

Original Research Paper

Rural-Urban Migration and its Implications on Ilesa Urban Extension

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Urbanization is rapid and irreversible; it's exerting unbearable stress on cities and big towns across the globe. This work examines the nexus between rural-urban migration and urban extension in Ilesa, Osun State, Nigeria. Primary data used were obtained via Satellite imagery that captured urban expansion in real time; Historical Landsat satellite images covering Ilesa from 1994 -2024 were used for the study. Images are LandsatTM of 1994, Landsat ETM+of 2004, Landsat ETM+ of 2014 and LandsatOLI of 2024 acquired via the USGS Earth Explorer Website. Five major land-use changes were used to depict the effect of emigration that reflects urban expansion in the study area. It was discovered that four other land uses are been continuously taken over by the Built-Up Area (BUA) in the study location. The work recommends a livable/meaningful life for rural people to discourage unnecessary exodus, and empowerment for planning agents to ensure effective and efficient service delivery that ensures the development of formal settlement and housing as well as accommodation arrangements for migrants by their employers. The work will be of tremendous use to scholars in the built environment and the general public.

Keywords: Rural-urban Migration, Urban expansion, Land uses, Build-Up Area and Ilesa

INTRODUCTION

Urban extension is the physical expansion of the geographical footprints of towns, cities or metropolitan areas into the surrounding countryside. As cities grow in population, they expand outwards, growing in the area and converting more land to urban use Angel 2023. According to Sun, (2020) from 2001 to 2018, the global Build-up Area (BUA) increased from $7.47 \times 10^5 \text{ km}^2$ to $8.0 \times 10^5 \text{ km}^2$ which is equivalent to an increase in the area of 1,130 standard football fields ($7,140 \text{ m}^2$) per day. During this period, the top 10 countries with the greatest BUA expansion were China (47.5% of the global BUA increase), the United States (9%), India (3.6%), Indonesia (2.8%), Russia (1.8%), Mexico (1.7%), Malaysia (1.6%), Vietnam (1.5%), Ghana (1.3%) and Nigeria (5.0%). It has also been discovered that most African rural migrants seek employment opportunities in neighboring regional economic hubs like a major city close by (Africa Centre for Strategic Studies [ACSS], (2023). Between 2020 and 2030, Africa's seven largest coastal cities Lagos, Luanda, Dar es Salaam, Alexandria, Abidjan, Cape Town, and Casablanca are projected to grow and physically expand by 40 percent.

The urban share of the world population is now projected to be as high as 68% by 2050. Urban expansion occurs through a complex mix of drivers, principally in-migration, natural population growth, housing deficit issues, and the complex land governance systems Fox *et al* (2015). In 1960, the global urban population was 34% of the total; however, by 2014 the urban population accounted for 54 % of the total and continues to grow. By 2050, it's projected that the urban population will have reached 68% (UNDESA, 2014). In Africa, migration has been on a steady upward trajectory for the past two decades. It's now torching the record level of over 40 million African migrants represent a 30-percent increase from 2010, this trend is expected to continue in 2024.

Moriconi-Ebrard, *et al* (2016) reported that settlements with a population of 10,000 inhabitants and above grew from 493 in 1970 to 1,947 in the 2010s. According to UNDESA (2018), in the year 2015, 51 percent of West Africa's urban population lived in cities of fewer than 300,000 inhabitants. This share is projected to decline to 44 percent in 2035, because of the projected larger population growth in the big cities; smaller cities are also expected to grow significantly. Urbanized areas are experiencing

challenges of uncontrolled expansion and public services that guarantee sustainability United Nations Department of Economics and Social Affairs (UNDESA), (2019).

With this accelerating urbanization that is powered by globalization, cities and metropolitan areas play an increasing role in drawing all forms of resources and providing opportunities for people to prosper both economically and socially Gao and Wang (2022). Preferential policies and massive influxes of capital have created uneven economic development between rural and urban areas Huiyuan *et al* (2023). This urban-rural inequality has culminated in betterment in job opportunities, access to infrastructural facilities, housing conditions, and the perceived and actual improved living standards in urban centers as well as many other distorted incentives.

