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IMPACT OF URBANIZATION ON LAND USE AND LAND COVER DYNAMICS ON THE ENVIRONMENT OF SULEJA, NIGER STATE, NIGERIA

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Abstract

Urbanization is among the problems confronting most cities of the world which is attributed to rapid settlements expansion and population growth. The contemporary issues of urbanization are common in the developing countries where development goes ahead of urban planning. This study examine the Impact of Urbanization on Land Use and Land Cover Dynamics on the Environment of Suleja, Niger state using Geospatial Techniques between 1993, 2008, 2018. Field work and ground trothing and picking of GPS point for proper identification serves as the primary data while TM, EMT+, and OLI were the secondary data for this research. Results indicate that the land cover (Vegetation) reduces from 26.07 (KM²) (19.12%), in 2006 to 21.40(km²) (15.70%) in 2018 as a result increase demand for land due to increasing population. Also the built up area was observe to be in increasing order from 11.67% in 1993, 29.72% in 2008 and 52.97% in 2018. The proximity of Abuja the Federal Capital Territory also contributed to the speedy growth of Suleja L.G.A. The implication of the research indicates that urbanization is the common factors that changes Suleja. The settlement (built-up) increase has encroached into the vegetation and agricultural landuse which is decreasing due to growth in population, constructions and other human needs.The negative effects are unplanned settlements, slums, social vices environmental degradation, pollution,

KEYWORDS: *GIS and Remote Sensing, Settlement, Population, Landuse Change, Urbanization*

improper waste disposal, decreasing biodiversity and agricultural land among others.It was therefore recommended that Suleja LGA should ensure consistent LULC mapping in order to quantify and characterize LULC changes and predict the future expected change with the observed trends.

Introduction

Rapidly occurring changes have resulted in an increasingly complex, or dynamic, world with exponential demands being placed on natural and built systems. Some of these global stressors include increases in population, urbanization, resource utilization, water consumption, vehicle ownership, land conversion, species extinction, and disease transmission (Gadiga and Galtima, 2017)).

Globally most of the land cover have lost their natural state, as most the landscapes have been altered by anthropogenic activities. The Earth surface is being significantly altered in some manner by man's presence on the Earth and his activities has created a profound effect on the natural environment thus resulting into an accelerated growth in settlements expansion (Agwanda and Amani, 2014). Urbanization is the increase in the population of urban areas versus rural areas In Nigeria this is largely caused by rural to urban migration and re-classification on new urban area (Agwanda and Amani, 2014), as it is the case with Niger state in general and Suleja in particular.

Urbanization has created adverse effects on the land such as loss of vegetation and agricultural land due to rapid population increase and migration leading to settlement growth with people competing for limited available land and other resources. Urbanization enhances the erection of substandard and illegal houses, overcrowding, unplanned settlement and slums with unpleasant living environment. Urban centres in developing countries particularly Nigeria is faced with similar urbanization problems, such as congestion, overcrowding, building collapse, poor drainage system, illegal construction, social vices, juvenile delinquency, slums and of utmost importance is the lack of comprehensive planning. Suleja the study area in Niger State is faced with similar problems (Khosla and Bhardwaj, 2019)

Studies have shown that Suleja L.G.A, has witnessed remarkable expansion, growth and developmental activities due to its proximity to Abuja the Federal Capital Territory (FCT) of Nigeria. The relocation of the FCT from Lagos to Abuja in 1991had lead to massive movement of people from other parts of the country to

settle at the suburbs of the FCT, due to high cost of accommodation within the Abuja City. (Amini *et al.,* 2011). Suleja had witnessed large influx of people from some demolished areas within the FCT and people from the North-Eastern part of the Nigeria who left their state due to terrorism or insurgencies. Suleja is a town serving as residence to people working in Abuja and other neighbouring towns of the metropolitan. That there is the need to produce new master plan for Suleja to replace the old designs that had already been overtaken by the rapid development of the towns. This study examine the Impact of Urbanization on Land Use and Land Cover Dynamics on the Environment of Suleja, Niger state using Geospatial Techniques between 1993, 2008, 2018. The data obtained will help the city planners, researchers, policy/ decision makers in administrative and infrastructural planning for the achievement of sustainable living environment in Suleja Local Government Area.

