FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 4 No. 2, June, 2020, pp 567 - 576
DOI: https://doi.org/10.33003/fjs-2020-0402-186

GEO-INFORMATIC APPLICATION IN ANOMALIES ASSESSMENT IN THE MASTER PLAN OF IDAH TOWN, KOGI STATE, NIGERIA

Ishaya S. and Omika U.Y.

Department of Geography and Environmental Management, University of Abuja, Nigeria

Author's Email: ishayasunny@yahoo.com and mikailyunus2014@gmail.com

ABSTRACT
Nigerian urban environments are characterized by uncontrolled organic and consciously created urban settlements driven by a host of factors. This study used geo-informatic technology to assess the anomalies in the Master Plan of Idah town between 2005 and 2015. The Master Plan of Idah town and high resolution IKONOS images were acquired to provide data for the study while geo-informatic technology was use in the data analysis. The results show that in 2005 residential land use exceeded the expected area in the Master Plan by 1,474,270.6 m^2, commercial land use is not accordingly developed having an area of 3,290 m^2 encroached upon, that of industrial is encroached upon by 569,766.8 m^2, educational is encroached upon by 769,766.8 m^2, recreational is encroached upon by 1,521 m^2, health is encroached upon by 62,802 m^2, religious is encroached upon by 8,026 m^2 while government and civic land is encroached upon by 9,265 m^2, and transport is encroached upon by 50,333 m^2. The study further revealed that the anomalies in the urban Master Plan of Idah town advanced in 2015 with the residential land use exceeded the expected land area designated for it in 2005 by 8,142,704.7 m^2 while other land uses that were not fully developed were also encroached upon. Despite the detailed master plan was prepared for Idah town covering the period 1974 to 2005 the implementation is absolutely void. The study recommended that, the Master Plan should be urgently renew to avoid further land use development resulting in more anomalies.

Keywords: Geo-informatic, satellite imageries, anomalies, master plan, land use.

INTRODUCTION

The chaotic and polluted cities of Western Europe's Industrial Revolution in the 19th century prompted the emergence of Master Plan which remains a vital document used for controlling urban development all over the world today (Ubani, Emeka and Lucy, 2014). Master Plan emerged as the key aspect of modernist planning and detailed the city layout from its built form to its ideal end state. A master plan should be able to guide and direct the physical development up to next 20 to 30 years in the planned area or city if the idea of achieving the Sustainable Development Goals (SDGs) is taken to be of high priority.

The current economic growth and urbanization in Africa (Nigeria inclusive) should be guided by appropriate planning and land use management at continental, regional, national, sub-national, and local scales. Nigeria has been experiencing rapid urbanization occasioned by uncontrolled organic and consciously created urban settlements (Jiriko, 2004). This explosive rate of urban growth has been attendant with complex socio-economic, physical and environment problems. Government intervention instruments have included formulation of urban planning and development policies, laws, establishment of sole-purpose urban development agencies, and adoption of urban development plans. Despite these efforts, the situation on ground indicates an apparent lack of effectiveness in the management of the fast growing urban settlements.

Idah is an ancient town in Kogi East and the seat of the highest traditional ruler of the state. Its Master Plan was prepared in 1974 to last between 1974-2005 with different land uses to include; residential, educational, recreational, transport, industrial, commercial, government and civic, health and religious. The creation of the Local Government Area in 1976, the establishment of Federal Polytechnic in 1977 and School of Health in the same year enhanced the influx of people from several parts of the state to the area, this, coupled with the natural population growth of the town attracted physical development to the area. This development has impacted the area in a way of population increase resulting in high demand for shelter which has great implication on the Master Plan of the area.

The dynamic, activities and result oriented nature of governments, individuals and organizations coupled with rapid urbanization as a result of population explosion in Idah town over the years has resulted in the significant alteration of Idah urban Master Plan. Amongst the problems faced from the distortion of master plan of the area includes: urban sprawl, slum, indiscriminate waste disposal, soil erosion, and pressure on biodiversity which indirectly affects the air quality and Ozone concentration of the area. The low response of enforcement on the urban master plan implementation by government to underpin the standard of physical development has resulted in the reduction of environmental quality of the town.

Increase in population, technological development, infrastructures and services in urban areas have influence on urban land use system where planning strategies were employed and have improved the health and safety of the environment and the inhabitants (Jiriko, 2008). Whilst this is the case in the developed countries, it is a far cry for the developing countries which Nigeria is one with urban planning challenges among its cities such as Lagos, Ibadan, Kano, Port Harcourt, Benin, Lokoja and Idah town.

