


# SPATIO-TEMPORAL ANALYSIS OF LAND USE CHANGE IN THE SUBURBS OF ILORIN, KWARA STATE, NIGERIA

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## Abstract

*The research analysed the spatio-temporal of land use changes in the suburbs of Ilorin from 1986-2023, the trend of the changes as well as the impact of the changes in the suburbs of Ilorin. The satellite imageries of various years between 1986-2023 were analysed using Archgis, Erdas Imagine 2014, Envi 5.0 and Microsoft Word were used for data analysis. Furthermore, a field survey was undertaken to inventory land-use change and to validate the GIS findings. Specifically, the survey sought to determine the prevailing conditions on the ground and to analyze the influence of land-use changes within the suburb. The results indicate that the built-up area in Eyenkorin and Ganmo is increasing at an unprecedented rate. In Eyenkorin the overall increase in built-up area from 1986 – 2023 was 41.37km2 (33.87%) while for Ganmo the overall increase in built-up area was 27.71km2 (16.11%). The proliferation of built-up areas has led to a decline in agricultural and vegetative land cover within the suburb, thereby adversely affecting both the economy and the ecosystem. The study recommends effective participation of all stakeholders in the management and planning of land use in the suburb, especially the Town Planning Authority. This will help in preventing uncontrolled land use change in the suburbs.*

***Key Words: Land Use, Land Cover, Suburb, Spatio-temporal, Imageries, Change***

## 1.0 Introduction

Land-use change remains a pervasive global phenomenon, perpetuated by ongoing geospatial structural adjustments within urban centers, towns, and their transitional peripheries, including suburban areas. The transitional process especially in the urban suburb is evident across the globe but at varying degrees, direction, magnitude and significance. The topic remains a subject of discussion among academicians, professionals and policy makers. The degree of changes in land use is attributed to many factors, these factors according to Oyebamiji (2003) are population change, change in fashion and taste, institutional factors, culture, religious issues, and legislation, economic factors, location, complimentary issues, transportation, and planning control.

The migration of people from surrounding towns into Ilorin in search of white-collar jobs and other opportunities has created a viable market for businesses. This has generated increased demand for commercial and residential facilities, leading to higher land consumption and land-use change (Olanrewaju, 2016). Consequently, urban expansion has extended toward suburban areas such as Ganmo and Eyenkorin. One of the key challenges confronting developers in Ilorin is the scarcity of available land amid rapid




urbanization, particularly in the city center. This has compelled developers to seek land at the urban fringe (Asiyanbi et al., 2023), often resulting in unauthorized land-use conversions for residential and other economic purposes. Although the effects of these changes on suburban dwellers remain largely unexamined, land-use change continues to pose significant concerns for communities at the urban periphery. Such transformations frequently entail large-scale modifications of land use in suburban areas (Hailu et al., 2024).

Ilorin as a city has Ganmo, Eyenkorin, Oke-Ose, Afon, Lanwa, Shao, Ogele, and Egbejila as suburban settlements. These settlements have been experiencing expansion in both size and population. They have witnessed land use changes as revealed by the pilot survey carried out. However, Ganmo and Eyenkorin were purposively selected for this study based on the fact that they are the two closest suburbs that have witnessed intensive land use changes out of all the suburbs around Ilorin. They witness the direct effect of the development and expansion of Ilorin. This study tends to reveal the peculiarity of the study area, the trend of land use changes, coupled with the social, physical and economic effect of land use changes in the suburbs. Little or none is known of the land use change in the selected suburbs of Ilorin. The result of this study on trends of land use change in the selected suburbs will be used for policy implications.

## 2.0 Literature Review

Land use refers to the manner in which a parcel of land, site, or structure is utilised for specific functions. The concept extends beyond the construction of buildings to include other activities such as waste disposal sites, cemeteries, and crematoria (Akintola, 2011). A primary driver of land-use change is urbanisation, which is recognised for its direct and indirect effects on land-use transformation. Suburbanisation, in particular, represents a significant outcome of urbanisation on land-use patterns (Sunday and Umar, 2018).

Urban expansion, defined as the outward growth of cities to their peripheries (McNicoll, 2011), often leads to the emergence of new residential areas, including suburbs that are commonly characterised by informal settlements. Ducksu et al. (2022) conceptualise suburbs based on three key attributes: peripheral location, intermediate population densities between urban and rural areas, and relative recency of development. Human activities, largely influenced by socio-economic factors, continue to alter both built-up and non-built-up areas, notwithstanding constraints imposed by physical conditions (Long et al., 2007). Land-use change, encompassing the conversion of land from one category to another and modifications in land cover through management practices, has transformed a substantial proportion of the Earth's terrestrial surface. These changes are largely undertaken to meet immediate human demands for natural resources (Meyer and Turner, 2016; Vitousek et al., 1997). Globally, alterations to forests, agricultural lands, built-up areas, water bodies, and the atmosphere are driven by the need to provide food, fiber, water, and shelter for a population exceeding six billion people.

The escalating demand for land in suburban areas poses substantial challenges to sustainable land-use in the suburbs of Ilorin. Such pressures


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undermine physical development, result in the conversion of agricultural lands and cash crop plantations, and have detrimental effects on the economic stability and livelihoods of suburban populations (Rastogi and Curtis, 2020). Despite the persistence of these challenges, there is a pressing need for comprehensive research to understand the complex dynamics of land-use change in suburban areas. Furthermore, the limited body of research on planning and development control in Nigerian suburban contexts has created significant challenges for both suburban areas and their residents. Ineffective land-use and development management has resulted in incompatible land uses, uncontrolled urban expansion (Nesru and Jaap, 2024), and the neglect of livelihood considerations (Musa and Odera, 2014). Given the substantial implications of land-use change for suburban areas, Hironori and Guy (2018) and Kalish (2021) emphasize that additional research is essential to inform planning and development strategies that prioritize sustainable livelihoods and effective land-use management. Through an investigation of these dynamics, this study seeks to contribute valuable insights for guiding suburban development and enhancing the well-being of suburban dwellers.

