Vol. 05, No. 02, pp. 34 –42 (2024)
ISSN: 2708-0757

JASTT

JOURNAL OF APPLIED SCIENCE AND TECHNOLOGY TRENDS

www.jastt.org

Geospatial Analysis of Urban Metamorphosis and implication on Development Control in Ile-Ife, Osun State, Nigeria

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Abstract

Cities in developing countries experience rapid expansion, which has a negative effect on the aesthetic value of the city. This paper thus examined urban metamorphosis and development control with the specific objectives of assessing the physical development between 1986 and 2018 and assessing residents' perceptions of development control regulation and challenges of development control enforcement as regards to road setbacks in Ile-Ife, Osun State. Landsat images were used to examine changes in the physical development (built-up) in Ile-Ife. A questionnaire and key informant interview were used to examine residents' perceptions of development control regulation and the challenges of development control enforcement. The result showed that built-up area increased from 2760.05ha (94.81%) between 1986 and 2002 to 6843.41ha (120.67%) between 2002 and 2018, and 9603.46ha (329.87%) between 1986 and 2018. Between 1986 and 2018, a recorded annual magnitude and frequency of 9603.46ha and 600.22 ha were built up. The study revealed that 60% of the informants confirmed that the planning authorities were grappling with inadequate funds and inadequate technical and manpower, which had resulted in their inability to undertake planning activities. The study concluded that rapid development had negatively affected development control in the study area. It is therefore recommended that the government strengthen the planning authority, subsidize the cost of plan approval, and provide easy access to building permits.

Keywords: *Urban Metamorphosis, Development control, Planning Authority, Geospatial analysis*
Received: February 04th, 2024 / Accepted: July 05th, 2024 / Online: July 9th, 2024

I. INTRODUCTION

This Cities all over the world experience hydra-headed growth. This growth emanated from the combination of natural increase, technological advancement, rural-urban migration, and socioeconomic advancement [1, 2]. It is therefore imperative that the government enforce an effective planning and control mechanism in cities. This could be achieved; there should be layouts of various landuses that would bring about physical development control [3, 4]. Development control is capable of assessing the likely impacts of the proposed projects, thereby guiding the interest of the public and ensuring compliance with all procedures and processes in the approval of plans [5]. Scholars such as Sanusi [6], Akinlabi [7], and Rash, et al. [8] have observed that the problems in urban areas such as urban slums, squats, pollution, traffic congestion, and environmental nuisance could be alleviated if development control is effective in urban areas.

In Nigeria, prior to the advent of Geographical Information Systems (GIS) and remote sensing, the monitoring, enforcement, and control of physical development were based purely on analogue techniques. By this technique, the landowner or developer was required to play for permission from the planning authority before the development work could be initiated. Such development control—regulating and managing what is built, where, and when—allows authorities to manage land across a large area. It permits authorities to ensure effective land allocation and allow the growth and protection of cities and towns [9]. Applications are assessed to manage potential impacts on roads and traffic; public health, safety, and amenity; natural environments and systems; and people and lifestyles. However, planning authorities in Nigeria operate on an outdated analogue (manual) system of file indexing, storage, and retrieval. Relevant layout plans that can be used when going out for site inspections are lacking. In addition, applications for development permits, payment of fees, processing, analysis, and decision-making, and communications with applicants are also done manually. Thus, the system usually led to frequent loss of

doi: 10.38094/jastt501183

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applicants' files, delays, corruptions, and time- and labor-intensive organization and retrieval. This manual approach is cumbersome, time-demanding, costly, and ineffective for the interests of all parties involved. It also led to general encroachments on road corridors, road reserves, sewer and water line reserves, substandard structures, and building collapse due to a lack of timely action. Inconsistencies in decision-making, and a lack of public participation in the planning process have also been observed [10-12].

The rapid growth in urban population and commercial activities has extremely affected facility locations in many Nigerian cities, particularly in Ile-Ife, Osun State. Structures that are improperly located disrupt urban activities, particularly urban transport systems. Road usage being the most popular mode of transportation in Ile-Ife, it is easily affected when structures are located in a manner that hinders the free flow of traffic. Road planning is part of community planning for an effective transportation system. Road transport is the most commonly used mode of transport worldwide. Perhaps it can be stated that more than half of the population of Nigerian cities depends on this mode of transportation [13]. This is evidenced by the traffic congestion observed in major business districts in the United States. Another activity that leads to heavy traffic along urban business regions is the average number of available parking spaces and the distance of these facilities from the road [14]. In most cities in Nigeria, physical development structures did not adhere to building regulations on setbacks between buildings considering the fact that developers set aside spaces less than what is required for roads, and this resulted in spontaneous and haphazard development in the city. Property developers flagrantly violate planning regulations in the course of development after they have duly secured planning approval, whereas some do not actually obtain approval before construction. However, it should be noted that local authorities lack the capacity to monitor and enforce development control regulations. As a result, developments, both permanent and temporary structures, have encroached on road setbacks without compliance with zonal regulations and building bylaws. There is a proliferation of informal vendor markets in urban centers and the construction of illegal extensions, among many other unauthorized developments. Urban centers have been grappling with unplanned settlements, traffic congestion, pollution, and costly public transport systems with woefully inadequate infrastructure services [15]. The effect of these is often more evident in the unorganized and uncoordinated spatial development in the central business district of Ile-Ife.