In the time past, Master Plans were developed to manage the problems of unplanned urban growth in Nigeria. They were designed to guide growths and development in cities like Kano (1963), Kaduna (1967), Calabar (1970), Ilorin (1972), Idah (1974), Makurdi (1978), Lagos (1980) and the Federal Capital Territory Abuja (1979) respectively. Over time, the method of manual and physical contact in assessing master plan anomalies is not only laborious, but very expensive and time consuming (Ishaya, Ahmed, Hadiza and Mundi, 2009). With the advent of earth mapping technology and computerization, it is possible to monitor and manage urban land use anomalies using Remote Sensing (RS) and Geographic Information System (GIS) techniques. These provide large-scale maps and imageries of areas, which could be classified to observe the anomalies that occurs in any designated land use map of an area. The observation of the earth from space provides objective information of human utilization of the land surface in situation of rapid and often undocumented land use change (Ujoh, Kwabe and Ifatimehin, 2010; Abakpa and Ejaro, 2019). One of the major advantages of satellite systems is their capability for repetitive coverage at short interval and consistent image quality which is necessary for change detection studies (Strivasta and Gupta, 2005). One of the major advantages of satellite systems is their capability for repetitive coverage at short interval and consistent image quality which is necessary for change detection studies (Strivasta and Gupta, 2005).

However, poor implementation of Idah urban Master plan since 1974 to 2005 and the inability of the appropriate authorities to review it after expiration in 2005 has ushered in significant anomalies and as such it is worrisome in seen existing structures and facilities in Idah town not in conformity with the land use categorization of the Master Plan as a result of little or lack of implementation. Therefore, the sources of the anomalies in urban Master Plan of Idah town needs to be studied, understood and addressed with the aid of geo-informatic technology between 1974-2005 and 2005- 2015 to enable the Master Plan function properly in guiding physical development of the area as low environmental quality, poor sanitary conditions, poor accessibility, unusual land use conversion and congestion of space has characterized the town.

Study Area

Idah town is theheadquarters of Idah Local Government Area of Kogi State. It is one of the oldest Local Governments created since 1976 in Nigeria. Idah town also double as the headquarter of the Igala Kingdom being the seat of power of the Attah of Igala, the paramount traditional ruler of the Igala people and chairman Kogi State traditional ruling council. Idah town was one of the first settlements along the River Niger to have contact with the European traders and also one of the oldest settlements in Igala land dating back to more than 780 years old according to oral traditional (Tijani, 2007).

Idah is located in the south–west of Kogi State between latitudes $7^0$6’23.44’’N to $7^0$11’N and longitudes $6^0$44’2.94’’E to $6^0$73’. Idah is bounded to the north and west by Igalamela/Odolu Local Government Area, to the south by Ibaji Local Government Area and to the west by Agenebode in Edo State across the River Niger. The total area covered by Idah town is about 3811.75 hectares (Idah Master Plan, 1974-2005). Idah receive an annual rainfall of between 100 – 150 centimeters with rainy season spanning from April to October and the dry season setting in between November and March. Relative humidity is over 80% in the morning and about 50% in the afternoon, the mean annual temperature is over 27^0C. The study area is predominantly guinea savannah type which is characterized by discontinuous canopy, shrubs and tall grasses giving the area a park appearance.

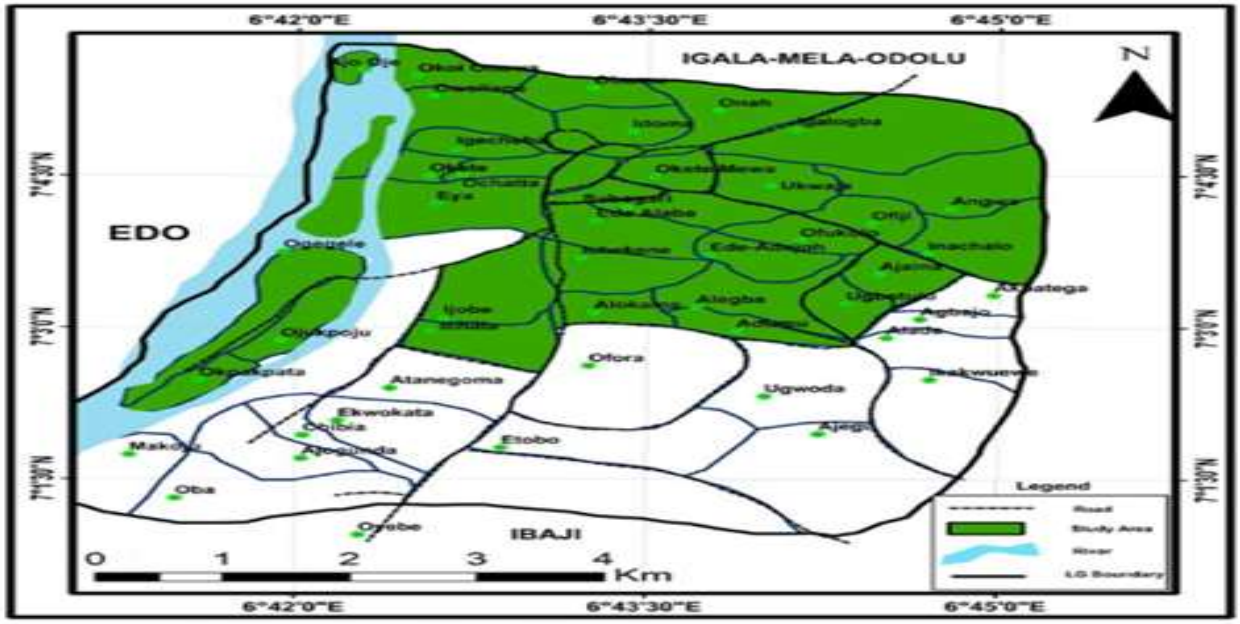

Figure 1: Map of Idah Local Government Area of Kogi State
Source: Town Planning Office Idah