Existing research on land-use dynamics has largely focused on urban centers and rural areas, with minimal attention given to suburban contexts. For instance, Alejandro (2024) and Dietz et al. (2023) have examined urban centers as the primary determinants of relocation and migration decisions. Similarly, Talema and Nigusie (2023) analysed planning strategies for managing urban sprawl in Nigeria, while Opiyo et al. (2024) investigated rural livelihood changes with emphasis on household assets and community resources. Diao et al. (2019) also explored urban and rural transformation in Ghana, focusing primarily on rural dynamics. Furthermore, Persson et al. (2021) assessed variations in livelihood responses to increased conservation enforcement in protected areas, with the objective of promoting conservation practices. Collectively, these studies have addressed issues of urban sprawl management, rural livelihood transformation, and conservation enforcement. However, a substantial knowledge gap persists concerning the temporal dynamics and impacts of land-use change in suburban areas.

This gap is particularly pronounced in the context of Ilorin suburbs, where unique socio-spatial processes are unfolding. To address this gap, the present study investigates the magnitude and significance of land-use changes in suburban areas over time. By generating empirical evidence on this issue, the study aims to inform policymakers on effective land-use planning strategies that can support sustainable livelihoods for suburban dwellers

## 3.0 Methodology

Ilorin is the capital of Kwara State and one of the largest cities in Nigeria. It lies between longitude 4032’00″ and 5000’00″ East of Greenwich meridian and between Latitude 8020’00″ and 8044’00″ North of the Equator as shown in Figure 1. It is bounded in the North by Moro L.G.A; in the East by some villages within Ilorin LGA itself, and Ifelodun L.G.A; while in the South and to the West, by Asa LGA as shown in Figure 1. The city of Ilorin is also the

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headquarters of Ilorin West LGA. Therefore, the city plays a dual administrative role as the capital of Kwara State and as the headquarters of Ilorin West LGA. Hence, Ilorin West, East, and South, as well as Asa and Moro LGAs, constitute what is known as the Ilorin emirate. At the same time, the Ilorin metropolis comprises Ilorin West, East, and South (Iroye and Abejirin, 2012). According to Olanrewaju (2009). Ilorin has an area of 100km2, Ilorin City serves as a gate between the South and the North. In other words, Ilorin is a frontier settlement between the Northern Hausa culture and the Southern Yoruba Culture.

The climate is tropical according to the Koppen classification characterized by rainy and dry seasons. The rainy season often occurs between March and November. The annual rainfall varies from 1000mm to 1500mm with a peak in September to early October. The average monthly temperature is generally high throughout the year (Ajibade, 2002). The minimum temperature ranges from 21.10C to 250C with an average maximum temperature of 380C, while relative humidity is about 77.50% and daily sunshine of about 7.1h (Olanrewaju, 2009) Vegetation and climatic condition viz-a-viz. Other factor dictates the vegetation type found in the area, the favourable climate is also a factor that attracts residents to reside in the Ilorin thus leading to a quest for more land and also resulting in land-use changes.

The rapid expansion of the built-up area of Ilorin in recent years has been associated with remarkable changes in the structure and types of land use within the town Ajibade & Ojelola (2004). During the pre-colonial period, urban land use in Ilorin was largely dominated by residential uses but the changes in the socio-economic structures of the town after the establishment of the British Colonial administration coupled with post-independence structure have caused great changes in its function types. These include Residential, Commercial, Industrial, Public and semi-public uses, Recreational, Infrastructure, and Circulation; (Onokerhoraye and Omuta (1986).

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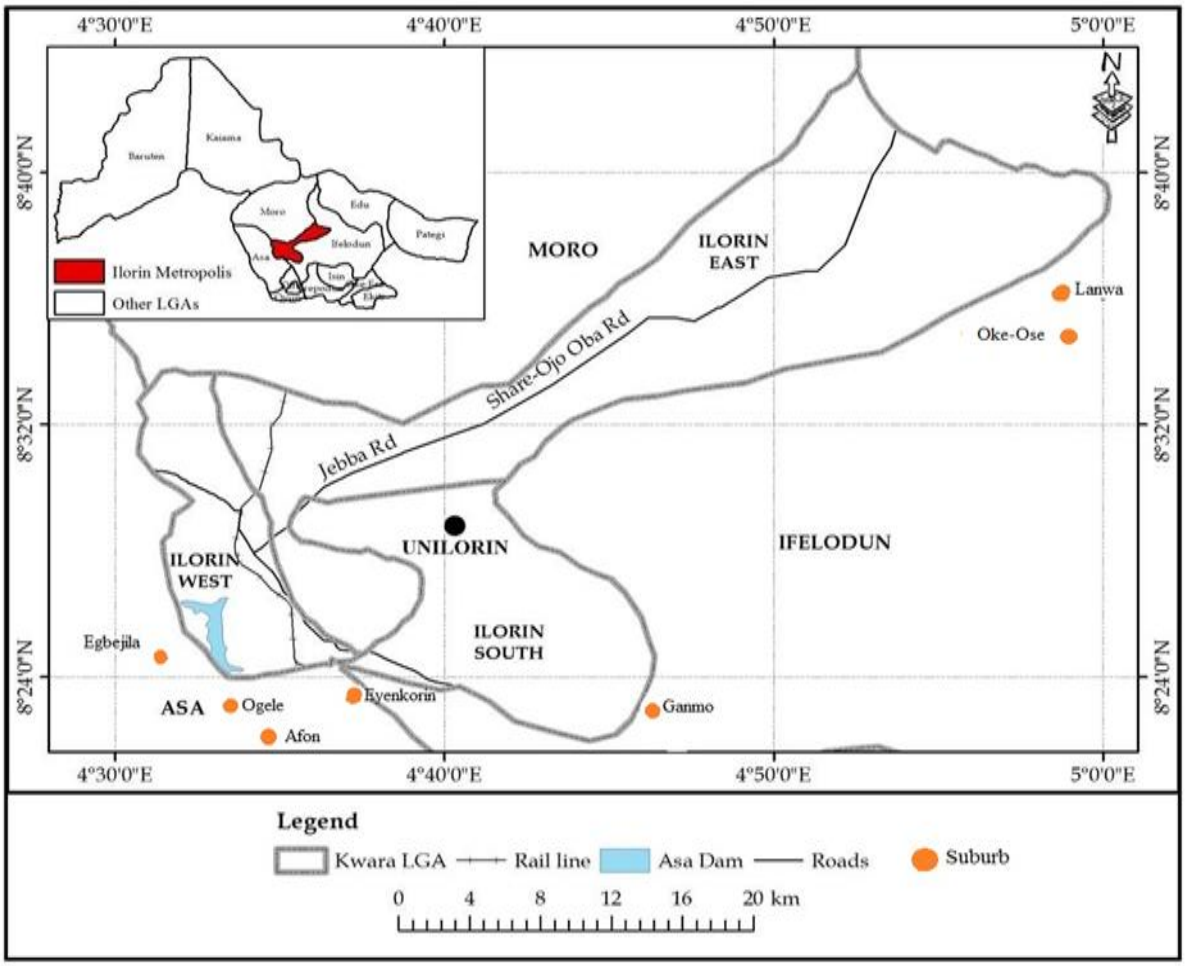



***Figure 1: Ilorin and the suburbs within the context of Kwara State***

This research adopted two instruments for data collection which are: field observation and collection of the secondary data from relevant agencies, while reconnaissance survey method was employed to get familiar with the study area; particularly to identify the issues of urban land-use changes in the study area. The study areas were visited for observation and land use inventory and information on land-use changes were collected and photographs were taken to support the observation.

