# URBAN SPRAWL IMPACT ON VEGETATION COVER IN ILORIN PERIPHERY ENVIRONMENT

**By**

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***Abstract***

*Urban sprawl and its effects are a rising topic in today's spatially different yet, physically definite and similar world. This study aims at evaluating the impacts of urban sprawl on vegetation cover in Ilorin and its environs using geo-spatial techniques. Three satellite images of 1988, 2003 and 2018 were processed, classified and analyzed in ArcGIS 10.4 environment to assess the total spatial loss of vegetation cover due to urban expansion. Built – up and vegetation extent values were extracted from the imageries and the spatial growth and vegetation loss within the study period was established. The findings revealed that the study area witnessed significant reduction in vegetation cover and built–up areas expansion respectively. Agricultural land occupying highest coverage of 174.05 km² (71.66%) in 1988 decreased to 141.05 km² (51.84%) in 2018. The total spatial loss was 33.00 km² (18.96%) at an annual change rate of 1.1km² (0.63%) within the same period. While the built-up area expanded from 27.80km² in 1988 to 67.08 km² in 2018, total spatial change of 39.28 km² (141.29%) was experienced with at annual rate of 1.31 km² (4.71%) within the study period (1988 – 2018). The study concludes that vegetation cover declined with increasing urbanization and urban expansion and recommends that urban spreading to areas with vegetation cover should be controlled as this will have serious repercussions on biodiversity, temperature levels and even food production. Urban expansion may be inevitable, however, with proper management and planning it can be desirable and sustainable.*

*Keywords: Urbanization; Landuse; Periphery; Vegetation; Vegetation loss*

## Introduction

Urban sprawl is the speedy enlargement and extension of built-up area growth such as offices, industries, center for shopping, and residential homes away from the central built-up areas into low-density, rural and undeveloped land near a city and usually car-dependent communities. Sprawl is used to describe substantially growing urban extents; the situation



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revealed from such altered landscape manifest cities distribution, thereby reducing the period and distances from and within cities. This creates an area where large structures such as houses, industries schools, companies among others are situated in an expanse around the town that originally had no one or few people living there in (Bongdap Nansel Nanzip, 2020).

The growth and development of built-up zones have expanded at great speed around the world. This has resulted in an increase from 15.4 percent of Nigeria's total population in 1960 which was about 6,955,836 million to 51.4 percent of Nigerian's total population that is **102,806,948** million in 2019 (Bhat et al., 2017; World Bank, 2020). As a result, greater stresses are placed on urban centers for spreading out there by infringing into the periphery areas. Disconnected expansions and homes with single-family are major causes of built-up extension usually which are created and found outside built -up expanses past town perimeters, but usually within transporting distance to the built-up center. For example, sprawl in Nigeria has a characteristic of unplanned housing expansions on the urban periphery, of which these lands are privately owned mostly, acquired in sole small plots and similarly bordering lands along waterways and coastline. Few instances are the cases that occurred in Lagos State, Ilorin, and Bukuru, Jos in Nigeria. These freshly established expanses have been termed the periphery-built-up areas and the inter metropolitan periphery. Urban sprawl is considered to go side by side with urban development that are unplanned, incremental and characterized by a mix of land uses that low-density and found on the urban fringe (Bongdap Nansel Nanzip, 2020).

Vegetation majorly implies the manifestation of plant in the predominant environment created by man. Natural vegetation is however the most endangered component of the ecosystems in the world today (Akpu et al., 2017). According to Varshney (2013), by means of countries looking forward to urbanize, civilize, develop and westernize, the plants especially those in the tropical forest setting will be in turn transformed and degraded over time creating a bare environment, thereby exposed to environmental threats and dangers. The vegetation of that area is influenced of activities of man (such as land clearing, bush-burning, infrastructural development, , mining, lumbering and timbering) on the



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environment implying a decrease in existing biomass. The outcome of this is referred to as vegetation degradation.

The natural landscape has significantly been altered due to the rapid expansion of built -up areas creating enormous environmental, social and ecosystem, impacts although a very minor fraction of the world's land-dwelling surface (Bhat et al., 2017). Ashiagbor et al., (2019) reported that the existing farming and woodland landscape was split with resultant environmental, socio-economic and urban governance implications due to the speedy peri-urbanization that occurred in the region.

Ismail et al.,(2019) revealed in their study that the consequence of this ever-expanding populace are the loss of vegetal cover and agrarian land, a lesser amount of resources from water, growing claim for housing and infrastructure for transportation. The built-up zone in Jabodetabek revealed an enormous rise in proportion from 2001 to 2015, considerably to the extent that the urban expanse is the prevailing land use and expanded up to 61 percent of Jabodetabek in 2015.

In Nigeria, about 21% of woodland vanished between the year 1990 and 2005. This great loss of flora with about 3.5% per annum amounting 350,000– 400,000 hectares per annum (Ladipo, 2010). Most of this vegetal cover is intentionally removed to make way for infrastructure development such as roads, railway and development of settlements among others. Deliberately, vegetation is removed to allow for development in infrastructural, wood for fuel, mineral exploration of mineral and settlements expansion.

Asonibare & Nmom, (2018) reported evidence of rapid development in Ilorin in their study with vegetation having a 0.27% loss similarly a loss of 0.80% between 1996-2010 and 2010-2016 respectively. Alongside this pattern, there was a reduction of bare land with 13.70% and a further decrease of 0.35% decrease during the study years respectively. However, there was an increase in Built-up land of 1.85% and an incomparable increase of 3.88% between 1996-2010 and 2010-2016 respectively while there was evident reduction in Vegetation land by 1.59% and a minor increase of 1.66% in the study year intervals respectively. Water bodies and tarred surfaces almost remain unchanged when compared one to the other (Asonibare & Nmom, 2018).