MATERIALS AND METHOD

The data used for the study were sourced from both primary and secondary sources. The primary data used were sourced through reconnaissance. During ground-tuthing, the coordinates of 32 locations were taken with GARMIN III GPS to authenticate land uses. The secondary data used were existing Master Plan with spatial resolution of 1:50,000 sourced from Ministry of Lands, Housing and Urban Development Idah Area Office, map of the study area obtained from Idah Town Planning Area Office, satellite IKONOS images of 2005 and 2015 obtained from Digital Globe with spatial resolutions of 0.82m panchromatic and 3.2m multispectral as well as journals. The instruments used with their respective specifications includes; GARMIN III GPS; Navigation; 500 Waypoints, 2000 Tracklog Points, 20 Routes and 30 Waypoints per route, Digital Camera; 8.0 Auto Focus, Flatbed Scanner; 8.5" × 14" size and 36-48 bit color, Computer System; hp G62, Printer; Hp LaserJet 1020 and ArcGIS 10.5.

Image Analysis

A working directory was created for this study on the computer system where all the data collected were stored. This was done through input device of the computer. The different images obtained were subset/submap into the administrative boundary of Idah town using ArcGIS 10.5. This is to ensure uniformity in the data size and to avoid working beyond the scope of the study. The band combinations used for the image composite are Near Infrared-band 4, Red-band 3 and Green-band 2. The choice for these bands composition is to give a clear distinction of various land uses in the study area with their respective boundaries. The IKONOS images were displayed in False Colour Composite (FCC) for a better visualization and identification of residential, commercial, industrial, educational, recreational, health, religious, government and civic and transport land use.

Supervised image classification was used for the study. The combined satellite images were classified by means of supervised classification with ERDAS Imagine software. Information from the field data and land use classification were utilized to identify training areas representing the land use classes which are; residential, education, recreational, transport, industrial, commercial, government and civic, health and religious. The change detection methodology has the raster data (that is, Ortho-Photo Master Plan) of the study area as the basis of the detection and the vector data (that is, shape files) of the study area showing the features of target. The overlay of vector on raster revealed the real situation in land use types of the study area where the extent of anomalies in land use distributions in the Master Plan were detected statistically and presented in m^2**,** tables and percentages.

RESULTS AND DISCUSSION

Land Use Distributions of Idah Urban Master Plan, 1974-2005.

Table 1 shows the nine designated land use types of Idah Urban Master Plan, 1974-2005. The table shows a total of 38,117,500 m^2 planned land use types for the area. The residential land covers 14,030,000 m^2 (36.8%) area, the commercial land covers 747,500 m^2 (2%), industrial land covers 1,450,000 m^2 (3.8%),educational land covers 11,840,000 m^2 (31.1%), recreational land covers 4,492,000 m^2 (11.8%), health land use covers 510,000 m^2 (1.3%), religious land use covers 160,000 m^2 (0.4%), government and civic land use covers 680,000 m^2 (1.8%) and lastly transport land use covers 4,208,000 m^2 (11%). The land use distribution in table 1 revealed that residential land use occupies the highest land area when compared with the rest and hierarchically it goes as follows: residential → educational → recreational → transport → industrial → commercial → government and civic → health → religious.

Table 1: Land Use Distributions of Idah Urban Master Plan, 1974-2005.

Land Use	Area (m^2)	Area (%)
Residential	14,030,000	36.8
Commercial	747,500	2.0
Industrial	1,450,000	3.8
Educational	11,840,000	31.1
Recreational	4,492,000	11.8
Health	510,000	1.3
Religious	160,000	0.4
Government & Civic	680,000	1.8
Transport	4,208,000	11.0
TOTAL	**38,117,500**	**100.0**

Source: Source: Idah Urban Master Plan, 1974-2005.