Migration is not regulated in Nigeria; this has encouraged uncontrolled internal migration and the decision to out-migrate to urban centers. Nigeria has a very high rural-urban dichotomy even though the nation is known for poor social amenities in quality and quantity and rural communities are more disadvantaged due to governmental neglect for decades Ogunmodede *et al* (2015). Nigerian rural-urban migration has experienced changes in the previous 20 to 30 years of urban transformation from rural communities to urban areas and a rate of about three (3) million rural dwellers migrated to urban centres with an increase of 75% of rural to urban migration recorded in every period of five (5) years according to National Bureau of Statistics [NBS], (2018). Nigeria's urban population has increased rapidly over the past 50 years and will continue to grow relatively fast in the coming decades, although how fast is a matter of some dispute.

Rural economic activities like farming are not providing sufficient income to sustain the family households throughout the year Chaudhuri St, and Mukhopadhyayudies (2010). According to the authors, about two-thirds of the poor in rural areas sustain their lives with subsistence farming either as small farmers or working on land owned by other people while the other third engage in small-scale activities. As long as there is an income differential, it's simply logical that people will always move to where there is a greater income. Farming is also seen by many as strenuous, back-breaking work and government policies do not provide rural inhabitants with viable economic alternatives resulting in massive rural-urban migration that does not only aggravates the existing urban problems but also creates new ones and expands the physical size of the cities faster than what the existing structure and developmental efforts can cope with.

Urban expansion does not come without its own problems; among the adverse consequences of unplanned urban expansion are a large amount of cultivated land, forest land, and shrubland is converted to urban land use which leads to many environmental problems such as increased carbon emissions which pose a serious threat to local sustainable development, waste management, urban flood, overcrowding, and accessibility-related issues [Schwarz *et al* (2011) d'Amour, *et al* (2017) Wei *et al* (2021) and Angel (2023)]. It has resulted in the reduction of agricultural land and by implication affected food production, encroaches on sensitive land, changed of rural lifestyle to an urban lifestyle, increases the distance from work and dependency on vehicles that increases pollution and traffic congestion, it increases infrastructural needs and cost of producing them, it also results in social and economic segregation among others [Hussien (2013), Samat (2014), Kavitha *et al* (2015), Patrick *et al* (2015) and Anselem (2019)].

Bothered by the enormous problems associated with urban expansion, scholars like [Mathewos (2011), Samat *et al* (2014), Patrick *et al* (2015) Mefekir (2017) and Oyeniya *et al* (2022)] have suggested the introduction and implementation of policies that can reduce the spread and impacts of urban centers into surrounding settlements which include implementing generous municipal boundaries that can accommodate growth, creation of accurate maps that project future growth, designating a hierarchy of public open spaces that can protect environmentally sensitive areas and in resource-scarce environments, designing a network of arterial roads, spaced 1km apart throughout the expansion area, these are the minimum preparations that a rapidly growing city can make. It is also important to open up land for development in response to expected and growing urban expansion (Angel, 2008).

Migration is the movement of people from one geographical area or region to another. People migrate for various reasons depending on the situation that brought about the decision Gwanshak *et al* 2022. Rural-urban migration can be ignited by voluntary or involuntary forces; voluntary migration entails movement by choice seeking a better life while involuntary migration takes place when the migrant has no choice but to move. Migration is a complex phenomenon with diverse effects on the economic, social and security lives of people which has to do with the movements of all works of life to different locations International Migration Report (2022). According to World Migration Report [WMR], (2015) continuous growth of the urban population that results from urbanisation is sometimes estimated as the sum of net rural-urban migration and the increase in urban population resulting from the expansion of urban boundaries. Urbanisation involves both the net movement of people towards and into urban areas and also the progressive extensions of urban boundaries and the creation of new urban centres Angel *et al.*, (2012).