Several studies have attempted to assess urban sprawl and it's attendant impact on vegetation and environment (Asonibare & Nmom, 2018; Bhat et al., 2017 ; Ashiagbor et al., 2019



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;Owoeye & Popoola, 2017 ). In the study area, there are limited studies that focused on the extent and rate of urban sprawl as well as the extent to which the spatial growth of the Ilorin is responsible for vegetation loss in its surrounding areas. As a result, there is a need to understand spatial growth of Ilorin because there is swift change of the natural landscape to man-made environment to urban development and demand there by encroaching on peri-urban agricultural and forested land. Therefore, the purpose of the study was to determine the level and frequency of urban sprawl in Ilorin between 1988 and 2018, the vegetation loss rate and extent in Ilorin between 1988 and 2018 and evaluate the spatial growth extent of the Ilorin and how is it responsible for the loss of vegetation in its surrounding areas.

## 2. Study Area

Ilorin the area of study is the Kwara State capital and it is located on latitude 8°24′ and 8°36′ North of the equator and longitudes 4°10′ and 4°36′ East of the Greenwich meridian respectively. Ilorin city is found in the zone of transitional vegetation belts of guinea savannah and woodland of Nigeria occupying about 468sqkm. (Tunde et al., 2013). The Ilorin-Lokoja trunk A road marks the northern limit from the Oyun river bridge (Ahaneku, 1990). The climate of the study area falls within the tropical hinterland climatic zone. It is tropical and seasonal having dry season occurring between November to April, and rainy season between May and October and rainfall amount varies from 1000 mm to 1500 mm, with the peak between September and early October (Mustapha, 2008). The ranges of temperature are from 20°C-30°C annually in the northwest of the state (Agaja, 2019 and Tunde et al., 2013).

It has an abundant savanna (Guinea) plant, characterized by perennial deciduous forest flora and located in the Western part of Nigeria. The vegetation is characterized by dispersed big trees undergrowth about 10 and 12 feet. Examples of Some of the prominent trees include Baobab, butter trees, , Locust beans Acacia etc (Ajibade, 2008). Ilorin has dendritic drainage system pattern due to its characteristics. Asa River is the most important river and it flows in south-northern direction. Ilorin is divided into a fairly wide valley by the Asa River creating two main section namely the Eastern and the western part (Olalekan et al., 2020). Ilorin is one of the fastest developing areas in Nigeria with a population at 619,310 during the 1991 population census to a population of 809,171 in 2001 and 904,102 in 2006 national census. There has been a rapid growth shown by the trend in population growth rate having



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a high rate of 5.11 between 1991 and 2006 which is quite higher than many other areas in the country. It has been experiencing rapid expansion since 1967 when it became the Kwara State capital. The built-up area was about 8.37km² extent in 1967 but it has increased today by about sixty percent in the year 2010. (Asonibare and Nwom, 2018)

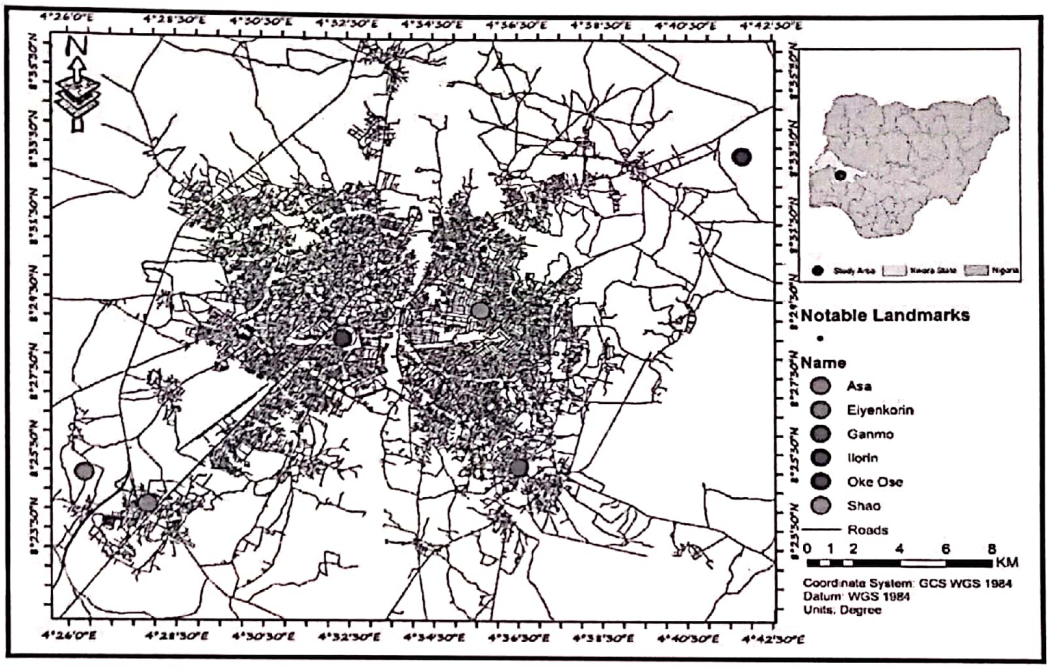


Figure 1: Ilorin Metropolis showing Selected Locations of Periphery
Source: Adopted Google Map (2019)

## MATERIALS AND METHODS

### 3.1 Data Needs

The data required for this study are images from satellite of Ilorin metropolis between 1988 to 2018 (1988, 1998, 2018). Satellite images were sourced from the United States Geological Survey (USGS). The study area map was sourced from googleearth.com.