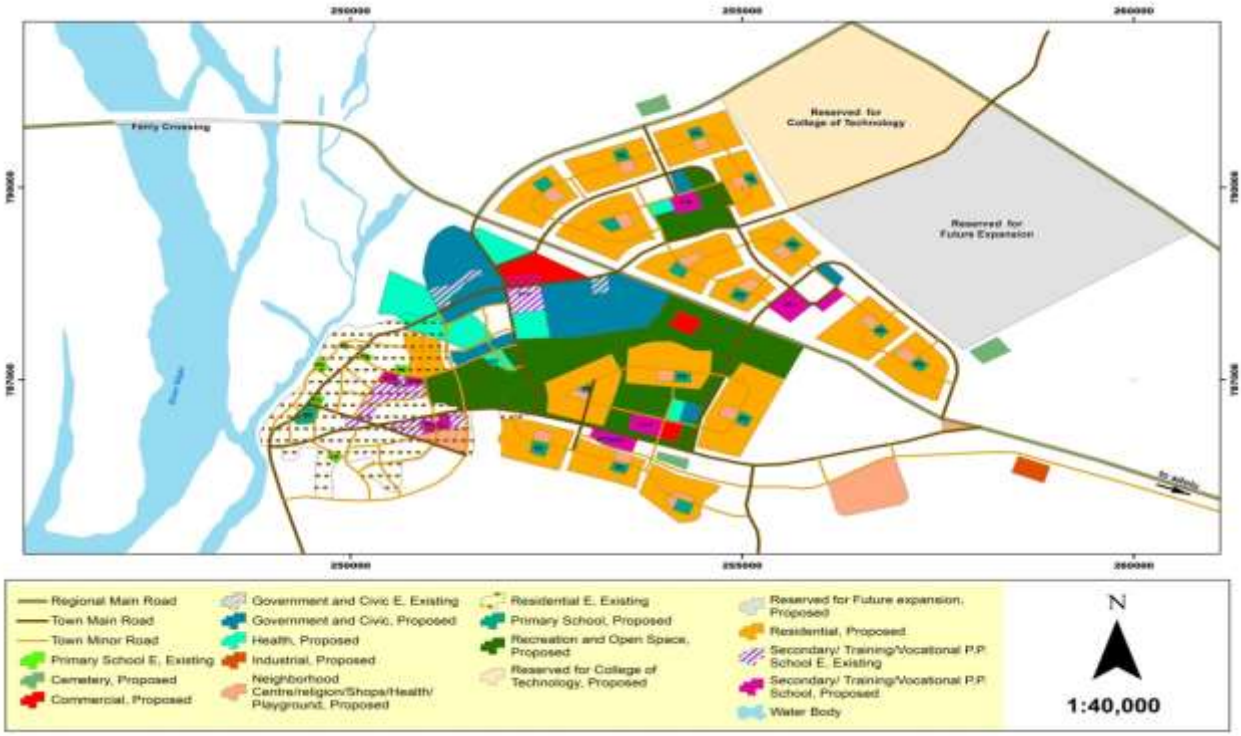

Figure 1: Digitized Land Use Map of Idah Town 1974-2005.
Source: Idah Urban Master Plan, 1974-2005.

Land Use Distributions of Idah Town in 2005

Table 2 depicts the land use distribution of Idah town in 2005. The land use distributions were obtained from classified 2005 IKONOS imagery of the study area. The table shows a total of 38,117,500 m^2 for nine land use types in the study area. The residential land covers land area of 15,504,270.6 m^2 (40.6%), commercial land covers 744,210 m^2 (1.9%), industrial land covers 880,733.2 m^2 (2.3%), educational land use covers 11,070,233.2 m^2, (29%), recreational land covers 4,490,479 m^2 (11.7%), health land use covers 447,198 m^2 (1.2%), religious land use covers 151,974 m^2 (0.8%), government and civic land use covers 670,735 m^2 (1.8%) and transport land use covers 4,157,667 m^2 (10.7%). It was revealed that residential land use is the only land use type that has increased significantly from 14,030,000 m^2 (38.6%) to 15,504,270.6 m^2 (40.6%) while other land use types were encroached upon by residential land use leading to their respective reduction in area coverage.

Hierarchically, the existing land use distribution of Idah town from 2005 IKONOS imagery goes thus; residential → educational → recreational → transport → industrial → commercial → government and civic → health → religious. This order is in accordance with what is obtained from the land use map of the study area in 2005 where residential land use takes the highest area followed by educational, recreational, transport, industrial, commercial, government and civic, health and lastly by religious land use.

Table 2: Land Use Distributions of Idah Town as at 2005

Land Use	Area (m^2)	Area (%)
Residential	15,504,270.6	40.6
Commercial	744,210	1.9
Industrial	880,733.2	2.3
Educational	11,070,233.2	29.0
Recreational	4,490,479	11.7
Health	447,198	1.2
Religious	151,974	0.8
Government & Civic	670,735	1.8
Transport	4,157,667	10.7
TOTAL	**38,117,500**	**100.0**

Source: Idah Urban Master Plan 2005 and 2005 IKONOS Imagery.