Urbanisation is primarily the result of migration and natural population increase; it leads to the expansion of urban boundaries. First, urbanisation is the net result of complex migratory movements between rural and urban areas, including circular migration back and forth World Migration Report [WMR], (2015). Indeed, net rural-urban migration can be as much the result of people delaying or not going back to rural areas as it is deciding to move to urban areas in the first place and high international out-migration from rural areas to urban, although neither is considered very significant. However, the extension of urban boundaries among other factors is a product of rural-urban migration and natural population increase [WMR], (2015). In practice, the people accumulating in near-urban or nearly-urban settlements have mostly come to be there as part of the net migration of people towards larger settlements or from the centre of urban settlements towards their peripheries. With urban densities declining in most parts around the world, expansion of urban boundaries should not be taken to reflect urbanisation in the demographic sense Angel *et al.*, (2011).

Demographic urbanisation involving a shift from rural to urban dwelling is expected to continue, at least in Asia and Africa. Asia and Africa are currently the only regions with urbanisation rates still more than three per cent per year, with all other regions at less than half a per cent [NBS], (2018). Hasan *et al.*, 2010 and Usavagovitwong *et al.*, 2013 opined that as urban population grows, the process of urban development, expansion and densification will continue to grow. Anselem (2019) pointed to the rapid shift in human residence from rural to urban in Sub-Saharan Africa has accelerated over seven

decades now and scholars have linked rural-urban migration and natural population increase to rapid urban expansion. Urban expansion and sustainable planning efforts do not match, the residents always experience environmental challenges like flood and accessibility-related issues, waste management, and inadequacies in power and water supply, among others [Hussien (2013), Samat (2014), Kavitha et al (2015), Patrick et al (2015) and Anselem (2019)].

While working on the physical development of 379 out of 384 US, Richter and Bixler (2022) introduce a large number of independent variables to explain the rate of expansion beyond the saturation of urban footprints that have significant effects on the rates of expansion. The authors identify three types of expansion: the infill of existing urban footprints, expansion within the immediate urban periphery, and ex-urban expansion that leapfrogs beyond 3 miles from existing urban footprints. Cruz-Bello et al (2023) focused on a fast-growing region west of Mexico City, Mexico, distinguishing between three zones, in their case the urban, the peri-urban, and the rural. Not unlike Richter and Bixler, the authors introduced a large number of drivers of urban expansion, many of which are found to be significant in explaining rates of expansion; distance to previously developed land, population density and distance to roads.

Salazar-Tamayo and Julio-Estrada (2022) compared the planned expansion areas and the actual expansion areas in five metropolitan regions in Colombia. They discovered inadequate planning because town/urban planners underestimated the areas needed for expansion. They also pointed to lack of capabilities to properly manage urban growth by the local authority. Gullette et al (2023) focus on the impacts of the rapid urban expansion of metropolitan Bangkok, the authors emphasised adverse social and economic impacts affects on the livelihoods of rural families inhabiting its urban fringes. Oyalowo (2022) studied the formal mechanisms and the planned expansion in Lagos, that has led to the proliferation of higher real estate development and that exclude lower-income families from planned areas. These works and discoveries are in tandem with popular urban growth theories like Concentric Growth Zone, Regional Land Use Model, Multiple Nuclei, and Sector Theories that explain perfectly the

unplanned urban expansion manifesting in our cities. Oyeniyi et al (2018).

Literature on rural-urban migration as well as urban expansion is robust but the nexus between the two have not been focused on. Emphases have been on the implication of rural-urban migration, pattern of land-use land-cover change/detection, but work on the connection between rural-urban migration and land-use/land-cover change is rare. This work, therefore, examines the nexus between rural-urban migration and Ilesa urban extension over three decades.

The growth of Nigeria's urban population in both absolute and relative terms has been accompanied by the expansion of existing built-up areas and the emergence of new and identifiably 'urban' settlements. summarises urban population trends from three data sources: available censuses (1952, 1963, 1991), the United Nations (which incorporates data from the 2006 census) and Africapolis, which combines census data with geospatial analysis.