Materials and Methods

The data for the research was sourced from https://earthexplorer.usgs.gov/ . The data used for this paper were secondary data, The objectives was achieved through the use of various epoch of satellite images specifically 2006 and 2017 to identify and map the various land use and land cover in the study area using ArcGIS 10.3.The study area was mapped and a supervised classification method was carried out based on Anderson *et al* (1976) level I classification system on (i.e. built up, vegetation rock outcrop, farmland, and water body). Mapping of the various land use was carried out to know the total land area covered by each land use. The summary statistic was obtained from ArcGIS through the attribute table.

Image pre-processing and classification

Satellite image pre-processing was done before change detection phenomenon is very important in order to establish a more direct affiliation between the acquired data and biophysical phenomena (Hassan *et al*., 2016). Due to acquisition system and platform movements, remotely sensed data from aircrafts or satellites are generally geometrically distorted. The satellite data were imported into ArcGIS 10.3 software in an image tif format for geometric correction. After the images were geo-referenced, subset was done on the basis of Area of Interest (AOI),

Results and Discussion

Analysis of 1993 imagery of the study Area

The satellite imagery of the study area indicates that farmland areas was the major land cover type covering 58.24 square kilometre (42.72%) of the area. This is

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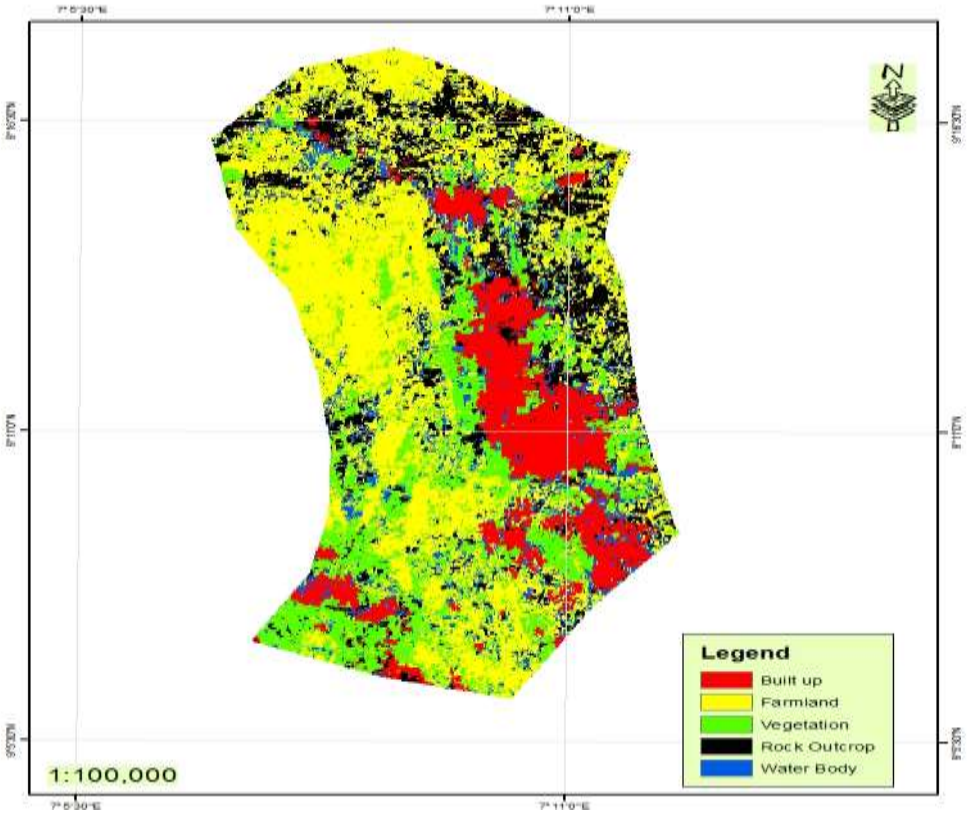
distributed everywhere on the study area since an indication that the inhabitant of the area engage in agricultural activities that supply agricultural products to the federal capital. This is followed by vegetation which covers an area of 26.07 square kilometre (19.12%), of the total land mass of the area. Rock outcrops covers an area 22.99 square kilometre (16.86%) these were typical found across the north western, north eastern, and south western section of the study area. This land use indicates that in 1993 they were more rock outcrop in the study. Also, built up covers an area of 15.89 square kilometer (11.67%). Finally, water body covers a total land area of 13.13 square kilometers (9.63%). The total land area of the study area is 136.3266 square kilometers.