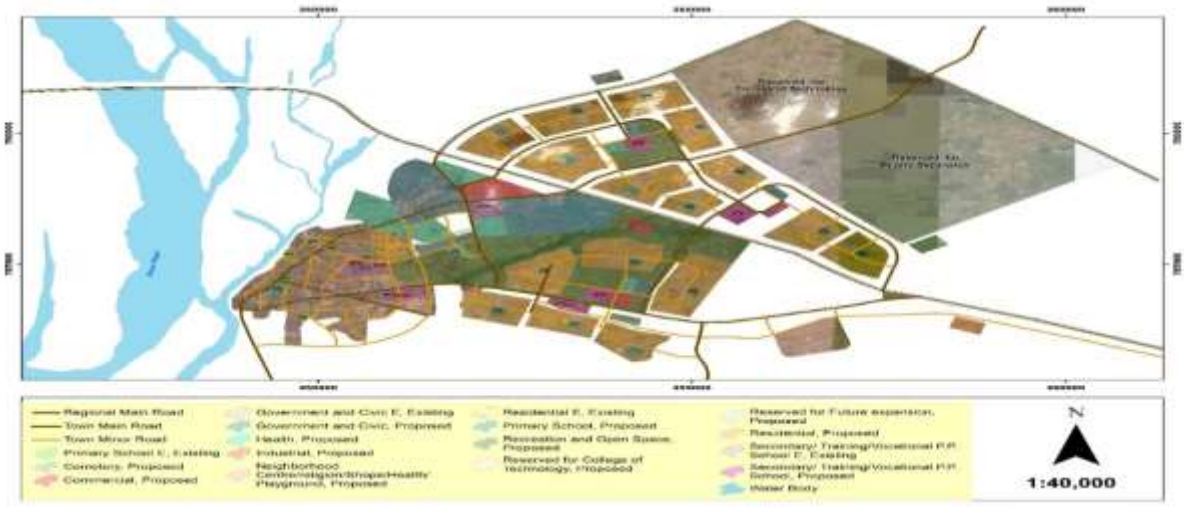

Figure 2: Overlaid Land Use Plan and 2005 Satellite Imagery of Idah Town.
Source: 2005 IKONOS satellites imagery.

Land Use Distributions of Idah Town in 2015

Table 3 shows land use distribution of Idah town in 2015. The land use distributions were obtained from classified 2015 IKONOS imagery on the land use map of the study area. The table shows a total of 38,117,500 m^2 for the nine land use types in the study area. The residential land use covers 22,172,704.7 m^2 (58.2%) of the total land area, commercial land use covers 373,701.5 m^2 (1%), the industrial land use covers 181,250 m^2 (0.5%), educational land use covers 11,813,221.4 m^2 (30.9%), recreational land use covers 74,866.8 m^2 (0.2%), health land use covers 470,769.2 m^2 (1.2%), religious land use covers 147,692.3 m^2 (0.4%), government and civic land use covers 408,000 m^2 (1.1%) and transport land use covers 2,475,294.1 m^2 (6.5%) of the land use area. It was observed that residential land use is the only land use type that has increased significantly from 15,504,270.6 m^2 in 2005 to 22,172,704.7 m^2 2015 while other land use types were encroached upon by residential land use leading to their respective reduction in area coverage.

Hierarchically, the existing land use distribution of Idah town from classified 2015 IKONOS imagery (figure 3) goes as thus; residential → educational → transport → health → government and civic → commercial → industrial → religious → recreation. This order is significantly different from what is obtained in the existing land use distributions of the study area in 2005 where residential land use takes the highest area followed by educational, recreational, transport, industrial, commercial, government and civic, health and lastly by religious land use.

Table 3: Existing Land Use Distributions of Idah Town as at 2015

Land Use	Area (m^2)	Area (%)
Residential	22,172,704.7	58.2
Commercial	373,701.5	1.0
Industrial	181,250	0.5
Educational	11,813,221.4	30.9
Recreational	74,866.8	0.2
Health	470,769.2	1.2
Religious	147,692.3	0.4
Government & Civic	408,000	1.1
Transport	2,475,294.1	6.5
TOTAL	**38,117,500**	**100.0**

Source: IKONOS Image of 2015.