ILESA, THE STUDY AREA

Ilesa is located on longitude 7°35' and 7°40'N and longitude 4°13' and 4°38'E. The city is in Osun State, Southwest Nigeria. She houses two local governments and their headquarters and serves as the capital city for the Ilesa people. The city enjoys a humid climate with an average temperature of 27°C. Ilesa is peopled by the Yoruba ethnic group who peacefully cohabits with other ethnic groups and nationalities. The people engage in farming, artisanship, trading, while some are in public service. Twenty bank branches, a teaching and a general hospital, and many other private health institutions are present. A public university, a college of health technology and many other lower educational institutions are situated in the rapidly growing city. The population of Ilesa was ≈ 310,000 in the year 2015. This was 0.17% of the total population of Nigeria. Since the population growth rate remains the same as in the period between the year 2006 to 2015 (+3.18%/year), Ilesha population in 2020 was 362, 513 and by 2024 it's about ≈400,000 people.

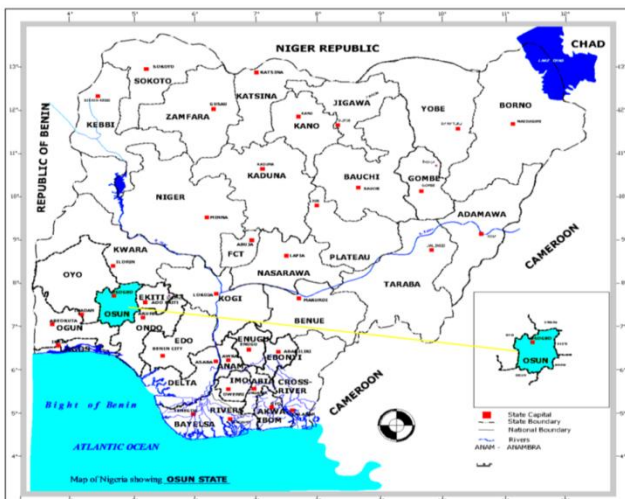


Fig 1: Osun State in Nigeria Setting.

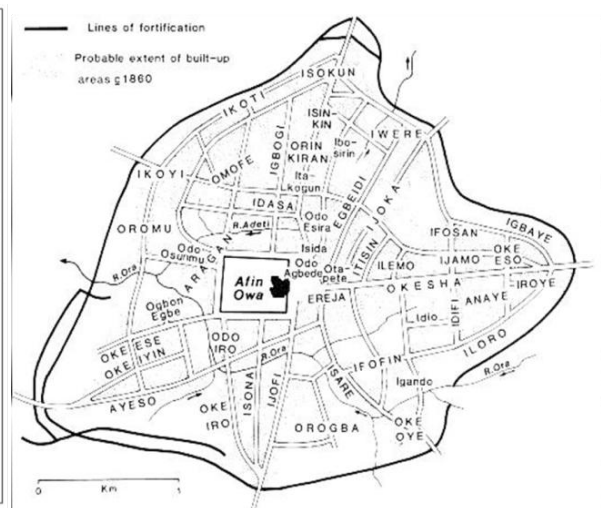


Fig. 2: Map of Ilesa.

Rural dwellers migrate to Ilesa because of her certain peculiarities; she is the cultural, administrative and commercial hub as well as the natural headquarters of the Ijesa people. In terms of size, she is the largest in Ijesa land and even Osun state as a whole. Ilesa has everything a city should have and the available facilities and amenities like the university and other academic institutions, health facilities, and daily and weekly marketplaces like Sabo and Atakumosa Markets. Other industries like Breweries, Yinka-Oba, and Rambo Paints and many others growing companies draw a whole lot of rural people looking to be free from rural life to Ilesa. Importantly, the discovery and exploration of gold in commercial quantity pull many able-bodied youth from far and near into the growing city. In the same vein, the conversion of the then College of Education to the new University of Ilesa is a big boost to the city's compelling attractions.