Ile-Ife, one of the major cities in Osun State, is bedevilled by problems of development control violations, leading to encroachment on setbacks to roads and thereby causing untold hardship to efficient road transportation. It portrayed a city of disorder, where local authority seems helpless to confront the challenge. This situation therefore calls for a review, particularly the identification of the pattern of these contraventions as a basis for proposing a solution to address the problem. It has become more glaring that the analogue technique is inadequate to address the issue, thus the need for GIS and remote sensing techniques as technical tools to support development control monitoring and enforcement. Remote sensing and GIS have the potential capability for easy detection of landuse changes, particularly physical development in urban areas, which will enable enforcement officers to respond rapidly to curb contraventions of development control challenges.

Recent studies have revealed an increasing rate of contravention of physical development regulations in many growing urban areas in Nigeria. However, the haphazard cities in Nigeria would be traced to the negligence and non-compliance with full planning proposals and development that would have brought about ideal neighborhoods in Nigeria's cities [16, 17]. This trend has been observed in Ile-Ife, Osun State, Nigeria. This paper, therefore, aims at analyzing urban metamorphosis and its implication on development control in Ile-Ife, Osun State, Nigeria.

TABLE I. COORDINATE OF THE FOUR CORNER OF ILE-IFE

BOUNDARY	*EASTING*	*NORTHING*	*LOCATION*
NORTH	668453.750054	84217. 814665	Eleweeran Junction
SOUTH	674948.921918	803571.352179	Ita-Osa Juncton
WEST	659082.180712	828901.266174	Ajebamdele,OUI Roundabout
EAST	678838.649801	832105.165185	Ife/Osu Junction

Source: Field Research (2019)

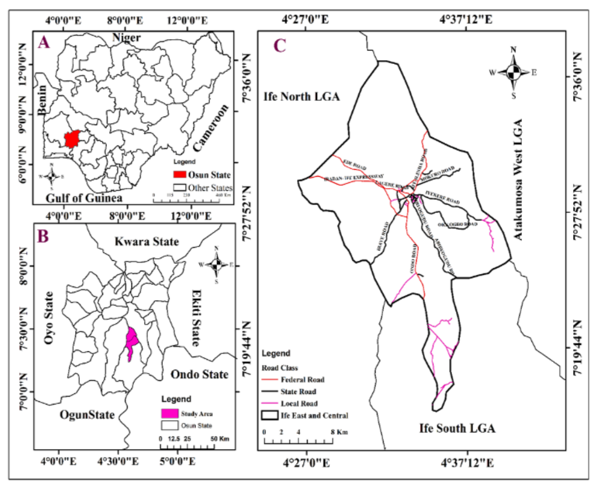

Fig. 1. A- Map of Nigeria showing Osun state, B- Map of Osun state showing Ife East and Central, C-Map of Ile-Ife showing Road Class. Source: Drafted from Cooperative Network Information (COPINE), OAU

II. STUDY AREA

Ile-Ife is popularly known as the source of the Yoruba tribe in Nigeria. As one of the important cities in Osun State, Nigeria, it consists of two Local Government Areas (LGAs), namely Ife Central Local Government, and Ife East Local Government. It had a total population of 355, 818 in 2006 [18]. The metro area population growth of Ile-Ife in 2021 was 522, 910, a 2.6% increase from the 2006 population. Ile-Ife is located between Latitudes 7°28' N and 7°46' N of the Equator, and Longitudes 4°36' E and 4°56' E of Greenwich Meridian (Fig. 1). Ile-Ife covers a total land mass of 378.0891km^2. Coordinate of the four the corner of the study area are presented in Table I. Ile-Ife links to the city of Ibadan through the Ife-Ibadan highway and to the coastal city of Lagos at a distance of about 200 km [19]. Ile-Ife is majorly dominated by Yoruba ethnics, who mainly involve themselves in the agricultural production of crops like maize, cassava, yam, cocoa, and kola, among others [20]. The socio-cultural group is the Yoruba ethnic group, one of the largest ethnic groups in Africa [19]. Ile-Ife has been described as a centre of learning and culture due to the presence of Obafemi Awolowo University (OAU) in the city. Ile-Ife also has road networks to other cities such as Ede, Ondo and Ilesha. The main road in the city is that leading from Ibadan to Ilesha and Ondo which cuts through Ife.

