCF
3	Landsat 8	2018/02/01	30m (ETM+)	NARSDA

Source: Author's Field survey, 2023.

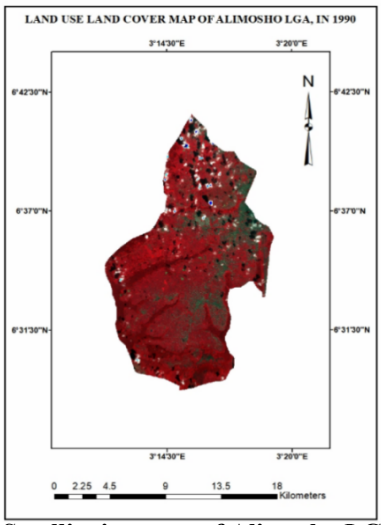

Figure 4: Satellite imagery of Alimosho LGA (1990).
Source: Author's Field survey, 2019.

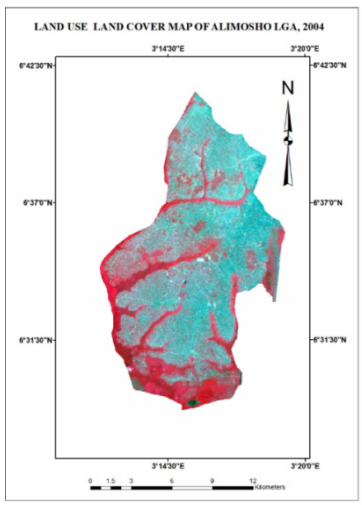

Fig 5: Satellite Imagery of Alimosho LGA (2004).
Source: Author's Field survey, 2023.

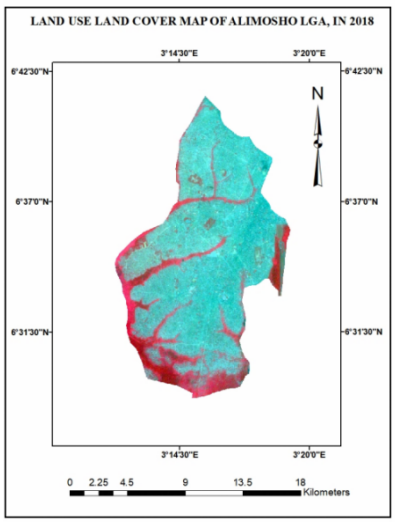

Fig 6: Satellite Imagery of Alimosho LGA (2018)
Source: Author's Field survey, 2023.

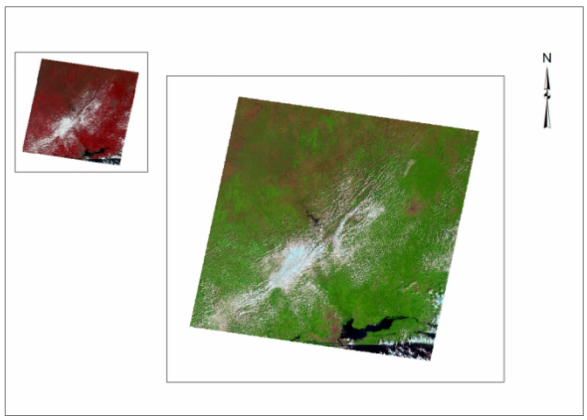

Fig. 7: Satellite Imagery Scene of Project area 1990.
Source: Author's Field survey, 2023.