### 3.2 Data Gathering Methods

All pixels were classified into land cover classes in a digital image or "themes" by Image classification. Thematic maps were then produced by using the characterized data entailing the land cover existing in an image (Vanjare et al., 2014). The categories of different land cover and land use were distinguished in the area of study from visual and digital interpretations of the satellite images, and since emphasis was on built-up growth and its



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vegetation cover impact. The classification scheme of land use / land cover allowed the land cover of various types within the study area to be classified into three namely; Built-up land, Water bodies and Others such as vegetation and bare surfaces (Jensen, 2005).

Post classification in this research was carried out to map out various types of land use in the study area between the period; 1988, 2003 and 2018. These Land cover maps were used to create a statistical table showing the areal extent (in km²) and different land cover type and percentage in the area for each study year (1990, 1999, and 2014) and bar charts created to display the statistics for easy comparison.

### 3.3 Analytical Methods

According to Jenkwe and Iyeh (2020), the rate of urban growth and vegetation extent and loss in the study area between 1988–2018 can be determine when the classified images are converted from raster to vector in order to obtain the class extent (area in km²). The landcover statistics comparison aided in distinguishing the percentage change. To characterize the landcover change of Ilorin in 1988, 2003 and 2018 area, calculation in kilometers square of the resultant landuse/types of land cover for each year was done and afterward the result was compared. In achieving this, the area extent in kilometers and the proportion change for each year was displayed in a table (1988 and 2018) and measured against each land cover type.

The percentage change was gotten by deducting the original value from the previous value of the same land use class; i.e., Variation in square kilometers = the latter area coverage of land-cover type/ land-use of interest minus the previous area of the same land-use/land-cover type covered. The formular is stated below:

$$\text{Change of Percentage} = \frac{\text{Previous - Original}}{\text{Original}} \times 100$$

Also expressed as:

$$\text{change of Percentage class} = \frac{\text{change observed}}{\text{Base year}} \times 100$$

The change of the annual rate of change (AR) was determined by the Percentage Change (PC) divided by the study year number multiplied by 100. The study year number between 2003 and 2018 is:



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2018 –2003 = 15.

$$AR = \frac{PC}{\text{No of years}}$$

AR stand for = Annual Rate
PC stand for = Percentage Change

The rate of Annual Change Rate in percentage was determined by dividing the Percentage Change by the number of study years multiplied 100.

$$AR = \frac{PC}{\text{No of years}} \times 100$$

According to Sharma et al., (2012), the land consumption rate (LCR) is the degree of compactness which point to a progressive development in a spatial pattern of a city and is calculated using the formula L.C. R=A/P. A stands for the area covered by the urban zone and the population of the urban area is P of that particular year (Yeates & Garner, 1976 and Sharma et al., 2012).

Linear regression was also used to create the actual connection between spatial development and vegetation loss with the built-up value as the independent variable (predictor) while vegetation has the dependent (Olive, 2017).

$Y = a + bX$

where;

Y= % change of Vegetation extent

a = y intercept.

b = slope of the line

X= % change of built-up area extent

## 4 Results and Discussion

### 4.1 Land Cover Types and Sizes between 1988 and 2018

Built-up areas occupied a small portion of the total area in 1988 increased drastically to almost double of the initial size in 2003 (27.80 $km^2$- 46.67 $km^2$) the same level of increment



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was also noticed between 2003 and 2018 (46.67 $km^2$ – 67.08 $km^2$) as shown in Table 1 and Figure 2. The rapid increase can be attributed to the industrial, transportation, commercial, physical development of the metropolis, locating and upgrading of new and existing social amenities, and the accompanying rise in socioeconomic indices. Influx of people majorly due to economic opportunities created by the presence of many higher institutions of learning like the University of Ilorin, Kwara state Polytechnic among others have increased. These contribute substantially to population growth and sets off the process of urban expansion. This is in line with Fanan et al., (2011) reporting that vegetal cover reduced at an alarming rate while built-up area increased,. Also, Owoeye & Popoola, (2017) revealed unceasing expansion in city growth was evident in the urban area percentage increase and there were conversions that were in incompatible in land expansions and uses that were unguided amounting to encroachment that are unwarranted into vegetal areas at the suburbs. Vegetation area occupy 174.05$km^2$ of the study area in 1988 and also witnessed decreasing trend throughout the study period with 170.57$km^2$ in 2003 and 141.05$km^2$ in 2018 (Table 4.1 and Figure 3). Logically, as population grows, more surrounding land which is basically agricultural land are absorbed for urban land uses such as constructions of building and roads; farmers tend to open up new forest land for agricultural activities (encroachment for agricultural and urban land uses) as well as the accompanying population pressure on forest resources and biodiversity. Owoeye & Akinluyi, (2018) reported that effects on the land uses pattern were unprecedented within the city and this occurred as a result of the city growing sporadically into the settlements adjoining each other. Conversions were unsuited in the land uses and extreme intrusion into green stretches in the connecting societies

There was a noticeable reduction bare ground in 1989 from 33.78$km^2$ to 19.44$km^2$ in 2013 and an increase to 27.67$km^2$ in 2018 (Table 1 and Figure 4). This could be attributed to agricultural practices that necessitate clearing the natural vegetation for creation of urban structure to cater for the increasing population. However, the later increase between 2003 and 2018 can be accredited to the awareness created through government initiatives to improve agricultural practices. This is not farfetched from Lasisi et al., (2017) reporting that vegetative cover /farmland compacted from 62.69045% (9277.71 hectares) in 1986 to 54.02527% (7995.33 hectares) in 2014 where as built-up areas increased from 6.60865% (978.03 hectares) in 1986 to 20.11178% (2976.39 hectares) in 2014.