III. Materials and Methods

This study applied primary and secondary data in the form of spatial and non-spatial data. Landsat imageries of Ile-Ife, which include Landsat TM (Thematic Mapper) data of 1986, Landsat ETM$^+$ (Enhanced Thematic Mapper Plus) data of 2002, and Landsat OL1 (Operational Land Imager) data of 2018, were used to examine changes in the physical development (built up) in Ile-Ife and constituted the secondary data. The satellite imageries, which consist of three epochs with a 16-year interval, were sampled based on data availability. Information on residents' perceptions of development control regulation and challenges of development control enforcement was gotten through a questionnaire and a key informant interview, and these are the primary data for this study.

Supervised pixel-based classification was performed on ERDAS Imagine software version 2015 using a maximum likelihood classifier. The three images were classified into different land use cover classes, such as built-up area, bare surface, vegetation, and water body. A false-color composite was used for the supervised classification. Cyan was identified as built-up, red as vegetation, and black as water. The visual interpretation method was also applied through the interpretation keys that include shape, size, association, texture, tone, and color. Furthermore, the accuracy and reliability of the classification results were evaluated by analyzing the user's accuracy, the producer's accuracy, the overall accuracy, and the kappa coefficient of the classified image as presented in equations 1, 2, 3, and 4 below. In order to determine physical development in Ile-Ife from 1986 to 2018, the expansion of built-up areas per hectare was directly measured based on the area extent as shown by the land use and land cover classification.

The study sampled 376 adjacent buildings along some selected roads in Ile-Ife, and questionnaires were administered to the owners or users of the buildings using systematic sampling techniques at 10-building intervals after the first one had been randomly selected. Also, responses from the five purposively selected key informants, which included a delegate from Ife East and Central, the director of the town planning department in Ife East and Central, and the head of the department of urban and regional planning at OAU, were used for this study.

$$\text{User's Accuracy} = \frac{\text{total number of pixel classffication for a particular class}}{\text{Row total of the particualar class}} \times 100 \quad (1)$$

$$\text{Producer's Accuracy} = \frac{\text{number of reference sites classifed accurately}}{\text{total number of reference sites for the class}} \times 100 \quad (2)$$

$$\text{Overall Accuracy} = \frac{\text{total number of correctly classified sites}}{\text{total number of reference sites for the class}} \times 100 \quad (3)$$

$$\text{kappa Coefficient} = \frac{\text{observed accuracy} - \text{chance agreement}}{1 - \text{chance agreement}} \quad (4)$$

These can be calculated as

$$\hat{k} = \frac{N\sum_{i=1}^{r} x_{ii} - \sum_{i=1}^{r} \left(x_{i+} \cdots x_{+i}\right)}{N^2 - \sum_{i=1}^{r} \left(x_{i+} \cdots x_{+i}\right)} \quad (5)$$

r = the number of rows n the error matrix
X_{ii} = the number of observations in the row i and column i
X_{i+} = total of observations in the row i
X_{+1} = total of observations in the column i
N = total number of observations included in matrix.

IV. Results and Discussion

A. Physical Development in Ile-Ife between 1986 and 2018

Table IV and Fig. 4 show various phases of landuse types between 1986 and 2018. On the whole, within thirty-two years, the built-up area that occupied a small portion (7.7%) in 1986 increased significantly to about double the initial size (15%) in 2002, and multiplied approximately four times (33.1%) the initial size in 2018. This increase could be attributed to the influx of people due primarily to employment opportunities, social amenities, educational institutions, transportation, commercial activity, physical development, and other socio-economic indices, the latter of which contribute substantially to population growth and the emergence of urban expansion.

In 1986, vegetation had the highest land coverage in the study area. It decreased significantly (i.e., from 58.93% in 1986 to 55.46% in 2002 to 36.75%) throughout the study period. The decrease in vegetation cover could be traced to increased physical development in the form of road and building construction that emanated as a result of population growth and urban expansion. In 1986, farmland covered a total area of 11380.48 ha (30.1% of the study area) and decreased to 9924.84 ha (26.25% of the study area) in 2002 and 8922.90 ha (23.6% of the study area) in 2018. The decline in farmland over the study period was attributed to the conversion of cultivated area to built-up area.