METHODS AND MATERIALS

Historical Landsat satellite images covering Ilesa from 1994 - 2024 were among the data used for the study. Images are LandsatTM of 1994, Landsat ETM+ of 2004, Landsat ETM+ of 2014 and LandsatOLI of 2024 acquired via the USGS Earth Explorer Website (see Table 1).

Varieties of methods were employed to develop reference data sets that include names of localities acquired from existing

maps for the interpretation of results. After the images were composited into colours infra-red composite (432), image clipping was performed. This pre-process was performed using the Extract by Mask tool in the ArcGIS spatial analyst tool on the mosaic ked image on the basis of the boundary of the study area. These pre-processing tasks allowed the exportation of the satellite images to ERDAS Imagine for classification and extracting land cover information. Image classification and interpretation was performed using ERDAS Imagine 9.2.

Training samples were gathered from more than 30 points as signatures for each Landsat satellite image using the Signature Editor. The training points were proportionally distributed to each cover type with at least 5 points per cover type. These signatures were then used in a supervised classification method. Land use/land cover was mapped by means of visual interpretation of satellite images. The classification was categorized into built-up and others. From the supervised classification methods in ERDAS Imagine, the parallelepiped maximum likelihood classification algorithm was used to produce the land cover maps. The Para-ML method combines parallelepiped and maximum likelihood classification methods and uses a decision rule to evaluate each pixel. The parallelepiped classification is based on a set of lower and upper threshold reflectance determined for a signature on each band.

Table 1: Data Type, Sources and Characteristics

S/N	Data type	Resolution/Scale	Acquisition Source
1.	Landsat(TM)190/55	30m	USGS Earth Explorer Website
2.	Landsat(ETM+)190/55	30m	USGS Earth Explorer Website
3.	Landsat(OLI)190/55	30m	USGS Earth Explorer Website
4	Landsat (TM) 190/55	30m	USGS Earth Explorer Website

Source: Authors' Compilation (2024)

Data Presentation and Analysis

Five major land-use changes were used to depict the effect of emigration that reflects urban expansion in the study area: i) Agriculture ii) Forest, iii) Water/river/reservoirs/aquaculture iv) Open space areas and most importantly v) Build-up areas. The satellite images reflect the changes in land uses that that show or reflect systematic urban expansion over the three decades under consideration that is 1994-2004, 2004-2014 and 2014-2024.

Land use for urban agriculture or farming activities around the city was 33, 811655% in the first decade up to 2004. Most indigenous families have their farm and farming activities somewhere close to the city. Places along Ilesa-Akure express road, Iyemogun axis, and interiors of arimoro-Idojesa-Abanise-Ibodi to Ibadan express road, along Irojo-Ilerin axis, along Ajaka-Estate-Omi Aladiye axis and about at least two kilometers to the limit of Ilesa urban limit were used as farmlands. Undeveloped or partially developed building sites were converted to farmlands, government-reserved areas after the Kaayanfada-Oromu area (back of Schools Board) was used for agricultural practices. The undeveloped land of the then Osun State College of Education now the University of Ilesa was rented out for prospective arable and subsistence farmers annually.

As time passed by, the places being used for farming activities began to shrink; by 2014, the percentage had reduced to 27.91123 %, and parts of the then farming plots have been taken over by residential uses. Rural migrants have converted the places to residential. The farmlands along and around Ibodi are now occupied by migrants from other states and tribes because of gold mining activities. Other laborers settled in Ilesa because of the massive water project before it was pursued. Many others that came for trading purposes were many along Sabo-express axis. By 2024, the land used for agriculture has been reduced by 10.9585%. In the first decade, the reduction was from 33, 811655% to 27.91123 % (5.90042 units reduction), by 2024, the places used for farming has been reduced to 10.9585% with (16.95273) more than 3 times the unit of the reduction in the previous decade. By implication, the size of land used for agriculture and other uses are reducing astronomically as the built-up or residential land uses are taken over.