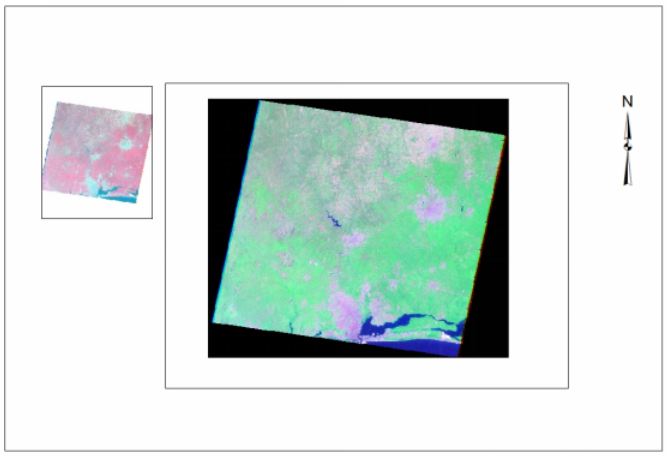

Fig. 8: Satellite Imagery Scene of Project Area 2018.
Source: Author's Field survey, 2023.

Image enhancement techniques help to improve the quality of the image and increase the possibilities of image interpretation. Landsat images have intensity values ranging from 0 to 255 in its different bands but the satellite sensor can record this intensity values within a shorter spectral range, for example 5 to 100 (Sabins 1996). There are different ways in which an image can be enhanced which includes contrast stretching, histogram equalization, and standard deviation stretching. Stretching an image usually helps to increase the contrast of the image and it is automatically applied to images using Erdas software unless the user chooses not to stretch the images. With histogram equalization, the darkest pixel is assigned the value 0 (black) while the highest value is assigned 255 (white) hence spreading the intensity values between 0 and 255 (Sabins, 1996). Histogram equalization was chosen as the image enhancement method for this project. The histogram equalization can be controlled using interpreter/radiometric enhancement, and then histogram equalization to display the window used for the image enhancement. The differences in the pixels are compensated for to produce uniformly distributed pixels along the output axis (Sabins 1996). The number of bins which is 256 helps to specify the distance with which the image is to be stretched.

Methods of Data Analysis

Two main methods of data analysis were adopted in this study.

i. Calculation of the area in kilometre square of the resulting land use/land cover types for each study year and subsequently comparing the results.
ii. Overlay Operations

The two methods were used for identifying change in the land use types. Therefore, they have been combined in this study. The comparison of the land use land cover statistics assisted in identifying the percentage change, trend, and rate of change between 1990 and 2018. The ArcGIS software was used in determining the magnitude of environmental change due to urbanization within the study area. The magnitude

of urban-induced change was then calculated by subtracting the area coverage of the base year from the reference year thus:

Magnitude = Landuse/Land cover size Reference Year - Landuse/ Land cover size Reference Base year (e.g1990-2018)

While the rate of urban-induced landuse/landcover changes in the study area was determined following these steps:

Step 1

Percentage change was calculated by dividing magnitude of change in land mass/size by the total landmass of the study area and multiplied by 100 thus:

$$\text{Percentage change} = \frac{\text{Magnitude of change in size} \times 100}{\text{Total land area of the study area}}$$

Step 2

The Annual rate of change is calculated by dividing the percentage change by the number of study period 1990 – 2004 (14years), 2004-2018 (14years), 1990-2018 (28years) thus: Annual rate of change = Percentage Change / Period

VI. Findings And Discussion

A total number of 194 copies of questionnaires were administered in the wards and local council development areas of Alimosho Local Government Area. However, 191 copies of the questionnaire were returned and deemed valid for analysis, which represented a return ratio of 98.5%. This was deemed valid to use as the basis of the findings of this research and it is from this that findings and inferences were drawn.

Land Use/Landcover Change

The land use and land cover distribution in the study area are examined. The land use and land cover distribution for each study year as derived from the satellite imageries are presented in Table 4. The built-up area, where we have all physical development within the Alimosho Local Government area, has consistently increased in land size, starting from almost about 48 square kilometers in 1990 to about 109 square kilometers in 2004 and about 142 square kilometers in 2018 which represents about 3 times its size of 1990 and 51.39% of the total land size of Alimosho Local Government area.