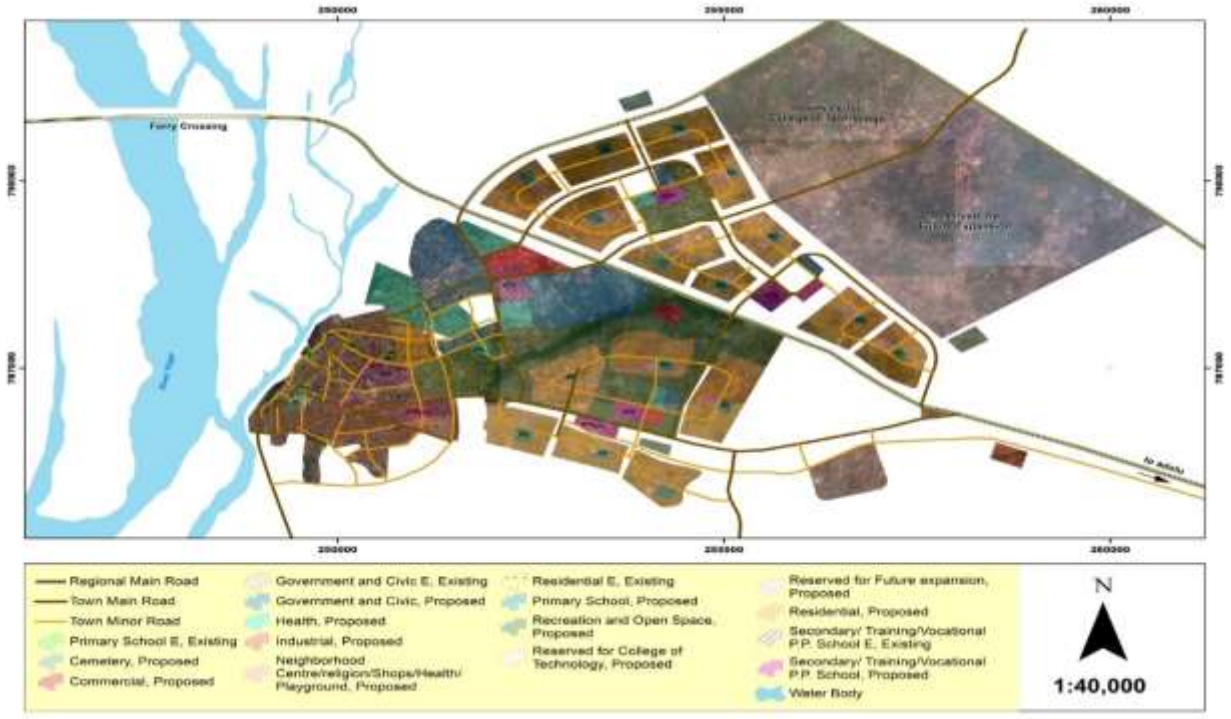

Figure 3: Overlaid Land Use Plan and 2015 Satellite Imagery of Idah Town.
Source: Idah Urban Master Plan 2005 and 2015 IKONOS Imagery.

Land Use Anomalies between Master Plan and Classified 2005 IKONOS Image

Table 4 shows land use anomalies between the Master Plan of Idah town and the classified 2005 IKONOS Image of the town. The table revealed that there are anomalies in the implementation of the 1974-2005 Master Plan of Idah Town. The residential land use exceeded the expected area in the Master Plan designated for it by 1,474,270.6 m^2 (3.8%), the commercial land use has not been accordingly developed following the provision of the 1974-2005 Master Plan having an area of 3,290 m^2 (−0.1%) encroached upon. The industrial land use is less than what was planned with up to 569,766.8 m^2 (−1.5%) areas of encroachment. Educational land use was also less than what was planned with up to 769,766.8 m^2 (−2%) encroached upon. Recreational land use is less than what was planned with up to 1,521 m^2 (−0.2) areas of encroachment. Health land use is equally less than what was planned with up to 62,802 m^2 (−0.1%) encroached upon. The religious land use is less than what was planned with up to 8,026 m^2 (0.3%) areas of encroachment. The government and civic land use is also less than what was planned with up to 9,265 m^2 (0.1%) encroached upon and lastly the designated transport land use is as well less than what was planned with 50,333 m^2 (−0.4%) areas of encroachment.

The results in table 4 revealed that residential land use is the only land use that exceeded the area designated planned area for it in the Master Plan and has encroached commercial, industrial, educational, recreational, health, religious, government and civic as well as transport land uses. These anomalies have caused alteration in the land use map of Idah town.

Land Use Anomalies between Master Plan and Classified 2015 IKONOS Image

Table 5 depicts the land use anomalies in the Master Plan of Idah town and the classified 2015 IKONOS Image. Findings revealed that there are anomalies in the implementation of the 1974-2005 Master Plan for Idah town. The residential land use exceeded the planned area in the Master Plan by 8,142,704.7 m^2 (21.4%), the commercial land use has not been accordingly developed following the provision of the 1974-2005 Master Plan having an area of 373,798.5 m^2 (−1%) encroached upon. The industrial land use is less than what was planned with 1,269,250 m^2 (−3.3%) area of the area encroached upon. Educational land use is encroached upon by 26,778.6 m^2 (−0.2%) while recreational land use is encroached upon with up to 4,417,133.2 m^2 (−11.6%). Health land use is equally less of what was planned with 39,230.8 m^2 (−0.1%) encroached upon. The religious land use is less than what was planned with 12,307.7 m^2 (−0.1%) areas of encroachment. The planned area for government and civic land use is encroached upon with 272,000 m^2 (−0.7%) while and the designated transport land use is encroached upon with 1,732,705.9 m^2 (−4.5%). Generally, residential land use is the only land use that exceeded the area designated for it in the Master Plan and has encroached more on other land uses in 10 years after the expiration of Idah urban Master Plan of 1974-2005.