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**Table 1: Different Land Cover Types in Ilorin between 1989 and 2018 (in km2 and %)**

| Land cover/years | 1988 | | 2003 | | 2018 | |
|---|---|---|---|---|---|---|
| | (km²) | Extent in % | (km²) | Extent in % | (km²) | Extent in % |
| Unclassified | 0 | 0 | 0 | 0 | 0.0171 | 0.007 |
| Built up Areas | 27.80 | 11.45 | 46.67 | 19.15 | 67.08 | 27.60 |
| Vegetation Areas | 174.05 | 71.66 | 170.57 | 70.00 | 141.05 | 58.04 |
| Bare ground | 33.78 | 13.91 | 19.44 | 7.98 | 27.67 | 11.39 |
| Water | 7.23 | 2.98 | 7.00 | 2.87 | 7.23 | 2.97 |

Source: Author's Analysis (2019).

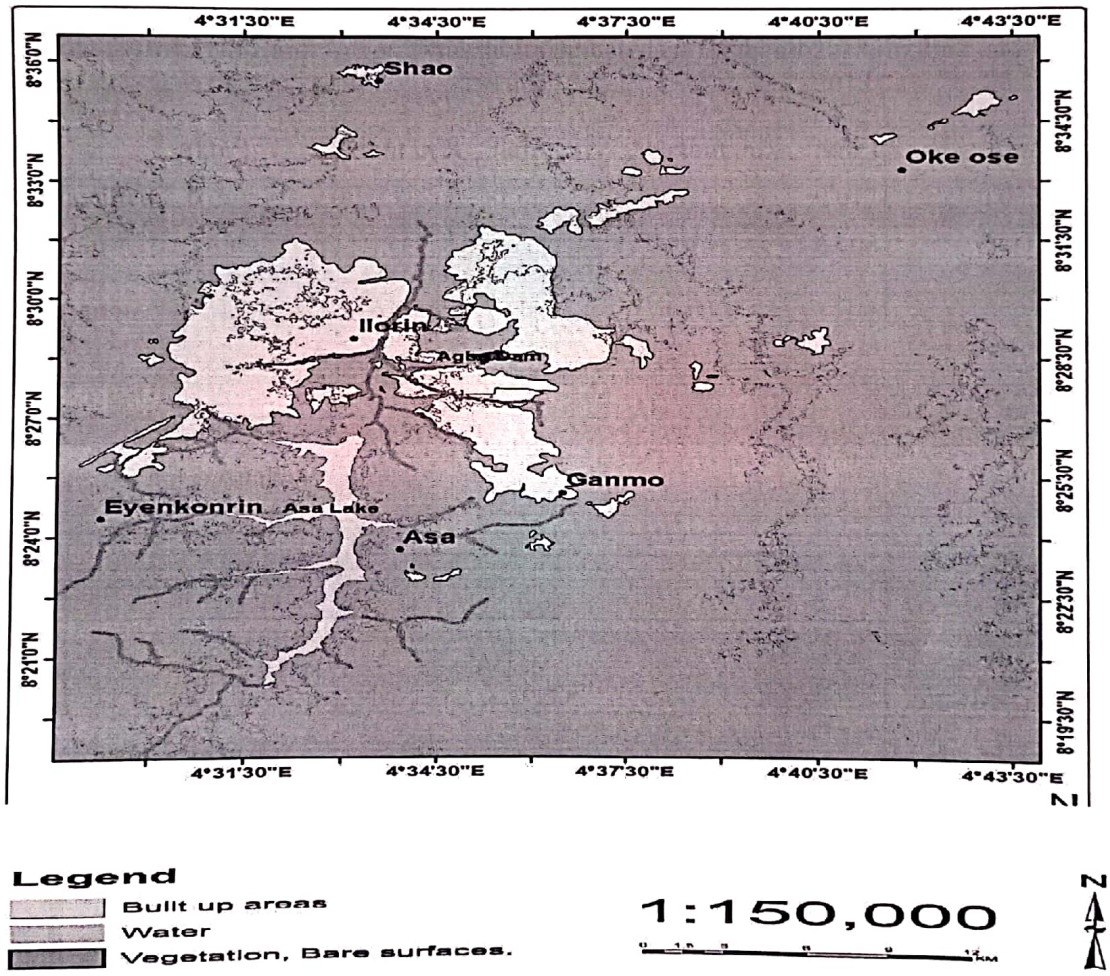


**Figure 2: Land cover types of Ilorin of 1988**

Source: Author's analysis (2019)