The leafy vegetation land use/land cover, which is the agricultural land light forest or undeveloped land, had the largest land size of 81 square kilometers in 1990 had substantially reduced to about 32.45% of its size by 2018, representing about 29.85% of the total land size of the study area. The loss in land size was gained by the built-up land use/land cover. The deep vegetation which is the swampy area and natural water drainage channel of the study area lost about 20 square kilometers in the 28years period of this study from 34.1091 square kilometers in 1990 to 14.022 square kilometers in 2018 representing about 11% loss of the total land size of Alimosho Local Government Area of Lagos state.

Table 4.: Landuse/Land Cover Distribution for 1990, 2004 and 2018

Year	1990		2004		2018	
Landcover/ Features	**(km²)**	**Area (%)**	**(km²)**	**Area (%)**	**(km²)**	**Area (%)**
Deep vegetation	34.1091	18.577	23.7699	12.946	14.0220	7.637
Leafy vegetation	81.1548	44.199	50.1534	27.315	26.3484	14.350
Built up	47.7009	25.979	109.1403	59.440	142.0668	77.373
Water body	9.3672	5.102	0.5499	0.299	1.1763	0.641
Cloud cover	11.2815	6.144	0.0000	0.000	0.0000	0.000
Total Area	**183.6135**	**100.00**	**183.6135**	**100.00**	**183.6135**	**100.00**

Source: Author's Fieldwork survey, 2023.

The cloud cover land was a result of cloud formation present during the time of exposure of the camera of the satellite. This has hurt the water land use/landcover because of the shadow formed which is almost the same code as that of water land use. This is why the water land use/land cover was reduced from 9.3672 square kilometers in 1990 to 0.5499 square kilometers in 2005 and then increased to 1.1763 square kilometers in 2018.

The data in (table 4)) shows the rapid rate of land use/land cover conversion from other land uses to built-up / settlement land use we have seen that about 52% of Alimosho land use had been converted to residential, industrial, or other development land uses in 28 years, it is projected that the remaining 22.6% of

other land use/land cover shall be fully converted to built-up area within the next 10 years if the current trend of conversion is sustained and if there are no serious government interventions taken to abate the trend.

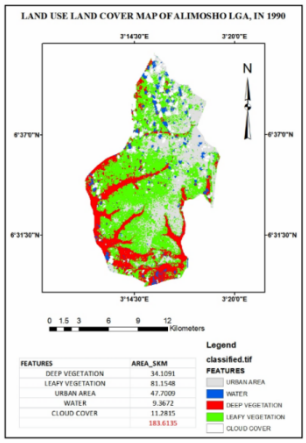

Figure 9: Land Use Land Cover Map for 1990.
Source: Author's Field survey, 2023.

Figure 9 indicates that land use/land cover features such as the deep vegetation (brownish red colour), leafy vegetation (in light green colour), and water (in Blue colour) were quite distinct at the time the imagery was captured in 1990 which shows that they had not been converted for urban development.

In the year 2004, the land use/landcover in (Fig.10) shows a remarkable change in the built-up area (in grey colour) which has expanded in the southwestern direction from the Northeast corner boundary (the Lagos Abeokuta expressway) of Alimosho Local Government area of Lagos state.

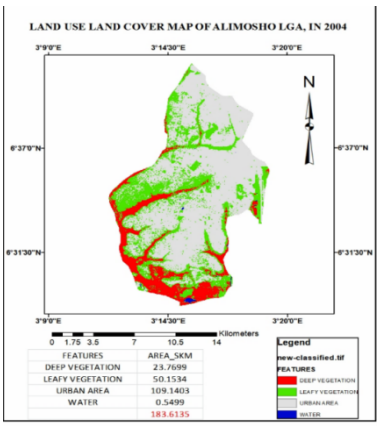

Figure 10: Land Use Land Cover Map for 2004.
Source: Author's Field survey, 2023.

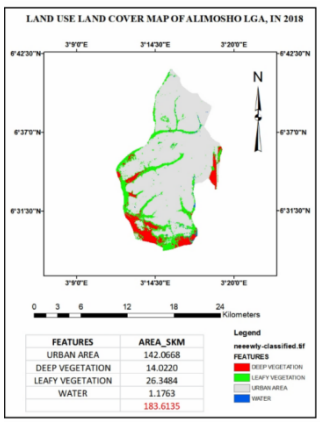

Figure 11: Land Use Land Cover Map for 2018.
Source: Author's Field survey, 2023.