Field observation was carried out by the author in the selected suburbs (Eyenkorin and Ganmo) of Ilorin. Field observations were undertaken to inventory land-use changes, validate information derived from GIS analysis on historical land-use change, and ascertain the current use of converted land as well as assess the impacts of these changes on the suburbs A camera was used to take photographs to support the findings of the field observation. Global Positioning System (GPS) was used to take the coordinates of the suburbs.

To assess the magnitude of land-use change in the suburban areas, field photographs were subjected to Visual Content Analysis. This method has been widely applied in urban and environmental studies to interpret visual data and

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derive insights on spatial processes. Following the approaches of Goodspeed (2014), Egbuna et al (2024) and Zhang *et al.* (2024), the photographs were systematically examined to identify and explain patterns of land-use change. The analysis focused on key manifestations observed in the field, including uncontrolled development, encroachment of built-up areas into agricultural land, loss of farmland, and reduction in vegetation cover. This approach enabled the interpretation of field observations to explain the nature, extent, and implications of land-use change in the study area.

**Geographic Information System (GIS) Analysis**

The land use/land cover imageries between 1986 and 2023 in $km^2$ were downloaded from the USGS website (www.earthexplorer.usgs.gov). The detail is shown in Table 1.

Table 1: Data Used and Properties

| Years of Images | Source | Path/row | Year/Date | Spatial Resolution |
|---|---|---|---|---|
| **Landsat 8 OLI and TIRS** | www.earthexplorer.usgs.gov | 191 and 54 | 2023/ 30 November | 30m Multi Spectral and 30m Thermal |
| **Landsat 7 ETM+** | www.earthexplorer.usgs.gov | 191 and 54 | 2010/ 06 February | 15m Panchromatic, 30m Multi Spectral |
| **Landsat 7 ETM+** | www.earthexplorer.usgs.gov | 191 and 54 | 1998/ 01 November | 15m Panchromatic, 30m Multi Spectral |
| **Landsat 5 MSS** | www.earthexplorer.usgs.gov | 191 and 54 | 1986/ 08 August | 30m resolution |

***Source: Author's Compilation (2023).***

## 4.0 Result and Discussion

This section is divided into four parts, the first section discusses the land use distribution and trend of land use change for each study year for Eyenkorin, and the second section discusses the land use distribution and trend of land use change for each study year for Ganmo. The third section presents the findings from the field survey on the impact of land use change in the suburbs while the last section discuss the results and their implications.

**Land Use Distribution of Eyenkorin from 1986-2023**

The statistics of the land use distribution for each study year of Eyenkorin are presented in Figure 2, 3, 4, and 5.

**Land Use Distribution at Eyenkorin, 1986**

Figure 2 reveal that in 1986 the predominant category is built-up area 64.98 $km^2$ representing 53.23% of the study area. Eyenkorin falls within Asa Local Government Area and shares a boundary with Ilorin the capital of Kwara State in the western part. The suburb is very close to Ilorin and falls along the road that links Ogbomosho and Ilorin. This made it witness rapid development over the years as urbanization in Ilorin had a great influence on its development. Light vegetation occupied 36.97$km^2$ (30.25%), thick vegetation occupied 19.94 $km^2$ (16.34%), and water body occupied the least area accounting for 0.22 $km^2$ (0.18%). Good road network from Ilorin to the suburbs is one key

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factor that encourages residents to settle in the suburbs. This supports the sector theory by Homer Hoyt cited in Ghosh (2008), that the availability of road networks attracts development.

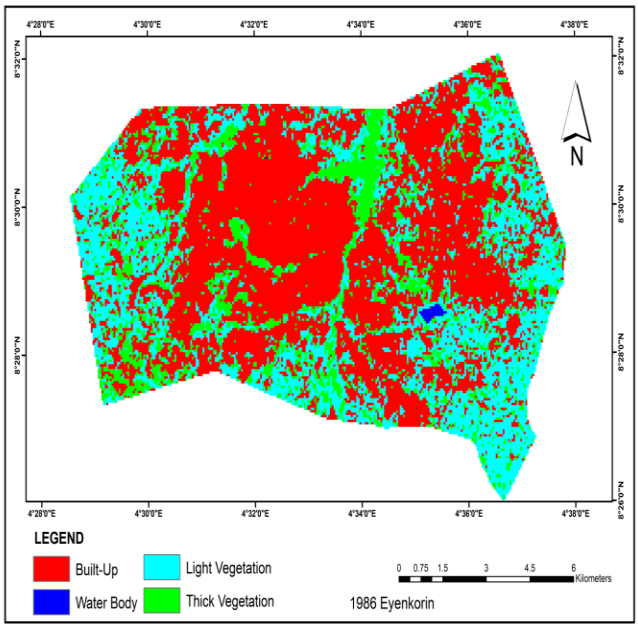



***Figure 2: Land Use Map at Eyenkorin (1986)***
***Source: Author's Work (2023)***

## Land Use Distribution at Eyenkorin, 1998

Table 2 and Figure 3 reveal that in twelve years from 1986 – 1998, the built-up area increased as it occupied 66.75km$^2$ (54.66%) of the total study area. This is the effect of urbanization happening in Ilorin where residential density is been converted to commercial uses like filling stations and shopping complexes among others. This act forced the previous residents of the converted buildings to the suburbs, making built-up land increase in the suburbs (Eyenkorin). The light vegetation declined as it occupied 20.98 km$^2$ (17.18%) due to the expansion of the built-up area, thick vegetation increased as it occupied 34.15 km$^2$ (27.97%) and water body 0.23 km$^2$ (0.19%) increased, this may be as a result of increase in rainfall.