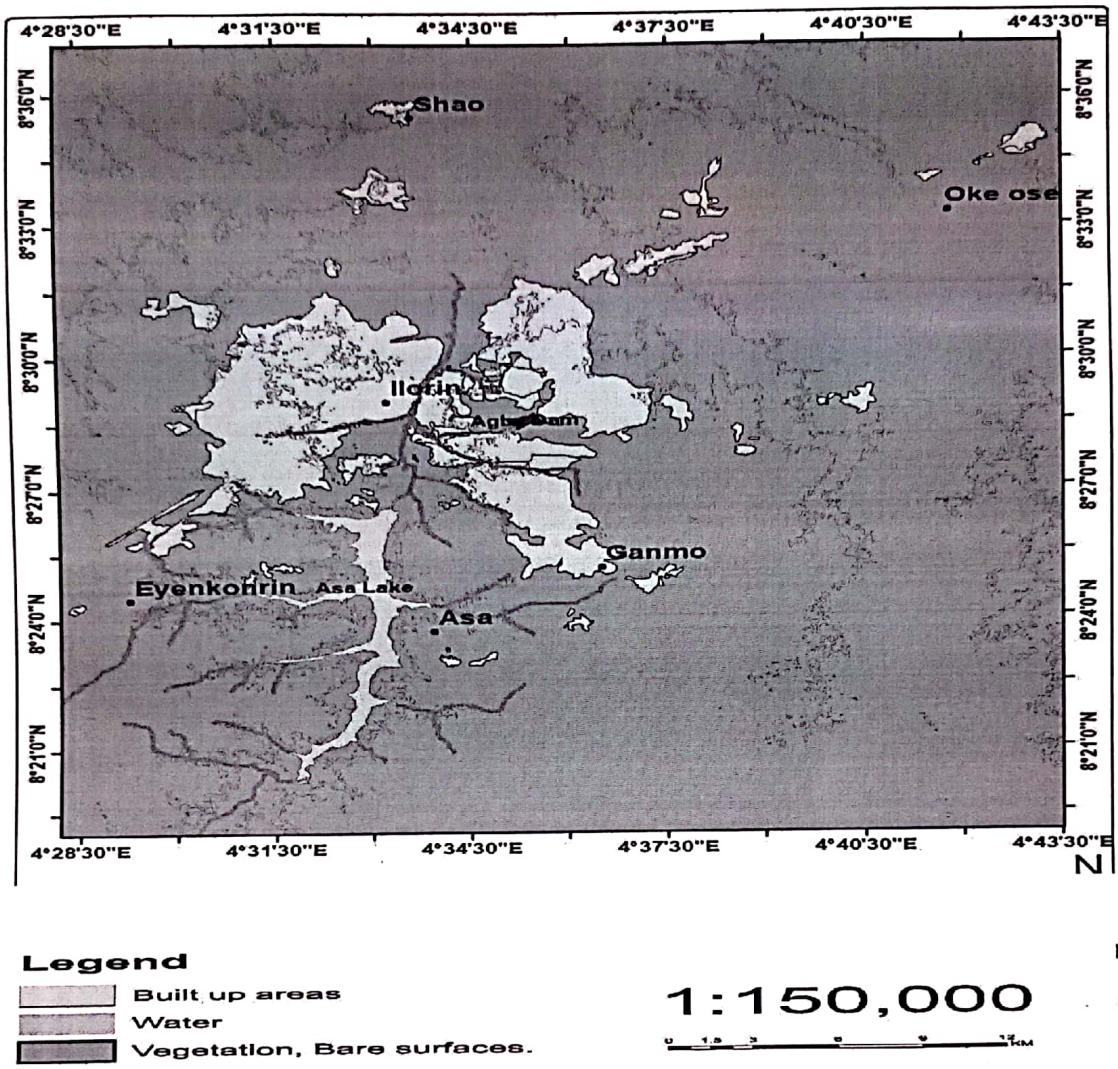


Figure 3: Land cover types of Ilorin of 2003
Source: Author's analysis (2019)



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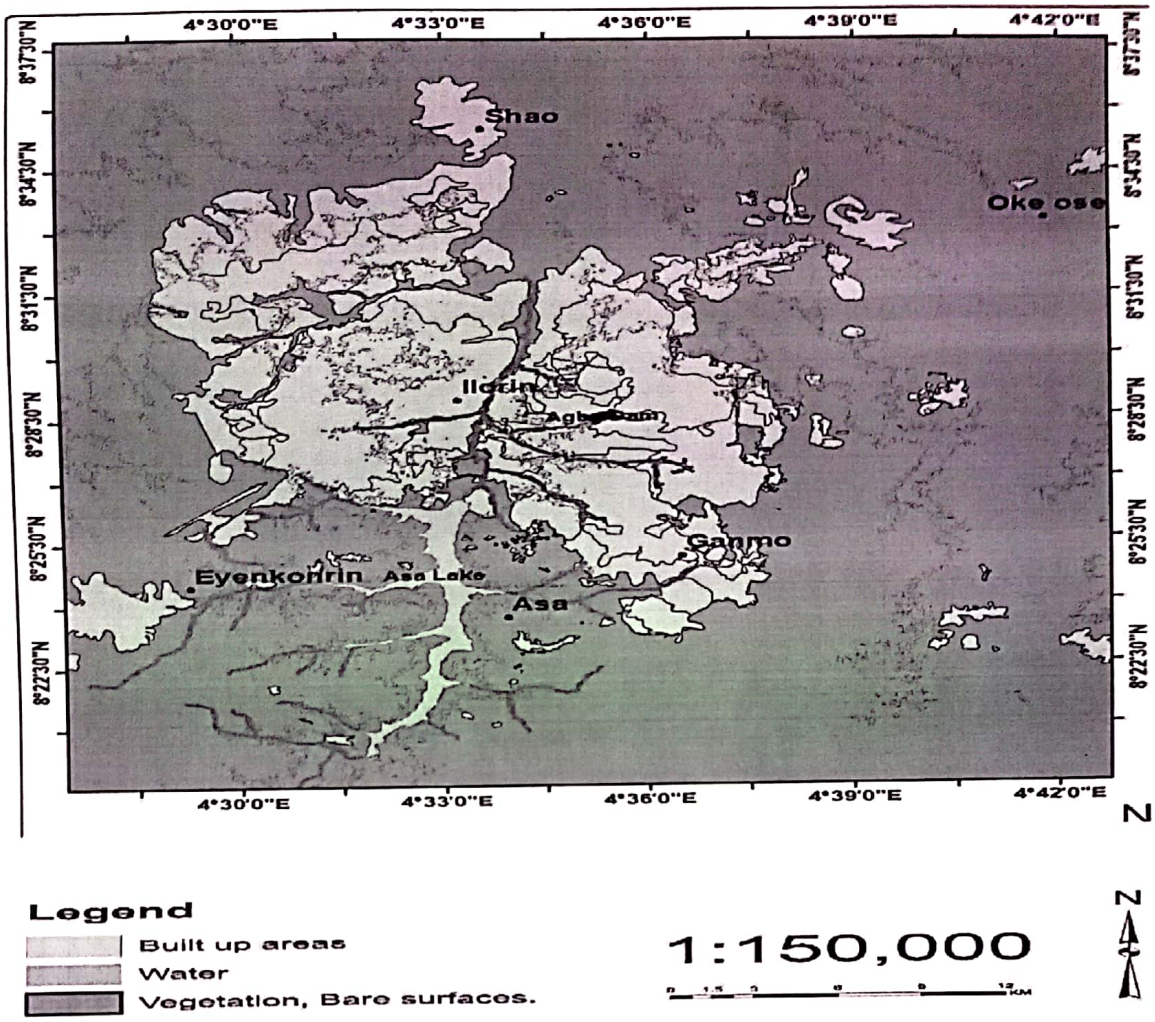