The Landuse/land cover map of 2018 in (Fig 11) of the study area shows that the built-up increases extensively while other land uses decrease, this implies that there are increase in development in the study area.

Landuse/Land Cover Change Dynamic

Table 5 shows that a total of 61.4394 square kilometers of land was changed in use between the first periods of study (the year 1990 to 2004), with the built-up area land use/land cover gaining all the land while the other land uses /land cover losing part of their land size. Table 5 also shows that for the second period of the study (year. 2004 to 2018) another 32.9265 square kilometers of land was converted to the built-up area while waterbody also gained 0.6264 square kilometers during that period as well. The other land use/ land cover loses part of its land size. The entire period of 28 years of the study shows that the built-up area land use/land cover gained a total of 94.3659 square kilometers while other land use/land cover lost a substantial part of the land size they had in 1990. This is shown in graphical form in Fig. 11.

Table 5: Change in Land Use Land Cover

Land Use / Land Cover Changes						
Land use / Land cover categories	**1990-2004 (14 years)**		**2004-2018 (14 years)**		**1990-2018 (28 years)**	
	(km²)	**Area (%)**	**(km²)**	**Area (%)**	**(km²)**	**Area (%)**
Deep vegetation	-10.3392	8.41	-9.7479	14.53	-20.0871	10.64
Leafy vegetation	-31.0014	25.23	-23.805	35.47	-54.8064	29.04
Built-up area	61.4394	50.00	32.9265	49.07	94.3659	50.00
Water body	-8.8173	7.18	0.6264	0.93	-8.1909	4.34
Cloud cover	-11.2815	9.18	0	0.00	-11.2815	5.98
Total Area	**122.8788**	**100.00**	**67.1058**	**100.00**	**188.7318**	**100.00**

Source: Author's Analysis, 2023

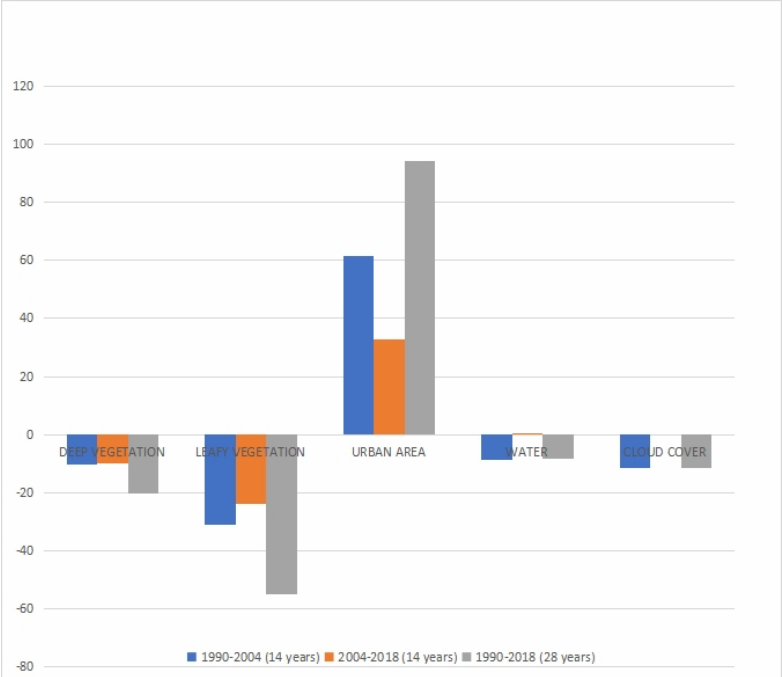

Figure 12: Rate of Change of landuse/landcover.
Source: Author's Field work, 2023.