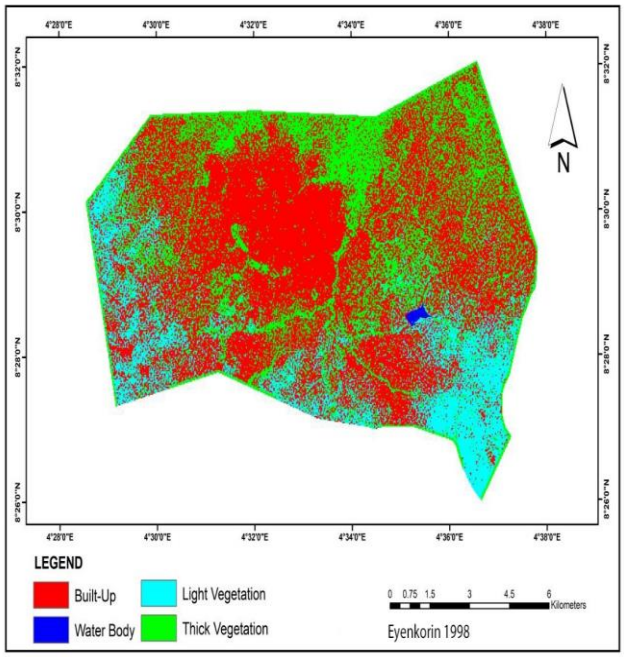



***Figure 3: Land Use Map at Eyenkorin (1998)***
***Source: Author's Work (2023)***

## Land Use Distribution at Eyenkorin, 2010

The built-up area continues to increase over the years as it occupied 77.98km$^2$ (63.8%) of the study area, thick vegetation and light vegetation now declined as they now occupied 28.69 km$^2$ (23.49%) and 15.29km$^2$ (12.53%) respectively. This is a result of vegetative land being converted to residential use as people keep moving to Eyenkorin, making conversion of vegetative land to residential use and other infrastructure use inevitable. The water body decreased as it occupied 0.15 km$^2$ (0.12%), this may be due to the climatic change. This finding is consistent with Jan *et al.*, (2022), who reported that uncontrolled suburban development can result in sprawl is happening at the suburbs.

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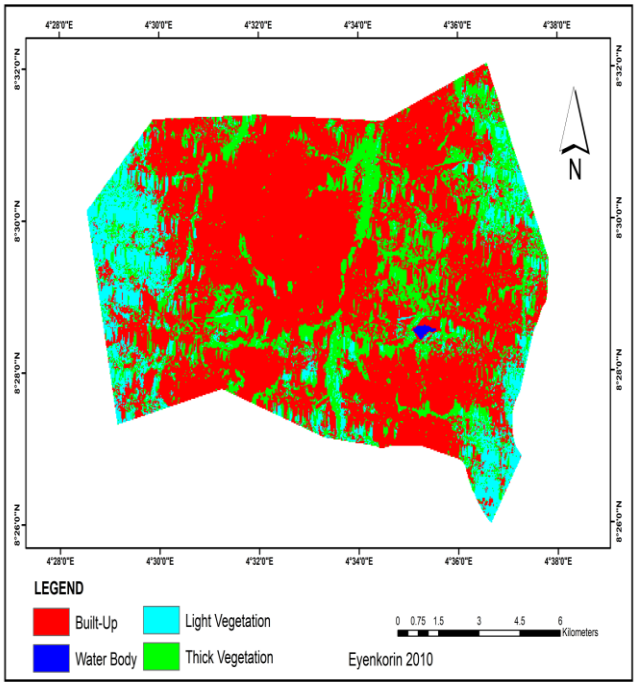



*Figure 4: Land Use Map at Eyenkorin (2010)*
*Source: Author's Work (2023)*

## Land Use Distribution at Eyenkorin, 2023

The LULC distribution from 2010 to 2023 witnessed a remarkable increase in built-up land which occupied 106.35km$^2$ (87.10%). This is the result of continuous influx into Eyenkorin from Ilorin the State Capital. Urbanization in Ilorin keeps happening at a fast rate making land inaccessible and very expensive thereby forcing people to the suburbs. There is a drastic decline in thick vegetation and light vegetation which now occupy 23.49km$^2$ (11.45%) and 4.08 km$^2$ (3.34%) respectively. This shows the impact of built-up expansion on vegetation. The water body increased as it occupied 0.23 (0.19%), this may be due to the increase in rainfall. This supports the finding of Adeboyejo & Abolade (2006) that the built-up area is expanding at an unprecedented rate of harming vegetation.

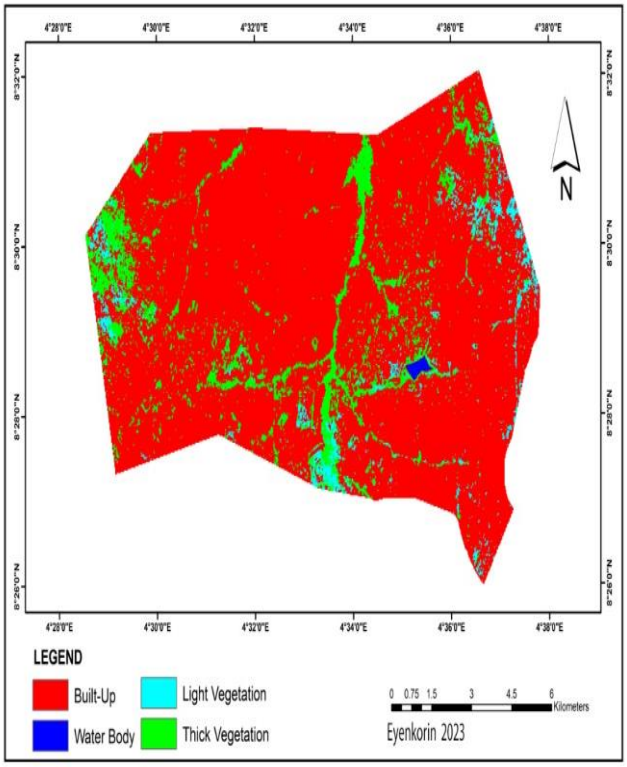



**Figure 5:Land Use Map at Eyenkorin (2023)**
**Source: Author's Work (2023)**

## Trend in Land Use Change at Eyenkorin, 1986 – 2023

The result of the analysis illustrates the trend of land use and land cover change in Figure 6. The result reveals that in the twelve years intervals between 1986 and 1998, there were both decreases and increases in land use and land cover categories as observed and revealed through field surveys and GIS information. The result reveals that built-up area, thick vegetation and water bodies increased within the survey period while light vegetation declined at the rate of (-13.07%). The change in built-up land which increased at the rate of (1.43%) between the years 1986-1998 is due to urbanisation that started gradually and the effect is been witnessed in the suburb.