There are forested areas within and around the city, even in the city centre, places beside the king's palace, Government Reserved Area GRA. Forests also dotted many of the places used for farming mentioned above. It was 13.74739 % in 2004, 2.088297% in 2014 and 0.173462% in 2024. As a result of gold discovery and mining activities that ensued, the new university, daily and weekly commercial activities in cities' marketplaces.

Massively, rural dwellers migrate to the city not just around the city but across the country. According to satellite images and accompanying data above, sooner than later, Ilesa will lose her valued forested area to urban expansion. The loss of forests implies the loss of biodiversity and challenge to the ecosystem with unbearable effects on the environment.

Open space includes undeveloped sites and green areas. The rate at which built-up area replaced open space was sudden. In 1994 open space was 15.82827 % but dropped sharply to 1.171039% by 2014 and by 2024 it has reduced to 0.776193%. These open spaces were in different locations within and around the city centre, increasing emigration results in a housing shortage and encourage the able land owners to develop their sites. Open spaces around and within the new university were developed; along Ido-Ijesa,-Abanise-Ibodi axis for the university staff and students. Some high-rise buildings have surfaced in Ilesa at Isokun, Imo and Ayeso areas, parks and gardens as well as shopping complexes now leather the city's landscape as a result of emigration from the mainly rural neighbourhood. With dwindling open space, congestion, slum and shanty town development is inevitable; reduction in open space affects residents' recreational activities and distorts urban morphology.

Water and wetland areas have also shrunk as living space expands gradually, the size of Ilo-elefo, Oora, Oromu-Ikoyi and Imo stream channels are now narrower. Some large wetlands that existed in the north-west have vanished by 2024 according to satellite images. In 2004, the wetland area was 17.37053%, by 2014, urban expansion had reduced it to 8.12843% as people pushed back water bodies for building purposes and by 2024 it had been further reduced to 5.205219%. By implication, the people are gradually losing wetlands and the associated benefits, disturbing the ecosystem and shrinking river

channels/water bodies thereby increasing the risks of flash floods and problems that come with it.

The built-up area has the most significant expansion over the decades under consideration. In 2004, the built-up area was 30.74739%. The then Ilesa was separated from rural and neighbouring settlements like Ibodi, Ilerin, Ijebu-jesa, Ido-ijesa, Ilo-ijesa, Ijaregbe and others have not merged like it is today. By 2014, the built-up area or urban area had extended to these settlements, reducing the forested areas, farmland sizes, the open spaces, the wetland areas that separate them and expanding the built-up area to 43.06657%. By the year 2024, the built-up area has expanded to 62.61584%. Many undeveloped sites have been developed and occupied, the city kept pulling the crowd from rural areas, and those who have their towns and villages are building their personal houses in the city been the capital and mother city for all Ijesa people.

Urban expansion has serious implications for food production because it reduces agricultural farmland, Jaime et al (2015). It has transformed rural settings and jobs into urban by changing rural lifestyle to urban Hussien (2013) and Samat (2014). Urban expansion has also encroached on sensitive land, increases dependency on vehicles because of the increase in distance from work that in turn increases pollution and traffic congestion Mefekir (2017). It has also led to infrastructural deficits as well as the cost of producing them Kavitha et al (2015). It also results in social and economic segregation. Urban expansion is not usually accompanied by adequate and sustainable planning efforts, the residents therefore experience environmental challenges like waste management, flood, and accessibility-related issues Ahmed et al 2015. It is affecting local and regional ecosystems and has impacted on the global environment especially when it's concomitant to temperature change Patrick et al (2015) and Anselem (2019).