Annual Rate of Change of Landuse/Land Cover

Table 6 shows the annual rate of change of the different land use/land cover in the study area, the annual rate of change of built-up area is positive all through the period of study while other land use/land cover has a negative annual rate of change signifying that built-up land use is steadily expanding in size while other land use is shrinking in size. For the first period of the study (1990 to 2004) was 2.39% which then reduced to about 1.28% in the second period of the study (2004 to 2018) while the annual rate for the entire 28-year period of the study was 1.84%. From the data, it is projected that if the annual rate of 1.84% increase for the built-up

area is maintained in the study area then there will be no more land available for other land use in the next 12 years.

Table 6: Annual Rate of Change in Land Use and Land Cover

Land use / Land cover categories	Annual Rate of Change		
	1990-2004 (14 years)	2004-2018 (14 years	1990-2018 (28 years)
	Area (%)	Area (%)	Area (%)
Deep Vegetation	-0.40	-0.38	-0.39
Leafy Vegetation	-1.21	-0.93	-1.07
Built-up Area	2.39	1.28	1.84
Water	-0.34	0.02	-0.16
Cloud Cover	-0.44	0.00	-0.22

Source: Author's Field survey, 2023.

Socio-demographic Characteristics of the Respondents

This focuses on the socio-demographic characteristics of the respondents. Information on their age, gender, and length of stay among others was collected in this section. Table 7 examined the gender of the respondents; findings revealed that 74.87% of the respondents were male while only 25.13% were female. This shows that there were more male respondents than females. The nature of the research was such that those who have stayed long in the area were targeted and it was discovered that most households visited deferred to the male member of the family/household responding to questions posed by the researcher.

Table 7: Gender of the Respondents

Gender	Frequency	Percentage (%)
Male	143	74.87
Female	48	25.13
Total	191	100.0

Source: Author's Field Survey, 2023.

The length of stay of the respondents in the area was examined in Table 8; findings revealed that 3.66% of the respondents sampled have been in the area for less than ten years, 12.04% have been in the area for a period of 10-20years while the majority of the respondents at 49.22% have been living in the area for a period of between 21-30years. Also, 35.08% of respondents have been in the area for 31-40 years. This shows that the majority of the respondents have had a lengthy stay in the area and have lived long enough in the areas to witness how they have evolved and witnessed the emergence of new developments and changes in use all around them.

Table 8: Length of Stay in the Area

Length of Stay	Frequency	Percentage (%)
Less than 10years	7	3.66
10-20years	23	12.04
21-30years	94	49.22
31-40years	67	35.08
Total	191	100.0

Source: Author's Field Survey, 2023.

Findings regarding the age of the respondents sampled in Table 9 revealed that 2.09% of respondents were between the ages of 21-30years, 18.85% were between the ages of 31-45years old, whole 54.45% who were in the majority were between 46-60years old, 24.61% were above 60years old. This shows that more than 90% of the respondents were over 30 years of age and must have witnessed quite a lot and have a thorough understanding of the urban fabric within the environment in which they reside.

Table 9: Age of the Respondents

Age of the Respondents	Frequency	Percentage (%)
21-30years	4	2.09
31-45years	36	18.85
46-60years	104	54.45
Above 60years	47	24.61
Total	191	100.0

Source: Author's Field Survey, 2023.

The academic qualifications attained by the respondents were examined in Table 10, findings revealed that (10.52%) of respondents had no formal education, 9.95% of respondents had primary education, and 36.65% had secondary education. While 52.88% of respondents who were in the majority had tertiary education as their highest academic achievement. This shows that almost all of the respondents have had formal academic education.

Table 10: Educational Qualification of the Respondents

Level of Education	Frequency	Percentage (%)
No formal Education	1	0.52
Primary Education	19	9.95
Secondary education	70	36.65
Tertiary Education	101	52.88
Total	191	100.0

Source: Author's Field Survey, 2023.