**Figure 4: Land cover types of Ilorin of 2018**
**Source: Author's analysis (2019)**

## 4.2 Changes in Land Cover and Implications

The rate and extent of vegetation loss as deduced from the Land cover classification obtained from Figure 5 presented in square kilometers and percentages are tabulated in Table 2 and 3.



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**Table 2: Extent of Vegetation loss between 1989 and 2018**

| | 1988 | 2003 | 2018 | (1988 –2003) | | (2003-2018) | | 1988-2018 | |
|---|---|---|---|---|---|---|---|---|---|
| **Land cover** | **(km²)** | **(km²)** | **km²** | km² | % | km² | % | km² | % |
| **Vegetation** | 174.05 | 170.57 | 141.05 | -3.48 | -2.00 | -17.31 | -10.15 | -33.0 | -18.96 |

**Source:** Author's Analysis,2019

It is evident that the spatial extent of vegetation witnessed very high levels of change over the study period compared to other land uses. It reduced by 3.48km² (2.0%) between 1988 and 2003 and by 17.31km² (10.15%) between 2003 and 2018, resulting in a total loss of 33km² (18.96%) of vegetation between 1988 and 2018 (Table 2).

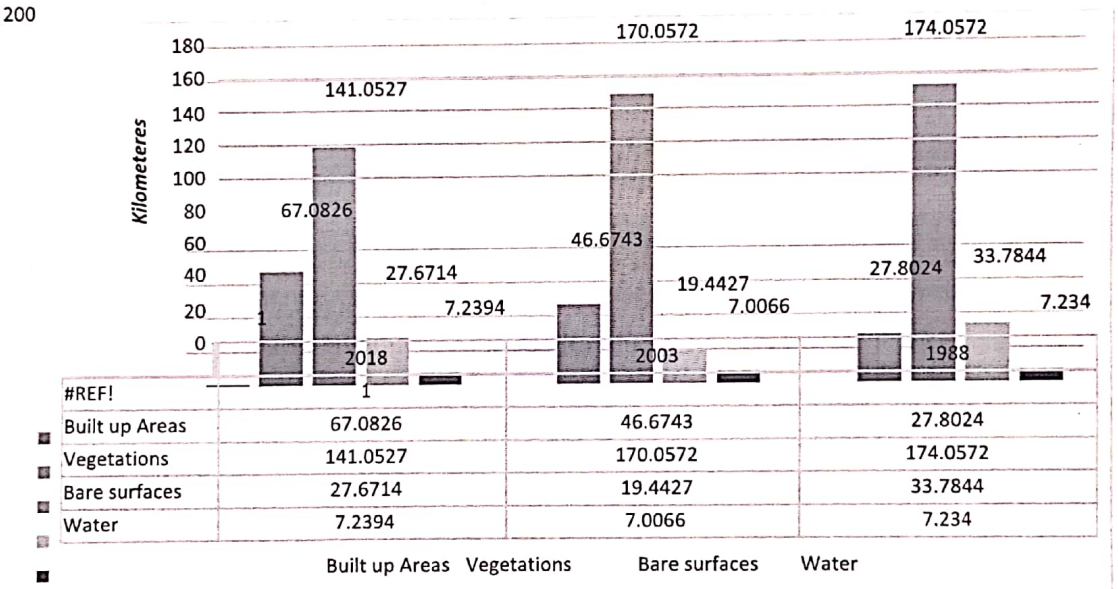


Figure 5: Land Cover Types and Area Extent in Study Area.
Source: Author's Analysis (2019)

**Table 3: Rate of vegetation Change loss between 1988 –2018.**

| | 1988 | 2003 | 2018 | Annual Rate Change (1988 –2003) | | of Annual Rate of Change (2003 - 2018) | | Total Annual Rate of change (1988 - 2018) | |
|---|---|---|---|---|---|---|---|---|---|
| **Landuse** | **(km²)** | **(km²)** | **(km²)** | **(km²)** | **%** | **km²** | **%** | **km²** | **%** |
| **Built-up** | 174.05 | 170.57 | 141.05 | -0.23 | 0.13% | -1.15 | 0.67% | -1.1 | 0.63% |