Bareland increased from 1.70% in 1986 to 2.04% in 2002 and 5.5% in 2018. This was attributed to anthropogenic activities that were related to urban expansion, the widening of transport facilities, and other impervious surfaces. Waterbody was the smallest of all the classes throughout the study years. It fairly declined, with 1.57% in 1986, 1.25% in 2002, and 1.05% in 2018 (Fig. 3). Population growth was the major factor, but the low change could be due to the presence of boreholes and water wells in almost all households in the study area, which effectively reduce the growing population's pressure on water bodies. Also, the decline of water bodies may be attributed to the encroachment of a growing population on some rivers within the city.

TABLE II. Change in Landuse/Landcover between 1986 and 2018

Landuses	1986 Area (ha)	%	2002 Area (ha)	%	2018 Area (ha)	%
Bareland	642.75	1.70	771.30	2.04	2079.49	**5.5**
Built-up	2911.29	7.7	5671.34	15	12514.75	**33.1**
Farm Land	11380.48	30.1	9924.84	26.25	8922.90	**23.6**
Vegetation	22280.79	5.93	20968.82	55.46	13894.77	**36.75**
Water Body	593.59	1.57	472.61	1.25	396.99	**1.05**
Total	**37808.91**	**100**	**37808.91**	**100**	**37808.91**	100

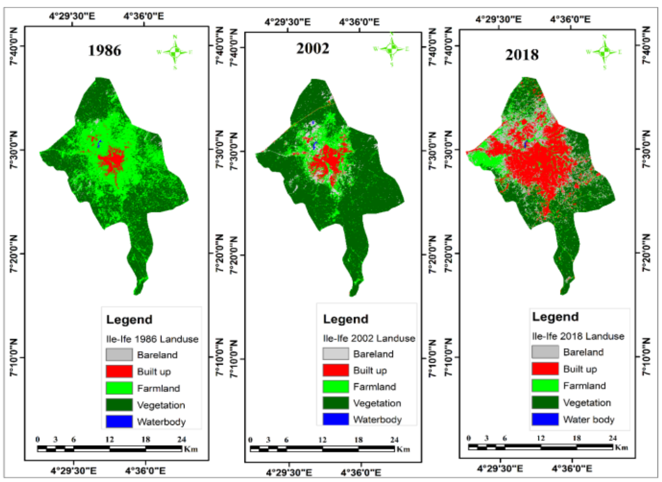

Fig. 2. Landuse Classification for 1986, 2002 and 2018. Source: Analysis on Landsat TM 1986; ETM+2002 and OLI, 2018.

B. *Extent of Change in the Physical Development in Ile-Ife between 1986 and 2018*

Table III and Fig. 4 show the extent of physical development in the study area between 1986 and 2018. It was evident that built-up areas witnessed the highest change over the study period compared to other land uses. It increased from 2760.05ha (94.81%) between 1986 and 2002 to 6843.41 representing (120.67%) between 2002 and 2018, and 9603.46ha representing 329.87% between 1986 and 2018. The factors that were responsible for an increased built-up area were the high rate of immigration from neighboring villages and towns into Ile-Ife, the high demand for accommodation, and other urban infrastructure that consequently led to rapid physical development (such as roads, buildings, industries, etc.). This result is corroborated by the findings of Oyinloye [21], which reveal that the location of local government headquarters, tertiary institutions, tourist centers, and industries has a pulling effect on the growth of urban areas in Nigeria. Naab, et al. [22] also reveal that urban growth is the outcome of social, economic, and political development, which in turn leads to urban expansion and the growth of large cities. It was deduced that the increase in physical development in the study area was the consequence of either some or all of the following: population influx, political, commercial, industrial, social, and improved socio-economic indices.

However, the magnitude and frequency of landuse changes were depicted in Tables IV, V, and VI between 1986 and 2018. The magnitude of change was negative for vegetation, water bodies, and farmland, with changes of -8386.02 ha, -196.6 ha, and -2457.58 ha, respectively, throughout the study period. This implies that as one land use decreases, another increases. For example, farmland with an annual frequency of change of -153.598 between 1986 and 1998 indicated that farmland lost about 153.598 ha annually to other land uses, especially to built-up areas. Unlike other land uses, built-up area and bare land had positive magnitudes and annual frequencies of change of 9603.46 ha, 1436.74 ha, 600.22 ha, and 89.796 ha, respectively. This implies that the built-up area increased by an average of 600.22 ha per year between 1986 and 2018.

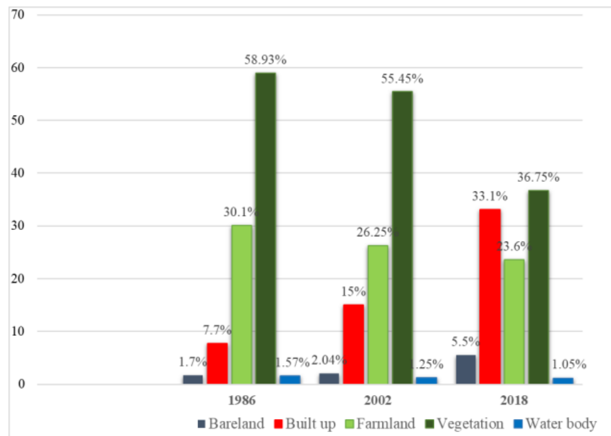

Fig. 3. Change in Landuse/cover Types in Ile-Ife between 1986 and 2018.