Table 11 shows that the marital status of the respondents up to 4.19% are single, 88.48% of the majority were married, 1.57% of respondents were divorced and 5.76% of respondents were widowed.

Table 11: Marital Status of the Respondents

Marital Status	Frequency	Percentage (%)
Single	8	4.19
Married	169	88.48
Divorced	3	1.57
Widow	11	5.76
Total	191	100.0

Source: Author's Field Survey, 2023.

The average monthly income of the respondents is shown in Table 12, 2.62% of respondents were earning less than 20,000 naira monthly, 21.47% of respondents earned between 20,000 and 100,000 monthly, 25.65% of respondents earned between 100,000-180,000 as their monthly average, while 33.51% respondents earned between 181,000-260,000 as their monthly average income and were in the majority, while 16.75% respondents earned above 260,000 monthly. This shows that the majority of the respondents were middle-income earners.

Table 12: Average Monthly Income

Average Monthly Income (naira)	Frequency	Percentage (%)
Less than 20,000	5	2.62
20,000-100,000	41	21.47
100,000-180,000	49	25.65
181,000- 260,000	64	33.51
Above 260,000	32	16.75
Total	191	100.0

Source: Author's Field Survey, 2023.

Perception on Land Use and Land Cover Change

Table 13 examined the existence of notice being given before the changes of the landuse either for public use or private use, findings revealed that 36.65% of respondents indicated that notices were given to the affected residents, while on the other hand majority of the respondents with 63.35% respondents stated that they did not receive any form of notices for land use change. This implies that only those affected received the notice, other residents would be aware of the change after the implementation has taken place.

Table 13: Availability of Notice before Land use Changes

Notice Given	Frequency	Percentage (%)
Yes	70	36.65
No	121	63.35
Total	191	100.0

Source: Author's Field Survey, 2023.

Rate of Land Use and Land Cover Change in your Area

Table 14 examined the rate of land use and land cover change within the areas in which the respondents are located, 43.46% of respondents indicated that there have been rapid changes in land use and land cover changes, 37.17% of respondents stated that the rate of land use and land cover change is moderate, 18.85% stated that the rate of land use and land cover changes in their area is slow, while 0.52% respondent

indicated that there are no significant changes in their land use and land cover changes. This shows that the rate of change in the area is extensive. Alimosho local government remains the most populous local government in Lagos State with more land needed for different uses within the local government

Table 14: Rate of Land Use and Land Cover Change in your Area

Rate of Change	Frequency	Percentage (%)
Rapid	83	43.46
Moderate	71	37.17
Slow	36	18.85
No Changes	1	0.52
Total	191	100.0

Source: Author's Field Survey, 2023.

Type of landuse conversion

Table 15 examined the type of land use conversion being witnessed in the neighborhoods of the respondents, findings revealed that residential to commercial land use conversion is the most common phenomenon as noted by 67.01% of respondents. 31.94% of respondents stated that conversion of residential to warehousing is what they noticed most in their area, while only 1.05% of respondents opined that residential to educational conversion is the most common. This shows that the conversion is often to uses that can generate more returns, therefore monetary returns are what usually drive conversion.

Table 15: Type of Land Use Conversion

Type of Conversion	Frequency	Percentage (%)
Residential to Shopping/Commercial	128	67.01
Residential to warehousing	61	31.94
Residential to educational	2	1.05
Total	191	100.0

Source: Author's Field Survey, 2023.

Drivers of Landuse Conversion

The drivers of land use/land cover change were assessed from the respondents' perspective (Table 16). Using a Weighted Mean Score (WMS) wherein respondents were expected to rank each item on a scale of 1-5, with 5 being Strongly Agree, 4 being Agree, 3 being Indifferent, 2 being Disagree, and 1 being Strongly Disagree. The number of responses for each grade of response is then multiplied by the respective allocated numbers which are then summed up and divided by the total number of responses. The highest-ranked driver of land use and landcover change is urbanization with a mean of 4.73. This is due to the migration of people into the study area, and this led to increased demand for land for residential, commercial, and other uses. Land as a capital stock was ranked second with a mean of 4.72, land is increasingly seen as an important economic resource that people trade to get financial returns, the demand for land in most urban locations often exceeds the supply and therefore people dispose of land for the economic benefit they could get without recourse to protecting the land and what is on it.