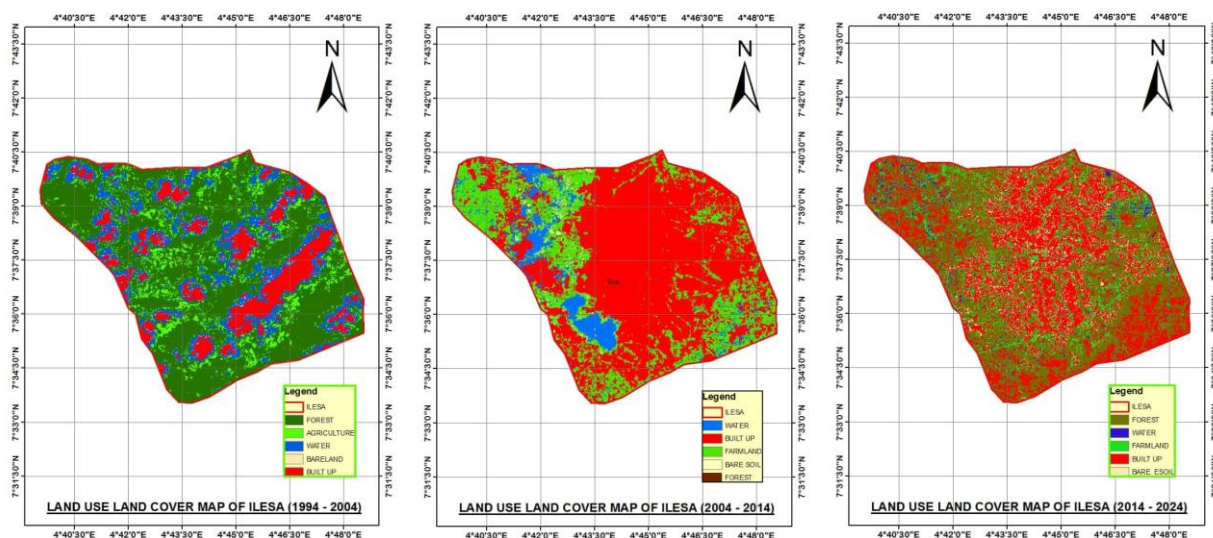


Figure 3: Satellite images of the study area over three decades
Source: Author's Fieldwork 2024

Table 2: Land use changes that reflect urban expansion in the study area over three decades

Decades	Percentages
Agriculture land use	Percentages
1994 -2004	33.81165%
2004 -2014	27.91123 %
2014 – 2024	10.9585%
Forest land use	Percentages
1994 – 2004	13.74739 %
2004 – 2014	2.088297%
2014 -2024	0.173462%
Open space	Percentages
1994 – 2004	15.82827 %
2004-2014	1.171039%
2014-2024	0.776193%
Built up Area	Percentages
1994 – 2004	30.74739%
2004 – 2014	43.06657%
2014-2024	62.61584%
Water and Wet Land	Percentages
1994-2004	17.37053%
2004 – 2014	8.12843%
2014 -2024	5.205219%

Source: Authors' Compilation from satellite images 2024

SUMMARY, CONCLUSION AND RECOMMENDATION

Rural-urban migration is massive in Ilesa and it has resulted in land use land cover change over decades in the growing city. Ilesa is the hub of economic, socio-cultural and political activities in Ijesaland. Discovery of and mining of gold is obviously playing a pivotal role in drawing development and especially able-bodied men into the city daily and land uses of centuries ago are now been transformed into urban development and the city continues to expand daily. The old farmland, forested areas, wetlands, open space and many more in and around the city has now been taken over by urban expansion. The direction of the extension alters the initial shape of the city's map; the expansion is more toward the northwestern part. (see figures two and three). This expansion is rapidly increasing; as we speak, it is faster than the urban planning efforts in the city. The effects have been a shortage of farmlands, forested regions, open space/green areas and wetlands. Biodiversity is also affected negatively; environmental pollution and ozone layer depletion are increased. Other effects are food shortage, loss of jobs for peasant farmers and worsened security issues and inhuman housing, development of slums and other forms of informal settlements around the city.

Empowerment of planning units that guarantee strict enforcement of planning laws is a necessity. Uncontrolled urban expansion should not be allowed to continue under the nose of urban/town planners. Rural-urban migration could be reduced by making life meaningful for rural dwellers in rural areas. Mining companies and other employers of these migrants can make provisions for the accommodation of their employees so that they will not need to scuttle for accommodation and erect temporary shelters in unoccupied places on other land uses in the study area.

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