**Source:** Authors Analysis, 2019

Table 6 above illustrates that vegetation extent decreases with an yearly change rate of -

0.23km² (-0.13%) between 1988 and 2003; and -1.15km² (-0.67%) between 2003 and 2018. The total loss of vegetation in annual rate was -1.1km² (-0.63%) between 1988 and 2018. This result coincides with the positive change rate of built up areas, implying that, built up areas are gaining land coverage from vegetation. The urban sprawl extent in the study area witnessed an increase between 1988 and 2018. It was evident that urban built-up witnessed high levels of change over the study period compared to other land uses, it increased from 18.87km² between 1988 and 2003 to 20.41km² between 2003 and 2018, resulting in 39.28km² (141.29%) as the overall urban growth between 1988 and 2018 (Table 4). This results are supported by Romero et al., (2018) revealing that the 50% of forests was cleared in intermediate/advanced stages and in early stages, 40% was directly associated to an urban growth increase of 37% in the last five decades.

**Table 4: Extent of Urban Sprawl between 1989 and 2018**

| EXTENT OF URBAN SPRAWL | | | | | | |
|---|---|---|---|---|---|---|
| | **1988** | **2003** | **2018** | **(1988–2003)** | **(2003-2018)** | **1988-2018** |
| **Land use** | **(km²)** | **(km²)** | **km²** | km² D % | km²D % | km² D % |
| **Built-up** | 27.80 | 46.67 | 67.08 | 18.87 67.88% | 20.41 43.73% | 39.28 141.29% |

**Source:** Author's Fieldwork, 2019, *km² D means differences in between the years in km²

Major urban expansion in the spatial extent of Ilorin occurred between 2003 to 2018 due to swift population expansion. The built-up area of the town was 46.67km2 in 2003 and in 2018 the physical built-up area reached 67.08km2. This rise in built up extent in the study period correlates with population growth (records of population growth between 2003-2018), thus indicating that population increase has contributed to spatial expansion of Ilorin metropolis. This is supported by World Bank (2020) reporting that the growth and development of built-up areas have expanded at a quicker pace around the world and this has brought about in an increase from 15.4 percent of Nigeria's total population in 1960 which was about 6,955,836 million to 51.4 percent of Nigerian's total population that is 102,806,948 million in 2019.

This result also corresponds with the findings of Adedibu et al., (1998) as citied in Ibrahim et al., (2014) identifying that urban growth in Ilorin between 1973 and 1998 was characterized by an astronomical growth rate due to the government policy and the increase of population due the movement of people into the city. Presently, the city is now experiencing a new trend of centrifugal distribution of the population to the suburbs thereby causing the city to continue to grow till date. Furthermore, the increase in population has given rise to other factors that



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contribute to urban expansion. Rapid urban growth has as a direct relationship with factors such as creation of states and local governments; and sitting colleges of education, polytechnics, universities, industrial centers, commercial centers, tourism resorts and population influx in Ilorin (Ibrahim et al., 2014).

**Table 5: Rate of Change in Urban growth between 1988 – 2018**

| | | | | Rate of Change | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1988 | 2003 | 2018 | Annual Rate change (1988 –2003) | | of Annual Rate Change (2003 - 2018) | | of Total Annual Rate of change (1988 - 2018) | |
| Landuse | (km²) | (km²) | (km²) | (km²) | % | km² | % | km² | % |
| Built-up | 27.80 | 46.67 | 67.08 | 1.26 | 4.53% | 1.36 | 2.92% | 1.31 | 4.71% |

**Source:** Authors Analysis, 2019

The annual rate of urban growth was significant throughout the study period. The study area witnessed change rates of 1.26km² between 1988 – 2003 and 1.36km² between 2003 – 2018. The entire study period (1988 to 2018) recorded a commendable annual urban change rate of 1.31km² (Table 5). The physical growth of Ilorin and all other observable physical changes cannot be separated from the rise in the town populace. The increase in the town populace is directly brought about by different centrifugal forces which in turn affect the land consumption rate.

**Table 6: Land consumption rate in Ilorin between 1988 and 2018.**

| Year | Population | Built up area (km2) | Land consumption Rate (LCR)% |
|---|---|---|---|
| 1988 | 399,005 | 27.80 | 7 |
| 2003 | 741,140 | 46.67 | 6.3 |
| 2018 | 1,201,511 | 67.08 | 0.0056 |

**Source: Author's computations (2019)**

The relationship between population growth, land consumption rate and spatial growth in Ilorin is illustrated in Table 6 and shows that the LCR for 1988, 2003 and 2018 are 7%, 6.3% and 0.0056% respectively. The finding shows that there is transformation of the land and these transformation in the status of the land use is due to increase in human population and pressure on socioeconomic activities. This result is supported by Oloukoi et al., (2014) reporting that there was a minor increment in the consumption of land (LCR) which was 1.2% in 2002 from the 1.1% in 1986 and kept on steady till 2009.