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In another twelve-year interval, between the years 1998 and 2010, the trend continued. The changes are in the increase in built-up land and the decline in other categories. Built-up land increased at the rate of (9.20%), while light vegetation decreased at the rate of (-4.65%), thick forest decreased at the rate of (-4.48%) and water body decreased at the rate of (-0.07%) respectively. The increase in the built-up area is a result of the influx of people into Eyenkorin as Ilorin the state capital become congested, coupled with its good location as it lies along the road that links Ogbomosho to Ilorin this attracted people to settle at Eyenkorin. The light vegetation declined as a result of an increase in demand and use of land for residential use by immigrants from Ilorin and its environments like Ogbomosho.

From 2010 to 2023, the trend continues as the built-up area keeps increasing and other categories of land use land cover like the Light and Thick vegetation keep decreasing. The built-up land increased significantly by (23.24%), while the other categories light vegetation and thick forest declined by -9.19% and -14.4% respectively, and the water body increased by (0.07%). The reason for the increase in built-up land is population growth and urbanisation. The decrease in thick and light vegetation is because they are cleared to pave the way for housing and other infrastructural facilities needed to cater to the rapid urbanisation. This implies that urbanisation in Eyenkorin is happening in an unprecedented manner with a continuous influx of people into the suburb which keeps having a greater footprint on the vegetation, the stability in the water body may be a result of stable climatic conditions. This finding supports the research of Yasi and Lei (2020), which suggests that suburban expansion influenced by urban centers can lead to the merging of suburbs with urban areas, forming larger cities.

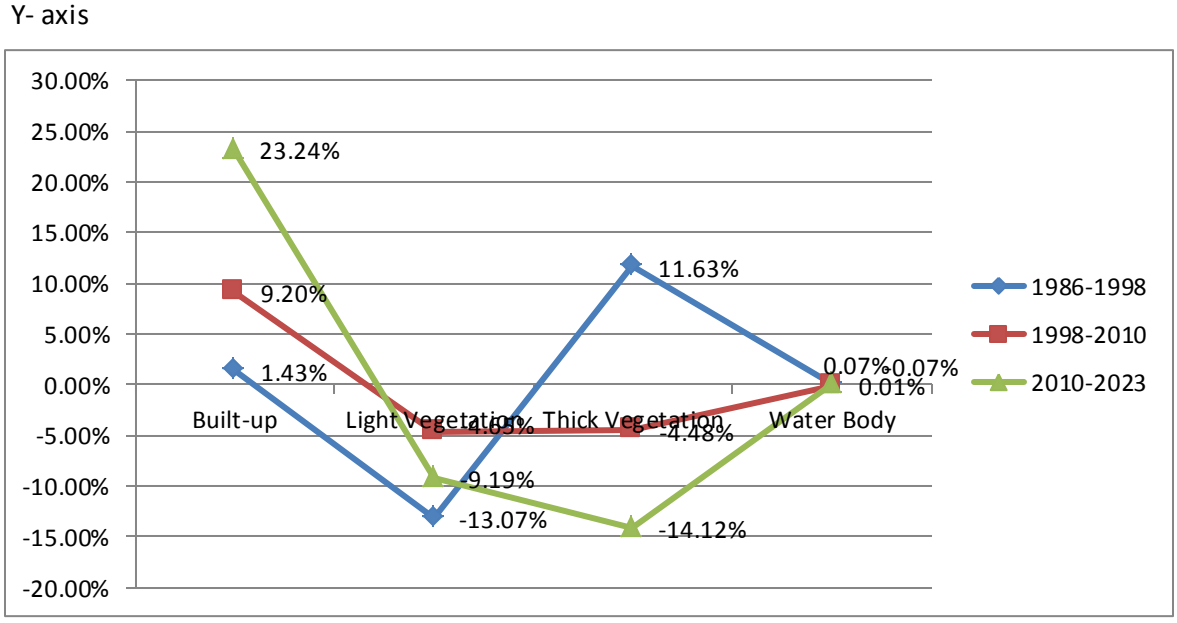



***Figure 6: Trend in Land Use Change of Eyenkorin, 1986 – 2023***
***Source: Author's Work (2023)***

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**Land Use and Land Cover Distribution of Ganmo from 1986-2023**

The statistics of the land use distribution for each study year for Ganmo is presented in Table 3 and Figure 7, 8, 9 and 10

Table 3: Land Use Distribution in Ganmo in (1986-2023)

| Land use/Land cover class | Year 1986 | | Year 1998 | | Year 2010 | | Year 2023 | |
|---|---|---|---|---|---|---|---|---|
| | Area($km^2$) | Area % | Area($km^2$) | Area % | Area($km^2$) | Area % | Area ($km^2$) | Area % |
| Built – Up area | 18.14 | 10.54% | 19.87 | 11.55% | 29.03 | 16.87% | 45.85 | 26.65% |
| Light Vegetation | 129.96 | 75.55% | 138.20 | 80.33% | 121.60 | 70.68% | 95.46 | 55.49% |
| Thick Vegetation | 16.84 | 9.78% | 7.22 | 4.20% | 16.52 | 9.60% | 24.14 | 14.03% |
| Water Body | 7.10 | 4.13% | 6.75 | 3.92% | 4.89 | 2.85% | 6.59 | 3.83% |
| Total | 172.04 | 100 | 172.04 | 100% | 172.04 | 100 | 172.04 | 100% |

***Source: Author's Work (2023)***

**Land Use Distribution at Ganmo, 1986**

Table 3 and Figure 7 revealed that in 1986 the predominant category was light vegetation 129.96$km^2$ (representing 75.55%) of the study area. Next to it was a built-up area of 18.14$km^2$ (10.54%), Ganmo falls within the Ifelodun Local Government Area and shares a boundary with Ilorin the State capital of Kwara State in the south. The suburb is very close to Ilorin on the west and it is located along the road that links Ilorin to other surrounding towns like Ajase, and Offa among others, coupled with urban expansion from Ilorin. This made it witness development over the years. Thick forest occupied 16.84 $km^2$ (9.78%) and the water body occupied 7.10$km^2$ (4.13%). This result is in agreement with Wassmer (2005) that the closeness of suburbs to the city coupled with good transportation linkage between them influences rapid urban expansion towards the suburb.