TABLE III. EXTENT OF PHYSICAL DEVELOPMENT BETWEEN 1986 AND 2018

Land use	1986 Area (ha)	2002 Area (ha)	2018 Area(ha)	1986-2002		2002-2018		1986-2018	
				Hect ares	% cha nge	Hect ares	% cha nge	Hect ares	% cha nge
Built -up	2911 .29	5671 .34	1251 4.75	2760 .05	94.8 1	6843 .41	120. 67	9603 .46	329. 87

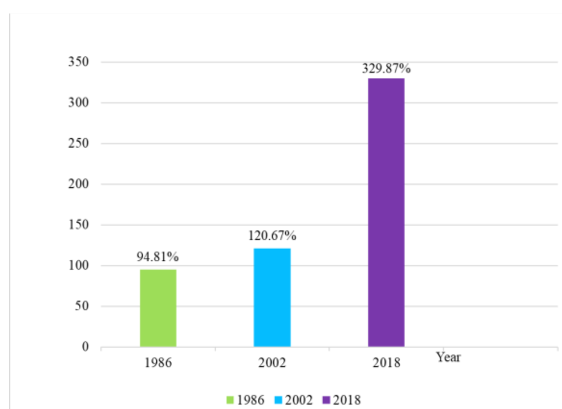

Fig. 4. Expansion of the Built up Area of Ile-Ife between 1986 and 2018

TABLE IV. CHANGES IN LANDUSE OF ILE-IFE BETWEEN 1986 AND 2002

Landuse Type	1986 Areas in hectares	2002 Areas in hectares	Magnitude of change in Hectares	Frequency of change in hectares	Percentage change
Bareland	642.75	771.30	128.55	8.03	20
Built up	2911.29	5671.34	2760.05	172.50	94.81
farmland	11380.48	9924.84	-1455.64	-90.98	-12.79
Vegetation	22280.79	20968.82	-1311.97	-81.99	-5.89
Water body	593.59	472.61	-120.98	-7.56	-20.38
Total	37808.91	37808.91			

TABLE V. CHANGES IN LANDUSE OF ILE-IFE BETWEEN 2002 AND 2018

Landuse Type	2002 Areas in hectares	2018 Areas in hectares	Magnitude of change in Hectares	Frequency of change in hectares	Percentage change
Bareland	771.30	2079.49	1308.19	81.76	169.61
Built up	5671.34	12514.75	6843.41	427.71	120.67
farmland	9924.84	8922.90	-1001.94	-62.62	10.095
Vegetation	20968.82	13894.77	-7074.05	-442.13	-33.74
Water body	472.61	396.99	-75.62	-4.73	-16.0
Total	37808.91	37808.91			

TABLE VI. CHANGES IN LANDUSE OF ILE-IFE BETWEEN 1986 AND 2018

Landuse Type	1986 Areas in hectares	2018 Areas in hectares	Magnitude of change in Hectares	Frequency of change in hectares	Percentage change
Bareland	642.75	2079.49	1436.74	89.796	223.53
Built up	2911.29	12514.75	9603.46	600.22	329.87
farmland	11380.48	8922.90	-2457.58	-153.598	-21.59
Vegetation	22280.79	13894.77	-8386.02	-524.13	-37.64
Water body	593.59	396.99	-196.6	-12.29	-33.12
Total	37808.91	37808.91			

C. *Accuracy Assessments*

The accuracy assessment was based on the error matrix, user accuracy, producer accuracy, the overall accuracy, and the kappa coefficient (Tables VII, VIII, and IX, respectively). The error matrix of the 1986 image gave a user accuracy of 99.97% for built-up areas, 100% for bare land, 93.02% for farmland, 99.97% for vegetation, and 100% for water bodies. The producer accuracy was 99.94% for built-up areas, 100% for bare land, 100% for farmland, 99.96% for vegetation, and 99.56% for water bodies. The overall accuracy was estimated at 99.94% with a Kappa coefficient of 0.99%. For the classification of the 2002 image, the error matrix gave a user accuracy of 99.98% for built-up areas, 98.07% for bare land, 91.11% for farmland, 99.45% for vegetation, and 100% for water bodies. The producer accuracy was 99.11% for built-up area, 100% for bare land, 99.19% for farmland, 99.20% for vegetation, and 99.50% for water bodies. The overall accuracy was estimated at 98.39% with a Kappa coefficient of 0.98%.