Table 4: Land Use Anomalies between the Master Plan and Classified 2005 IKONOS Image

S/N	Land Use Type	Area in m^2 2005 Existing	and % of Image	Area in m^2 Master Plan	and % of Idah 2005	Changes in Area in m^2	Changes in Area in %
1	Residential	15,504,270.6	40.6	14,030,000	36.8	1,474,270.6	3.8
2	Commercial	744,210	1.9	747,500	2.0	−3,290	−0.1
3	Industrial	880,733.2	2.3	1,450,500	3.8	−569,766.8	−1.5
4	Educational	11,070,233.2	29.0	11,840,000	31.0	−769,766.8	−2
5	Recreational	4,490,479	11.7	4,492,000	11.9	−1,521	−0.2
6	Health	447,198	1.2	510,000	1.3	−62,802	−0.1
7	Religious	151,974	0.8	160,000	0.5	−8,026	0.3
8	Government and civic	670,735	1.8	680,000	1.7	−9,265	0.1
9	Transport	4,157,667	10.7	4,208,000	11.1	−50,333	−0.4
	TOTAL	**38,117,500.0**	**100.0**	**38,117,500.0**	**100.0**		

Source: Classified Idah Urban Master Plan and Classified 2005 IKONOS Image.

Table 5: Land Use Anomalies between the Master Plan and 2015 IKONOS Image

S/N	Land Use Type	Area in m^2 2015 Existing	and % of Image	Area in m^2 Master Plan	and % of Idah 1974-2005	Changes in Area in m^2	Changes in Area in %
1	Residential	22,172,704.7	58.2	14,030,000	36.8	8,142,704.7	21.4
2	Commercial	373,701.5	1.0	747,500	2.0	−373,798.5	−1.0
3	Industrial	181,250	0.5	1,450,500	3.8	−1,269,250	−3.3
4	Educational	11,813,221.4	30.9	11,840,000	31.1	−26,778.6	−0.2
5	Recreational	74,866.8	0.2	4,492,000	11.8	−4,417,133.2	−11.6
6	Health	470,769.2	1.2	510,000	1.3	−39,230.8	−0.1
7	Religious	147,692.3	0.4	160,000	0.5	−12,307.7	−0.1
8	Government and civic	408,000	1.1	680,000	1.8	−272,000	−0.7
9	Transport	2475,294.1	6.5	4,208,000	11.0	−1,732,705.9	−4.5
	TOTAL		**100.0**	**38,117,500.0**	**100.0**		

Source: Classified Idah Urban Master Plan 2005 and Classified 2015 IKONOS Image.

DISCUSSION OF FINDINGS

Findings revealed that residential land use is the only land use type that exceeded the area designated for it in the Master Plan and has encroached on commercial, industrial, educational, recreational, health, religious, government and civic as well as transport land uses in 2005 and in 2015. These results were in accordance with the findings of Ishaya *et al.,* (2009) in Federal Capital City where they observed that there are anomalies in the implementation of the 1991 Master Plan where residential land use has encroached on other land uses by 515.871 m^2 (5.87%). Recreational land use, open space land use, institutional land use, commercial land use and communicational land use were the most encroached upon by residential land use. The findings of Alabi (2007) in Lokoja town which revealed that the built up area have increased from 0.34 km^2 to 10.31km^2 at growth rate of 0.9% eaten deep into other land uses from 1987 to 2005 is also in agreement with the findings of this study. The work of Weje and Ameme (2018) in Port Harcourt equally agrees with the findings of this study where the result of their analysis revealed sharp deviation in development among the different land uses leading to amorphous and uncoordinated growth contrary to the master plan prepared for it. Also, those of Jimoh, *et. al.,* (2017) in Auchi found that developers contravened development control regulations, such as construction of building without approved building plans, violation of setback regulations, exceeding of plot coverage and others. Socioeconomic characteristics of respondents, absence of planning scheme and inadequate planning staff in Auchi planning authority account for these contraventions.

Despite the fact that detail master plan was prepare for Idah town covering the period 1974 to 2005 the implementation is absolutely void. In agreement to this finding is the observation of Bogdana (2011) he assert that despite the widespread evolution of master plans, they are perceived as a goal in themselves rather than a means as many master plans were prepared without absolute implementation in Romania. Emad *et al.,* (2017) observed that in Egypt, highly technical plans are drawn up, but nobody puts them into practice and the always end up gathering dust on the shelves of national agencies or local government without being utilized to make improvements to local economic or environmental well-being. In the same vein, Daniel and Chernor (2018) maintained that physical development planning guidelines to guide urban development, but enforcement and effective compliance has been weak in most towns in the Wa Municipality area of Ghana.