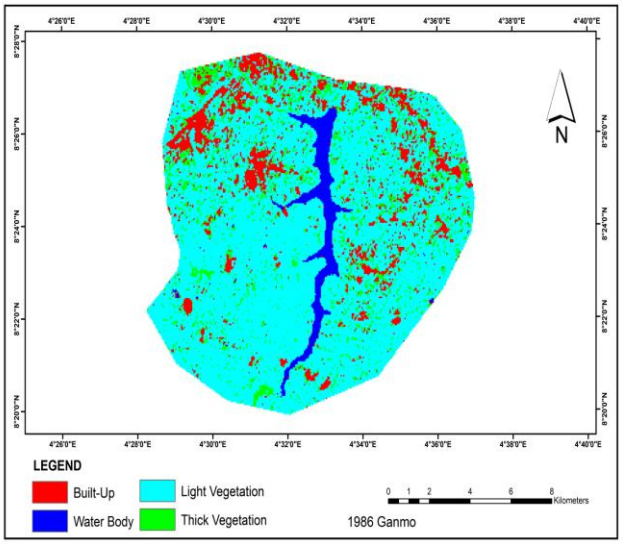



***Figure 7: Land Use Map at Ganmo (1986)***
***Source: Author's Work (2023)***

**Land Use and Land Cover Distribution at Ganmo, 1998**

Figure 8 and Table 3 reveal that in twelve years from 1986 -1998, the light vegetation and built-up land increased as they occupied 138.20$km^2$ (80.33%) and 19.87 $km^2$ (11.55%) respectively, thick vegetation and water body declined as they occupied 7.22 $km^2$ (4.20%), and 6.75 $km^2$ (3.92%) respectively. The increase of built-up land is a result of the influx of people from Ilorin

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into Ganmo, fluctuation water body may be due to climatic change.

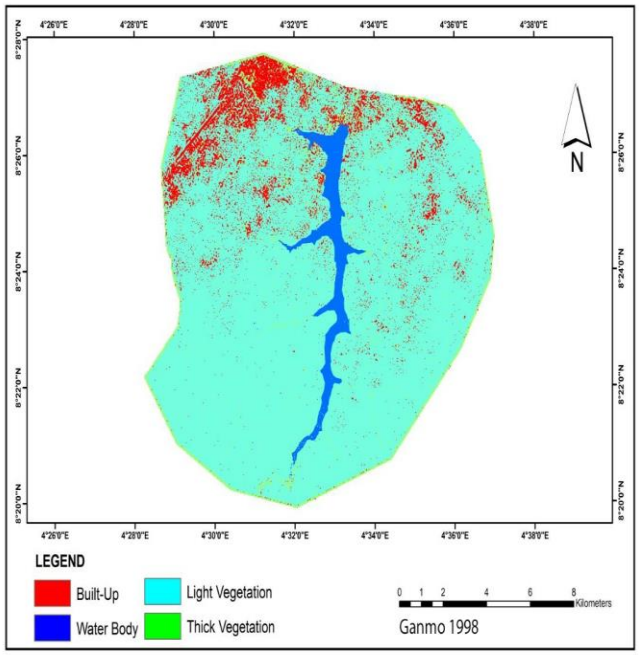



***Figure 8: Land Use Map at Ganmo (1998)***
***Source: Author's Work (2023)***

## Land Use Distribution at Ganmo, 2010

The built-up area continues to increase after another interval of twelve years from the year 1998 to year-2010 as it occupied 29.03km$^2$ (16.87%), thick vegetation also increased as it occupied 16.52km$^2$ (9.60%) while light vegetation and water body declined as they occupied 121.60km$^2$ (9570.68%) and 4.89km$^2$ (2.85%) respectively. The influx of people into Ganmo keeps increasing the level of development and urbanization, more vegetative land is now converted to residential and other infrastructural use. The decline in the water body may be due to the reduction in the rate of waterfalls. This finding is in consonance with Istiyanti *et al.*, (2024), who opined that proximity of the suburb to the city is a strong factor that attracts people to the suburbs in Nigeria.

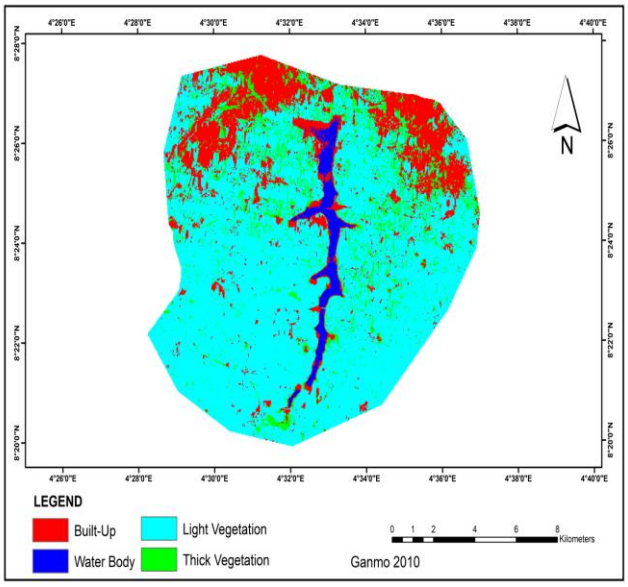



***Figure 9: Land Use Map at Ganmo (2010)***
***Source: Author's Work (2023)***

## Land Use Distribution at Ganmo, 2023

The LULC distribution from 2010 to 2023 witnessed a remarkable increase in built-up land which occupied 45.85km$^2$ (26.65%), this is a result of an unprecedented influx of people into the suburb from Ilorin within this period of years, thick forest and water bodies also witnessed some increase within this year of study as the occupied 24.14 km$^2$ (14.03%) and 6.59 km$^2$ (3.83%) respectively. Light vegetation occupying 95.46 km$^2$ (55.49%) witnessed some decrease. This is a result of more vegetative land being cleared off for residential and other uses as demand for land for residential and commercial uses at Ganmo keeps increasing because of the demand for land from Ilorin. Fluctuation in water bodies is subject to the volume of rainfall. This result is consistent with Sunday and Umar (2018), who found that urbanisation and its associated effects in urban centers drive people to reside in nearby suburbs.