The error matrix of the 2018 classification gave a user accuracy of 99.99% for built-up, 47.47% for bare land, 86.81% for farmland, 100% for vegetation, and 100% for water bodies. The producer's accuracy includes 99.60% for built-up areas, 100% for bare land, 100% for farmland, 99.92% for vegetation, and 99.54% for water bodies. The overall accuracy was estimated at 99.62% with a Kappa coefficient of 0.97%. Scientifically, the kappa coefficient takes a value from 0 to 1. If the Kappa coefficient is equal to 0, there is no agreement between the classified image and the reference image. If the Kappa coefficient is equal to 1, then the classified image and the ground truth image are totally identical. So the higher the kappa coefficient, the more accurate the classification is. It can be concluded that the overall classification for Landsat TM of 1986, ETM+ of 2002, and OLI of 2018 was acceptable and reliable, while the overall kappa coefficient ranging from 0.97 to 0.99 was rated as substantial for this study.

TABLE VII. ERROR MATRIX FOR THE CLASSIFICATION OF LANDSAT TM 1986 IMAGE

Landuse/cover classes	Built up	Bare land	Farm land	Vegetation	Water body	Row Total	Users accuracy
Built up	3517	0	0	1	0	3518	99.97%
Bareland	0	6	0	0	0	6	100%
Farmland	1	0	40	2	0	43	93.02%
Vegetation	1	0	0	7682	1	7684	99.97%
Water body	0	0	0	0	227	227	100%
Column Total	3519	6	40	7685	228	11478	
Producers' accuracy	99.94%	100 %	100 %	99.96 %	99.56 %		

Overall accuracy = 99.94%, Kappa coefficient = 0.99%

TABLE VIII. ERROR MATRIX FOR THE CLASSIFICATION OF LANDSAT ETM + 2002 IMAGE

Landuse/cover Classes	Built up	Bareland	Farm land	Vegetation	Water body	Row Total	Users accuracy
Built up	5710	0	0	0	1	5711	99.98%
Bareland	0	51	0	1	0	52	98.07%
Farmland	0	0	123	75	0	135	91.11%
Vegetation	51	0	1	9507	0	9559	99.45%
Water body	0	0	0	0	199	199	100%
Column Total	5761	51	124	9583	200	15719	
Producers' accuracy	99.11%	100 %	99.19 %	99.20 %	99.50 %		

Overall accuracy = 98.39%, Kappa coefficient = 0.98

TABLE IX. ERROR MATRIX FOR THE CLASSIFICATION OF LANDSAT OLI 2018 IMAGE

Landuse/cover Classes	Built up	Bare land	Farm land	Vegetation	Water body	Row Total	User's accuracy
Built up	22001	0	0	0	1	22002	99.99%
Bareland	47	52	0	0	0	60	86.66%
Farmland	40	0	270	1	0	311	86.82%
Vegetation	0	0	0	1406	0	1406	100%
Water body	0	0	0	0	220	220	100%

Total	22088	52	270	1407	221	24038
Producers Accuracy	99.60%	100%	100%	99.92%	99.54%	

Overall accuracy= 99.62%, Kappa coefficient = 0.97%

D. *Resident's Perception of Development Control Regulation*

Table X revealed that 8.5% of the respondents strongly disagreed that the developer deliberately contravened the development control regulation. While 27.7% of them disagreed, 8% and 5.3% disagreed, 50.5% of them agreed, strongly agreed, or were undecided that the developer deliberately contravened development control regulation. Therefore, with an average mean score of 2.7, it can be concluded that the majority of the respondents were undecided that the developer deliberately contravened development control regulation. Further study revealed that 10.3% of the respondents strongly disagreed that there were some buildings that contravened the right of way, while 10.8% of the respondents disagreed. 14.1% of the respondents had an undecided perception that there were some buildings that contravened the right of way, while 29.8% and 34% of the respondents agreed and strongly agreed that there were some buildings that contravened the right of way in the study area. With an average mean score of 3.68, it can be concluded that the majority (63.8%) of the respondents agreed that there were some buildings in the neighborhood that had infringed on the right of way. Moreover, 13.7% of the respondents strongly disagreed, 12.5% disagreed, 14.9% were undecided, 26.1% agreed, and 32.7% strongly agreed that building conversion was a prominent factor affecting compliance with development control. With an average mean score of 3.51, it can be deduced that more than half (58.8%) of the respondents agreed that building conversion was a prominent factor affecting compliance with development control.