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### a. Urban Expansion Relationship and Vegetation Loss

The result of the unorganized growth of the metropolis has resulted to the vegetation cover loss. The urbanized area is increasing mainly as a result of the conversion of vegetation cover and agrarian land being converted to urban Land use. Great pressure has mounted on the land due to the high demand for both residential and commercial as well as other developmental structures. As a result, there was a swift increase in the clearing of vegetation and agricultural land for physical expansion. Table 3 and 4 reveals that the period 2003-2018 which recorded the highest percentage of plants loss (1.15km) representing a yearly loss rate of 0.67% and highest rate of spatial growth of 0.36km annually. It can therefore, be implied that the built-up is taking up the land with vegetal covering including the agricultural land.

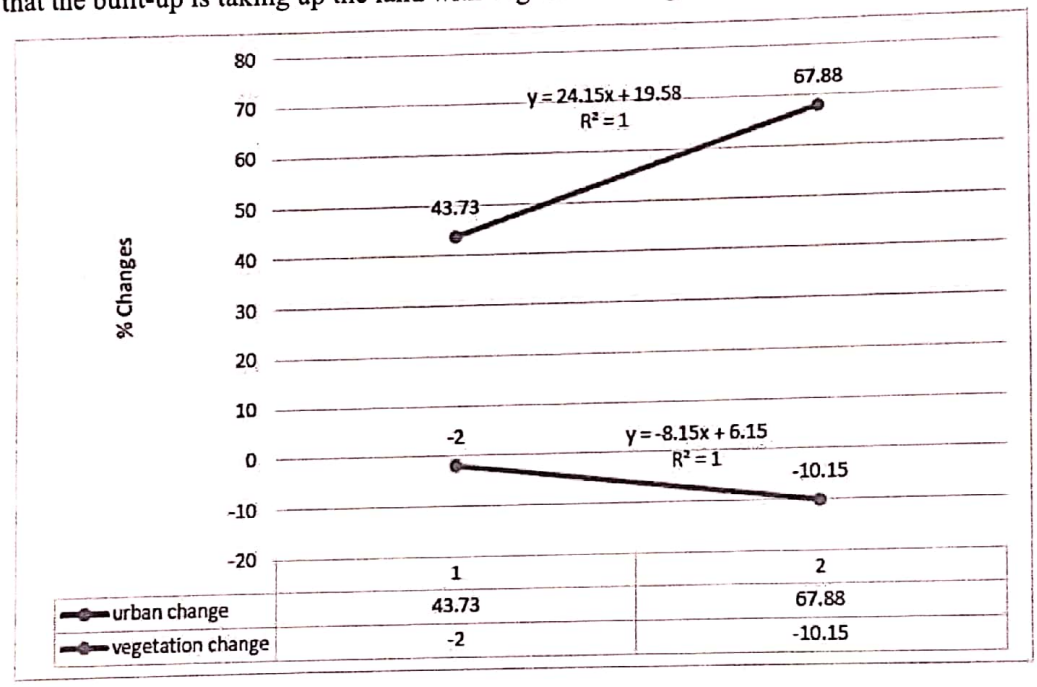


Fig.6: Urban Expansion Relationship and Vegetation Loss in Ilorin Metropolis.
Source: Author's Analysis (2019)

Within the study period (1988-2018), 19.0% of the vegetation was lost at a yearly percentage of 0.63%. Even between 1988 and 2003, Table 3 and 4 shows that as urban areas enlarged by 67.88%, vegetation declined 0.13%. Also, the result of the trend line equation for urban change $y = 24.15x + 19.58$ is positive; meaning that the area has been experiencing a significant increase in urban growth over a period of 30 years. Other results indicate a strong



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positive relationship between urban change and time with a correlation coefficient of ($R^2$ = 1). Also, the trend line equation result for vegetation change y = -8.15x + 6.15 is negative; meaning that the area has been experiencing a significant decrease in vegetation cover over a period of 30 years (Figure 6). This can be attributed to the rapid urban growth as shown in the strong positive correlation coefficient trend line equation of the urban change being the primary effect of swift population growth that calls for expansion of urban setting. Other results show a strong positive association between vegetal cover change and time with a correlation coefficient of ($R^2$ = 1). The result shows slight loss in vegetation cover with increases in spatial growth. However, the change rate of the vegetation though slow, if continued without control measure that are adequate, may cause the vegetation cover of city to be stripped within a few decades. This is in line with Romero et al., (2018) revealing that the 50% of forests was cleared in intermediate/advanced stages and in early stages, 40% was directly associated to an urban growth increase of 37% in the last five decades. These result findings are supported by Ashiagbor et al., (2019) revealing that 200 percent increase in urban areas was experienced with substantial fragmentation and reductions in open forests, riverine and agricultural lands. Also, Lasisi et al., (2017) reported in their study that vegetative cover /farmland compacted from 62.69045% (9277.71 hectares) in 1986 to 54.02527% (7995.33 hectares) in 2014 where as built-up areas increased from 6.60865% (978.03 hectares) in 1986 to 20.11178% (2976.39 hectares) in 2014. According to Bhat et al., (2017), one of the major reason for large scale migration of people from rural and smaller towns to bigger cities is mainly due to the search for better employment opportunities and better quality of life leading to an increase in the urban population.

**5 Conclusion and Recommendations**

In conclusion, the study shows that Ilorin has lost quite significant portion of its vegetation to urban expansion. The loss though slow but nonetheless noticeable. It also emphasizes that urban expansion and associated activities play a significant role in shaping the natural landscape. Therefore, the study recommends the incorporation of green landscapes into urban land use planning systems is paramount and as crucial part of urban development since urban growth and expansion is inevitable. Also, proactive measure should be taken by all stakeholders in the study area towards a better understanding of the changing pattern of landuse/landcover of the area so as to be better equipped in order to manage various



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environmental challenges that might be associated with urban expansion.

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