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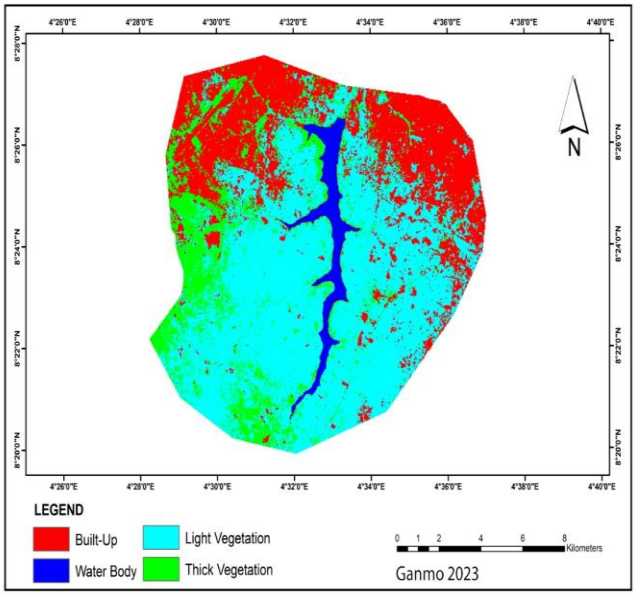



***Figure 10: Land Use Map at Ganmo 2(023)***
***Source: Author's Work (2023)***

**Trend in Land Use Change of Ganmo, 1986 – 2023**

The trend of land use and land cover change as illustrated in Figure 11 reveals the twelve years interval between 1986 and 1998. There were both decreases and increases in land use and land cover categories in the study area. The result reveals that the built-up area and light vegetation increase at the rate indicated therein. Thick vegetation and water bodies declined at the rate of -5.58% and -0.21% respectively, the built-up area that increased between years 1986-1988 by (1.01%) was because the suburb started witnessing the effect of urbanization in Ilorin that started slowly between the study period.

In the period between 1998 and 2010, the trend continued, the change in the built-up land is increasing, built-up land increased at the rate of 5.32%, thick vegetation also increased at the rate of 5.40% while light vegetation and water bodies declined at the rate of -9.65% and -1.07% respectively. The reason for the increase in built-up land is population growth as people keep migrating to Ganmo at an unprecedented rate. The decrease in light vegetation is because they are cleared to pave the way for housing and other infrastructural facilities needed to cater to the rapid urbanisation happening in Ganmo.

The period of 2010 to 2023 witnessed continuity in the trend of land use change as built-up areas and thick vegetation keep increasing at the expense of light vegetation. The built-up area significantly increased by 9.78% and the thick vegetation increased at the rate of 4.43%, water body also increased by 0.98% while vegetative land declined significantly by -15.19%.

The significant increase in the built-up land, which increased at the rate of 9.78%, is due to urban expansion coupled with gentrification that happened in the Ilorin metropolis forcing the previous residents to migrate to the suburb. This is because of the closeness of Ganmo to Ilorin and the access to transportation facilities which give people easy movement to and from Ilorin, the state capital for their business and work. The remarkable reduction in light vegetation is a result of vegetative land being cleared to cater to the demand for residential and commercial use by immigrants. This implies that urbanisation in Ganmo keeps happening at an unprecedented rate which could harm the ecosystem. Fluctuation in water bodies is a result of unstable climatic conditions. This finding supports the research of Tomasz and Robert (2020), which suggests that rapid suburban expansion in developing nations can lead to conurbation between cities and suburbs.

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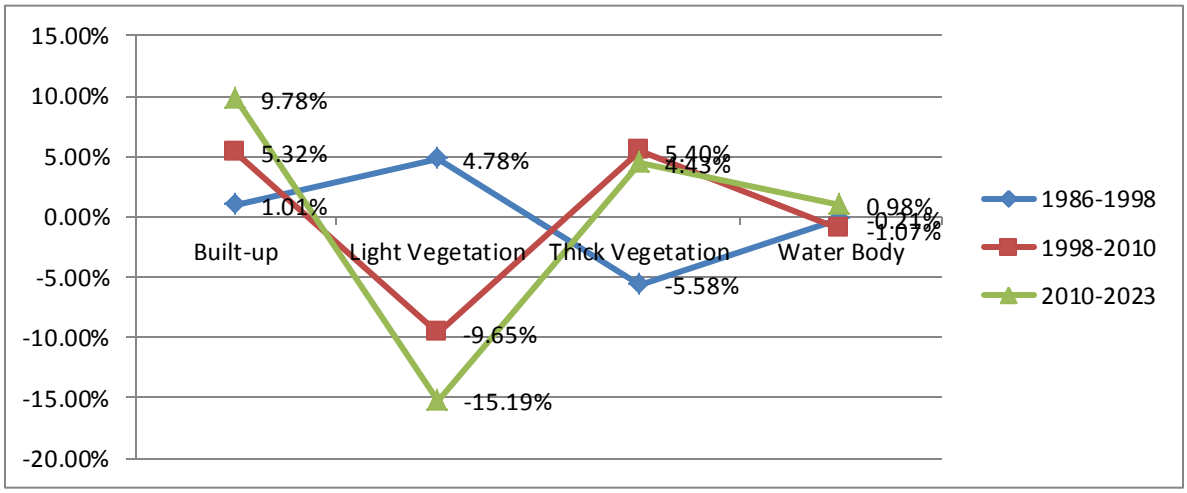



***Figure 11: Trend in land Use Change of Ganmo, 1986 – 2023***
***Source: Author's Work (2023)***

**Impact of Land Use Change in the Suburbs of Ilorin**

This section explained the effect of land use change in the suburbs of urban areas, the information obtained from the survey carried out in the suburb of Ilorin. It was discovered that development, expansion and overcrowding in the Ilorin metropolis have led to urban-suburb migration. This migration has resulted in land use changes in the suburbs. This change has different impact in the suburb. The impacts are listed and explained below.