Further analysis revealed that 10.1% of the respondents strongly disagreed, 9.3% disagreed, 23.1% are undecided, 19.4% agreed, and 38% strongly agreed that the road setback regulation should be adhered to. Hence, with an average mean score of 3.66, it can be deduced that the majority (57.4%) of the respondents agreed that road setback regulations should be adhered to. Also, 44.4% of the respondents strongly disagreed, 21.3% disagreed, 15.4% were undecided, 8.2% agreed, and 10.6% strongly agreed that planning authorities effectively enforced development control regulations after plan approval. With an average mean score of 2.19, it can be deduced that the majority (65.7%) of the respondents disagreed that planning authorities effectively enforced development control regulations after plan approval. It was also revealed that 5.9% of the respondents strongly disagreed, 6.6% disagreed, 23.9% were undecided, 18.9% agreed, and 44.7% strongly agreed that non-compliance with development control regulations had negatively impacted their neighborhood. With an average mean score of 3.90, it can be deduced that the majority (63.6%) of the respondents agreed that non-compliance with development control regulations had negatively impacted their neighborhood. In addition, it was also revealed that 8.5% of the respondents strongly disagreed, 7.2% disagreed, 21.5% were undecided, 23.1% agreed, and 39.6% strongly agreed that non-compliance with road setback regulations could lead to narrow rights of way, traffic congestion, and accidents within the city. Therefore, with an average mean score of 3.78, it can be deduced that the majority (62.7%) noticed non-compliance to road setback regulations, which could result in a slim right of way, road congestion, and frequent accidents in the city. It was also revealed that 9% strongly disagreed, 5.1% disagreed, 26.9% were undecided, 22.1% agreed, and 37% strongly agreed that violations of development control regulations were due to inadequate monitoring and dull inspection. With an average mean score of 3.73, it can be deduced that the majority (58.6%) of the respondents agreed that a lack of adequate monitoring and routine inspection was responsible for violating development control regulations.

Furthermore**,** Table X revealed that 6.9% of the respondents strongly disagreed, 29% disagreed, 48.7% were undecided, 10.6% agreed, and 4.8% strongly agreed that violators of development control should be duly punished. With an average mean score of 2.77, it can be concluded that the majority (48.7%) of the respondents have an undecided perception that violators of development control should be duly punished. **I**It was revealed that 16.5% of the respondents strongly disagreed, 10.4% disagreed, 7.7% were undecided, 17.8% agreed, and 47.6% strongly agreed that developers, community heads, and planning authorities should cooperate to ensure total compliance to development control regulations. This was also evident in the average mean score of 3.70 and the agreement of the majority (65.4%) of the respondents.

TABLE X. PEOPLE'S PERCEPTION OF DEVELOPMENT CONTROL REGULATION

Variable	**Strongly Disagreed**		**Disagreed**		**Undecided**		**Agreed**		**Strongly Agreed**		**Mean score**
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	
Developer deliberately contravened development control regulation	32	8.5	104	27.7	190	50.5	30	8.0	20	5.3	2.7
Buildings contravened the Right of Way	39	10.4	41	10.9	53	14.1	112	29.8	131	34.6	3.68
Building conversion is a prominent factor affecting compliance to development control	52	13.8	47	12.5	56	14.9	98	26.1	123	32.7	3.51
Road setback regulation should be adhere to	38	10.1	35	9.3	87	23.1	73	19.4	143	38	3.66
Planning authorities effectively enforce development control regulation after plan approval	167	44.4	80	21.3	58	15.4	31	8.2	40	10.6	2.19
Non-compliance to development control regulations has negatively impacted your neighborhood.	22	5.9	25	6.6	90	23.9	71	18.9	168	44.3	3.90
Non-compliance to road setback regulation can lead to Narrow right of way, traffic congestion and accident within the city	32	8.5	27	7.2	81	21.5	87	23.1	149	39.6	3.78
No adequate monitoring and inspection to ensure compliance development control regulations is dull	34	9.0	19	5.1	101	26.9	83	22.1	139	37	3.73
Punishing violator of development control	26	6.9	109	29	183	48.7	40	10.6	18	4.8	2.77
Need for synergy between local planning authority, community leaders and developers	62	16.5	34	10.4	89	7.7	68	17.8	123	47.6	3.70

Source: Fieldwork, 2019 (average mean score value: 1=Strongly Disagree, 2=Agree, 3=Undecided, 4=Agree, 5=Strongly Agree