Agricultural expansion is with a mean of 4.55 and ranked third, land use for planting of crops competes with livestock farming often leading to natural vegetation being cleared away to make way for the new agricultural use that is about to take place. The weather pattern is another factor with a mean of 4.35, a noticeable general increase in temperature with less rainfall recorded in many areas, and its attendant consequences on flora and fauna thus gradually transforming land cover from what it used to be. The security situation is ranked sixth with a mean of 3.96, the current situation in the country is such that every natural landcover within and around urban areas is frowned upon, as the fear exists it may constitute hideouts for miscreants and other social misfits in the society. Therefore, there is usually a conscious effort to alter the cover to make it more security-friendly and ease access for people. Government policy with a mean of 3.36, government at various levels including the; federal, state, and local governments, their various agencies, and parastatals have a major role to play in land conversion in the study area, and any development efforts that are to be carried out has to be first approved by them, without which a formal development cannot take place. This shows how significant their power is and what they can do that affects land use conversion. Other factors noted by the respondents include private and individual ownership of land and materials for construction (Table 16).

Table 16: Drivers of Landuse Conversion

Drivers	VS	S	FS	I	VI	Mean Score	Rank
Urbanization	**139**	**52**	-	-	-	**4.73**	**1st**
Land as a capital stock	**137**	**54**	-	-	-	**4.72**	**2nd**
Agricultural Expansion	**119**	**59**	**13**	-	-	**4.55**	**3rd**

Changing weather pattern	**98**	**62**	**31**	**-**	**-**	**4.35**	**4th**
Increasing private and individual ownership	**107**	**49**	**17**	**16**	**-**	**4.26**	**5th**
Security situation	**87**	**43**	**27**	**34**	**-**	**3.96**	**6th**
Materials for construction	**81**	**51**	**19**	**40**	**-**	**3.91**	**7th**
Policy	**39**	**47**	**63**	**28**	**14**	**3.36**	**8th**

Source: Author's Field Survey, 2023.

Respondents perspective on the effects of landuse conversion

In Table 17, the effects of land use conversion were assessed from the respondents' perspective. Using a Weighted Mean Score (WMS) wherein respondents were expected to rank each item on a scale of 1-5, with 5 being Strongly Agree, 4 being Agree, 3 being Indifferent, 2 being Disagree, and 1 being Strongly Disagree. The number of responses for each grade of response is then multiplied by the respective allocated numbers which are then summed up and divided by the total number of responses. Out-migration is ranked first and has a mean of 4.90, the frequency with which people move out of this area as the concept of highest and best use and bid rent indicates that the use that brings the most returns is what properties will be put to, many people have been priced out of the market due to their inability to afford properties in such areas, while some just move out as a resultant effect of the land use conversion. This shows that a key effect of land use conversion is the moving of people into new areas that can better suit their current needs. Change in urban fabric is ranked second with a mean of 4.80, the structure of the society changes as a direct consequence of land use conversion, an area that used to be predominantly residential can with time become largely commercial with its attendant issues.

Disruption of economic activities is ranked third with a mean of 4.67, land use conversion alters and distorts any existing economic structure, depending on how the conversion swings, it can bring in high net-worth individuals and commercial ventures which can force up the general prices of commodities and can go as far as affecting rent, thus leading to rental increment and reduced purchasing power for former occupiers whose income has not significantly increased. Increased government presence is ranked 4.24, areas where land conversion is taking place on a large scale often show significant economic potential which can significantly influence government presence as they provide amenities such as roads, schools, and hospitals among others, and also tax the economic activities taking place in such areas to generate revenue for the government. The destruction of flora and fauna of the area is ranked fifth with a mean of 4.06, the plant and animal life go extinct due to constant development and redevelopment by way of conversion, as there is always an increased need for space, plants, and animals in the study area gradually diminish till they go into extinction.