**a. Loss of Agricultural Land:** As revealed in Plate 1and 2, primary occupations (farming, soap making, broom making, among others) are the occupations of many of the suburb dwellers and as the urban-suburban migration takes place, it influences land use changes in the suburb, thereby making some of the residents in the suburb lost their land to other land uses such as residential, commercial, among others as revealed in Plate 2. This loss of land deprived the farmers of cultivating and also deprived other primary occupations like soap makers, mat makers, and broom makers from getting the resources needed for their production. This will have a negative impact on the livelihood of the suburban dwellers. This discovery is in agreement with the finding of Musa and Odera (2014) that rapid urbanization experienced in the city has attracted many people to settle in the suburbs resulting in the clearing of agricultural land to pave the way for urban development and its attributes.

**b. Loss of Vegetation:** It was observed during the survey that loss of vegetation is on the increase as land that was previously occupied by grasses and trees is now used for residential uses (see plate 3). These trees are being used for different purposes like house roofing, as fuel for

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cooking and bakeries. This act of falling trees without replacement will lead to different environmental challenges such as erosion, flooding, depletion in air quality, flooding and extinction of endangered species. This supports the findings of Abdissa (2005) that land-use change consequently results in social, environmental and economic problems for the society.

**c. Uncontrolled Development:** It was also observed that unprecedented land use change in the suburb as a result of migration from Ilorin is promoting uncontrolled development as developments in some areas of Eyenkorin are scattered showing no sign of planning (see Plate 4). If this is allowed to continue it will lead to a problematic environment and slum development which will not be conducive to live in. This finding aligns with the research of Yong et al., (2015), which highlights the prevalence of unguided suburban residential development in cities, often lacking adequate public facilities.



***Plate 1: Maize Farm at Iyana Afon, Ganmo***



***Plate 2: Agricultural Land Use Changed to residential Land Use at Ganmo***



***Plate 3: Clearing of Vegetation and Economic Trees for Development Purposes at Ganmo***



***Plate 4: Uncontrolled Development in some Part of Eyenkorin, Ilorin***

The analysis of LULC dynamics in Eyenkorin and Ganmo between 1986 and 2023 reveals a




clear pattern of suburban transformation driven by Ilorin's urban expansion. In 1986, the two suburbs presented contrasting landscapes. Ganmo was predominantly vegetative, reflecting its agrarian character and limited urban influence at the time. Eyenkorin, however, already had a substantial built-up footprint. This early difference can be attributed to locational advantage. Eyenkorin's position along the Ogbomosho-Ilorin corridor and its direct boundary with Ilorin made it more accessible and therefore an early destination for urban spillover. Ganmo, located along the Ilorin-Ajase-Offa road, was similarly connected but experienced a slower initial conversion due to its relatively peripheral position. This spatial pattern aligns with established urban theory. The proximity of both suburbs to the city core and their integration into major transport routes created favorable conditions for outward growth. This supports Wassmer's (2005) assertion that closeness to a city and good transportation linkages drive suburban expansion, and the sector theory of Homer Hoyt cited in Ghosh (2008), which emphasizes development along transport axes.

Between 2010 and 2023, both suburbs experienced accelerated built-up expansion, indicating intensified suburbanization. The increase was particularly dramatic in Eyenkorin, where built-up areas became the overwhelming land cover, while Ganmo recorded a significant but less extreme rise. This surge was largely propelled by demographic and economic pressure from Ilorin. As land in the city became scarce and expensive, households and businesses moved to the periphery in search of affordable alternatives. This process reflects the filtering effect identified by Sunday and Umar (2018), where urbanization in the core pushes residents into adjacent suburbs. The expansion of built-up areas occurred largely at the expense of vegetative and agricultural land. Both suburbs recorded substantial declines in light vegetation as farmlands and open spaces were cleared for residential and commercial development. While minor increases in thick vegetation and water bodies were observed in some periods, likely due to rainfall variability, the overall trend points to ecological stress and fragmentation of green spaces. This outcome corroborates Adeboyejo and Abolade (2006), who noted that peri-urban growth in Nigerian cities occurs to the detriment of vegetation and farmland.

These trends carry important implications for sustainable development in the Ilorin metropolitan region. The rapid loss of agricultural and green spaces threatens food security, biodiversity, and key ecosystem services such as climate regulation and flood control. The dominance of unplanned built-up expansion also places increasing pressure on already inadequate suburban infrastructure, including roads, drainage, and water supply. Furthermore, the depletion of vegetation reduces the climate resilience of both areas, increasing vulnerability to heat stress and flooding. If current trajectories continue, Eyenkorin and Ganmo risk becoming poorly serviced, environmentally degraded urban fringes rather than livable extensions of Ilorin.

## 5.0 Conclusion and Recommendations

This study has established that land-use changes in the suburb are not only happening at a very rapid rate as shown in the increase in built-up land and decrease in vegetative and other land uses, it also brings some environmental and




socio-economic challenges such as distortion of the ecosystem, agricultural land loss and uncontrolled development that may be disastrous if not well managed and controlled. There is therefore an urgent need for proactive, integrated land-use planning. This should involve enforcing development control to guide orderly growth, protecting remaining green and agricultural belts, promoting infill development to optimize existing built-up areas, and providing basic infrastructure to support sustainable suburban settlements. Such measures are essential to balance urban growth with environmental sustainability and ensure that both suburbs contribute positively to the long-term development of the Ilorin metropolis. It is therefore concluded that all the stakeholders involved in environmental management should respond quickly to the challenges of land use change in the suburbs to prevent the same occurrence of slum development and economic challenges existing in the city centre of most developing nations.

Based on the findings of this study, there is a need for better control of land use in the suburbs to prevent all the challenges emanating from land use change, this could be possible if the stakeholders involved in land and town planning could implement the following recommendation made based on this study findings

i. There should be proper visitation of the town planning officers in the suburbs of the urban areas to prevent unapproved development from emanating. This will be possible by providing the necessary equipment needed by the Town Planning Authority to function effectively.

ii. There should be a tool (master plan) to guide the development in the suburbs of Nigerian cities. If the master plan is available and implemented, it will prevent the suburbs from having the same problems that are prevalent in most Nigeria urban centres.

iii. The well-being of the suburb dwellers who are at the receiving end of urban-suburb migration should be given priority. Therefore, their health and socio-economic well-being must be incorporated into the planning policy to protect their livelihood and standard of living.

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