E. Challenges of Development Control Enforcement as regards to Road Setback

The interview revealed that in Osun State, a 45-meter setback must be observed from the road center to the property line, with a minimum of 90-meter right of way on federal roads. On a state road, 30 meters of setback is to be observed from the road center to the property line with 60 meters of right of way, while 15 meters of right of way with 7.5 meters of setback between the road center and property line are to be observed on a local road. The staff of the local planning office was made up of the director of town planning and land services, who was the chief executive officer, as well as recommending officers, field officers, surveyors, architects, estate officers, administrative officers, and an account clerk at the registry. It is the responsibility of the staff to monitor and implement development control regulations, approve building plans, and consider petitions made by community members and developers as regards physical development. It was revealed that both the professional and non-professional staffs of the local planning authorities were less than fifteen. This reduces the effectiveness of development control enforcement as the available staff were incapacitated in ensuring development control enforcement within the wide range of the local planning jurisdiction. The local planning authorities were short of technical power such as vehicles and motorcycles to carry out their functions. Table XI showed that the majority of the informants, 60%, confirmed that the planning authorities grapple with inadequate funding from the ministry and inadequate technical and manpower, which has resulted in their inability to undertake planning activities and other awareness programs to support enforcement of development control. One of the respondents explained that;

"*The staff strength in planning authority is relatively small and this shows the reason why contravening structures cannot be promptly identified, monitored and prevented. Again, the operation equipment like vehicles for site visitation and inspection are inadequate and the only available vehicle of the authority has been out of use for sometimes now*".

The table also revealed that 20% of the informants explained that the vulnerability of enforcement officers to mob attack during enforcement activities is a serious challenge, while 20% of the informants added that intervention by politicians in the ministries frustrates planning and regulation enforcement. One of the informants highlighted that;

"*The rich individuals often use their political influences to intervene and manipulate planning authorities over their properties which are in contravention of planning regulations*".

These challenges have drawn back the activities of the local planning authority in Ile-Ife. During inspection, it was a usual experience to see that most buildings do not comply with the approved plan, while some buildings were converted from residential to commercial use without reverting back to the local planning authorities. One of the informants added that;

''*Obviously, such informal development is evident on setback to roads in Ile-Ife and it can be concluded that the general level of building compliance to road setback is extremely low*''.

Findings as revealed in Table XI indicated that a majority of 60% of the informants attributed factors facilitating non-compliance to development control as being high cost and delay in plan approval. As confirmed by one of the informants;

''*Fees collected for building plan approval is exorbitant compared with economic situation of the state. This has made many developers to make part payment in order to initiate approval process, and thereafter begin physical development without completing their payment due to the high cost and longtime of approval processing*".

This could be responsible for the negligence of many buildings that do not have planning approval in the study area. Moreover, 20% of the informants claimed that the inability of the local planning authority to cause a significant charge can be traced to corruption among the planning officers. While 20% of the respondents added that a lack of an enabling environment is a major factor affecting non-compliance, especially with development control.

TABLE XI. CHALLENGES OF DEVELOPMENT CONTROL ENFORCEMENT

S/N	Interview Question	Main Idea	Response	Code	Frequency of Main Idea	Percentage
1	What are the main factor facilitating non-compliance to development control?	Factor facilitating non-compliance to development control.	High cost and delay in plan approval.	Q12	3	60
			Corruption amidst town planner.		1	20
			Lack of enabling environment.		1	20
	Total				5	100

2	What are the challenges faced as regards to development control enforcement particularly on building setback from road?	Challenges of development control enforcement.	Inadequate fund, inadequate technical and manpower.	Q13	3	60
			Vulnerability to mob attack.		1	20
			Interference by political actors.		1	20
	Total				5	100

V. Conclusion and Recommendation

This study examined urban metamorphosis and development control activities in Ile-Ife. Also, the study assessed the physical development between 1986 and 2018 and assessed residents' perceptions of development control regulation and challenges of development control enforcement in the study area. Based on the findings from the study, it was evident that built-up areas witnessed the highest change over the study period compared to other land uses. Despite the high level of awareness on development control regulation, developers still violated the roadblock without regard to an approved development plan. The study concluded that rapid development had negatively affected development control in Ile-Ife, and to curb these contraventions, there is a need to increase the number of professional town planners, builders, architects, and enforcement personnel in the physical planning authority so that the monitoring and enforcement of physical development control will be stable. Also, necessary equipment that can aid the effectiveness of their work should be provided, especially additional vehicles for regular inspection. As a matter of necessity, adequate funds should be made available to the local planning authority to enhance the public awareness program on development control and also for effective development control activities. The government should make available legal support for the authority so as to protect the enforcement officers from mob attack and enable strict compliance with the development control regulation by developers. The influence of politicians and the rich should be curbed in such a way as to allow effective monitoring, routine inspection, and proper enforcement.

Therefore, independent power should be given to the local planning authority by the state government to function professionally without political interference. This will permit the authority to realize its mandate without any fear. Furthermore, there should be a reduction in the cost of procuring building permits, and the bottlenecks involved in the process should be eliminated in order to aid easy access to building permits. Transparency should be ensured in the process of issuing building permits to the developers.

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