CONCLUSION

This study demonstrated the efficacy of geo-informatic technology in the assessment of anomalies that existed in the urban Master Plan of Idah town of Kogi State. This study conclude that despite the fact that detail master plan was prepared for Idah town covering the period 1974 to 2005 the implementation is absolutely void. The Idah master Plan over the years is not seen as schedule for urban physical development, planning towards enforcement and effective compliance. The study also conclude that residential land use increased significantly thereby encroaching on other land uses that are yet to be fully developed. The land use encroached upon include; commercial, industrial, educational, recreational, health, religious, transport, and government and civic land uses. Residential land use occupies the highest proportion of land area in Idah urban Master Plan of 1974-2005 and residential land use is the only land use type that has increased significantly encroached into educational, transport, health, government and civic, commercial, industrial, religious and recreation land uses.

RECOMMENDATIONS

Based on the findings of the study the following recommendations were made;

i. The State and Local Governments should through the Ministry of Lands, Housing and Urban Development, and Town Planning Board as a matter of urgency commence on the steps and processes to renew the urban Master Plan of Idah in order to avoid further land use development resulting in more deviations.

ii. The Kogi State Government should through appropriate authorities sponsor comprehensive clearing and compensation be given to the victims as fast as possible to address the occurred anomalies in the Master Plan of Idah town.

iii. The land enforcement agencies should be empowered to legally deal with any person or organization who fails to adhere strictly to required best practices on land use regulations in the area.

REFERENCES

Abakpa, D.I. and Ejaro, S.P. (2019). Application of Geospatial Technology in Assessing the Impact of Urbanization on Vegetation Degradation in Kuje Area Council, Abuja, Nigeria. *International Journal of Research and Scientific Innovation (IJRSI).* Vol. 6, Issue 7, July 2019.

Adepoju A.S and Adepoju A.G (2016). Dimension of Land Use Conversion in Ado-Ekiti Metropolis.*International Journal of Computational Engineering Research (IJCER).* Volume, 06, 12-21.

Alabi M.O (2007). A Study of the Physical Expansion of Lokoja Town using Geoinformatic Techniques. *Confluence Journal of Environmental Studies*, vol. 2, No. 1, pp. 48-52.

Bogdana N (2011).A Methodology for Assessing How Master Plans Contribute Toward Achieving Sustainable Urban Development. *Transylvanian Review of Administrative Sciences*, No. 32 E/2011, pp. 174-194.

Emad K, Taher O, and Aref A (2017). What Are the Main Challenges Impeding Implementation of the Spatial Plans in Egypt Using Ecotourism Development as an Example? *Journal of Social Science*, 6 (75).

Daniel, D and Chernor, A.J (2018). Sustainable Urban Development and Land Use Management: Wa Municipality in Perspective, Ghana. *Journal of Sustainable Development;* Vol. 11, No. 5; 2018.

Idah Urban Master Plan 1974-2005, Benue State, Nigeria. DAR al-handasah consultants (Shair and Partners). Ilorin, Beirut, London.

Ishaya S., Ahmad, Hadiza A. and R. Mundi (2009). "Application of Geo-Informatics Techniques in the Detection of Land use Anomalies in Abuja Master Plan, Nigeria". *The Abuja Journal of Geography and Development*. Vol. 3 pp. 46-56.

Jimoh, B. A, Al-Hasan, A.Z, Imimole, W.O, and Ahmed, M.B (2017). Contravention of Development Control Measures in Auchi, Edo State, Nigeria. *Applied Science Reports,* 20 (1), 30-34.

Jiriko, K.G (2004). "Effective Management of Rapid Urbanization in Nigeria: The Need for

Appropriate Planning Paradigms". Ph.D. Thesis, Department of Urban and Regional Planning, University of Nigeria, Enugu Campus.

Jiriko, K. (2008). Urban Master Planning Paradigm in Nigeria: what future? Kaduna: Mba Prints+Graphics.

Ubani O, Emeka M, Lucy U. (2014), Physical Master-planning as Panacea to Physical Planning Challenges in Nigeria Cities: Case Study of Abuja, Nigeria Capital City. Civil and Environmental Research www.iiste.org ISSN 2224-5790 (Paper) ISSN 2225-0514 (Online) Vol.6, No.2, 2014.

Strivasta, S.K. and Gupta, R.D. (2005). Monitoring of Change in Land use/ Land cover Using Multi- Sensor Satellite Data. Availableon-line at http://www.gisdevelopment/application/environment/overview .

Ujoh, F., Kwabe, I. and Ifatimehin, O. (2010). Urban Expansion and Vegetal Cover Loss in and around Nigeria's Federal Capital City. *Journal of Nigerian Institute of Town Planners.* Vol. 2, pp 2134-2142.

Weje, I.I and Ameme, B.G (2018). Evaluation of Plan Implementation: Peri-Urban Development and Diobu Layout plan, 1975-2018. *The Environmental Studies*, Vol. 1, Issue 2, pp 70-79.