Rent increase is ranked sixth with a mean of 4.05, land use conversion is often necessitated by a need or demand in the market and the previous use or uses as the case may still be in need by some people. Ranked seventh with a mean of 3.73 is an increase in domestic crime, domestic crimes within such neighborhoods increase as new uses and activities emerge in such neighborhoods, and more people come in as a result of urban development. Environmental degradation is ranked with a mean of 3.57, erosion, and flooding are occurring with increased frequency, and arbitrary conversion of land use contributes significantly to this.

Table 17: Effects of Landuse Conversion

Challenges	**VS**	**S**	**FS**	**I**	**VI**	**Mean Score**	**Rank**
Out-migration	**171**	**20**	**-**	**-**	**-**	**4.90**	**1st**
Change in Urban Fabric	**158**	**27**	**6**	**-**	**-**	**4.80**	**2nd**
Disruption of existing economic structure	**139**	**41**	**11**	**-**	**-**	**4.67**	**3rd**
Increased government presence	**93**	**61**	**27**	**10**	**-**	**4.24**	**4th**
Destruction of local floral and fauna	**102**	**57**	**30**	**2**	**-**	**4.06**	**5th**
Increase in Rent	**79**	**59**	**36**	**17**	**-**	**4.05**	**6th**
Increase in Domestic Crime	**61**	**53**	**52**	**20**	**-**	**3.73**	**7th**
Environmental Degradation	**54**	**48**	**56**	**18**	**15**	**3.57**	**8th**

Source: Author's Field Survey, 2023.

Role of Planning Institutions

The role of planning institutions in land use conversion was examined, findings revealed that 37.17% of respondents opined that planning officials grant approvals for building conversion, 23.04% of respondents noted that planning officials demolish unapproved conversion developments, 17.80% of respondents stated that enforcing regulations is the primary duty of planning officials in guiding land use conversion, planning officials also create new regulations that guide planning conversion due to the available situation which may warrant it (Table 18). All the aforementioned roles are part of the duties of the planning officials in ensuring that the environment is safe from arbitrary land use conversion.

Table 18: Role of Planning Institutions

Role	Frequency	Percentage (%)
Grant planning approvals	71	37.17
Demolish unapproved plans	44	23.04
Enforce regulations	34	17.80
Create New Regulations	42	21.99
Total	191	100.0

Source: Author's Field Survey, 2023.

VII. Conclusion And Recommendations

The local government has witnessed tremendous development over the years with the largest population in the State; its urban area is close to three-quarters of its spatial coverage. It is therefore imperative for a more harmonized system to be in place to guide development efforts in a way that will not jeopardize future needs while meeting our needs of today. Further studies need to be carried out on the economic and ecological effects of land use change on our urban environment. Based on the key findings of this research, the following recommendations are therefore proffered. The government needs to be more involved in planning regulation, current efforts are concentrated in high-brow commercial locations and the little attention given to other less urban areas like Alimosho has to go beyond revenue generation into the government coffers, the rate of built-up area expansion needs to be checked using workable development control measures which will guard against the conversion of the remaining 22.63% of the study area land into built-up land use. Also, the government needs to develop a housing policy framework and programs that would help to absorb the growing demand for housing in the study area.

There should be a collaborative effort in enforcing planning regulations, the government needs to work more with residents, educate them, enlighten them on the disadvantages of arbitrary building conversion, and empower them to report such as the spread of government's resources and personnel is thin on ground. Also, critical stakeholders such as those in the private sector and planning professionals have a role to play in ensuring man's footprint on the land. The total cleaning up of vegetation is not advantageous to all concerned in the long run and it therefore becomes imperative that sound advice and professional recommendations should be given to clients at all times, to guide them and prevent them from constantly seeking loopholes in the government's regulations to exploit.

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