Fiqure 4.1: Classified 1993 Land use/Landcover Map of the study area
Source: Author's Analysis, 2019

Analysis of 2008 imagery of the study Area

Figure 4.2 shows the land use and land cover map of the study area for 2008 indicates that Agricultural area has the highest land mass, it covers an area of 53.3538 square kilometer (39.16%). A decreased of 4.8879 (Km^2) (3.56%) within the six-year' time period from 850.936. Naturally, increase in population usually

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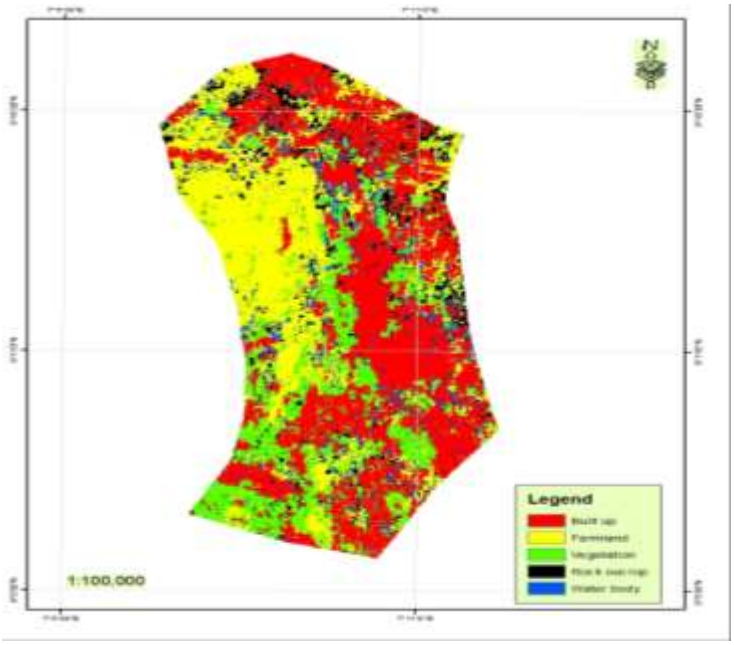
corresponds to increase in or demand for more food. Therefore, the need for more land to farm becomes very imperative and this of course implies that more vegetation would have to be depleted. This can be observed in table 4.1 which indicates that in 2008 agricultural land occupied the highest land mass. This is followed by built up that increases from 15.8931 Km^2 (11.67%), to 40.4883 (Km^2) (29.72 %) which is attributed to increase in population through migration of people from other town to the area due to its proximity to the federal capital of Nigeria. In addition, Vegetation also decreased from 26.0721 Km^2 (19.12%), in 1993 to 23.5413 (Km^2) (17.28 %) in 2008 a decreased of 2.5308 (Km^2) (1.84 %) as a result of deforestation and clearing of land for farming activities. rock out crop also decrease from 22.9896 (Km^2) (16. 86%) in 1993 to 8.9244 (Km^2) (6.55%) in 2008, a decrease of 14.0652 (Km^2) (10.31 %), and finally water body also decreased from 13.1301 (9.63%) in 1993 to 9.9396 (Km^2) (7.29 %) in 2008 a decrease of 3.192 (Km^2) (2.34%). The continuous movement of people as well as climate change has continue to alter the land scape of the study area which has continue to undergo changes from one land cover type to another as seen in figure 4.2.



Fiqure 4.2: Classified 2008 Land use/Landcover Map of the study area
Source: Author's Analysis, 2019

Analysis of 2018 imagery of the study Area

The analysis of 2018 satellite image of the study areas reveals that that there was continuous expansion of built up area. The expansion encroached on the river bank and other land cover types as reveal in (Figure 4.3). The LULC map reveals that in 2018 Settlement areas covers a total of 72.20 (Km^2) (52.97%) of the total area which is made up both residential, commercial, and other land use category

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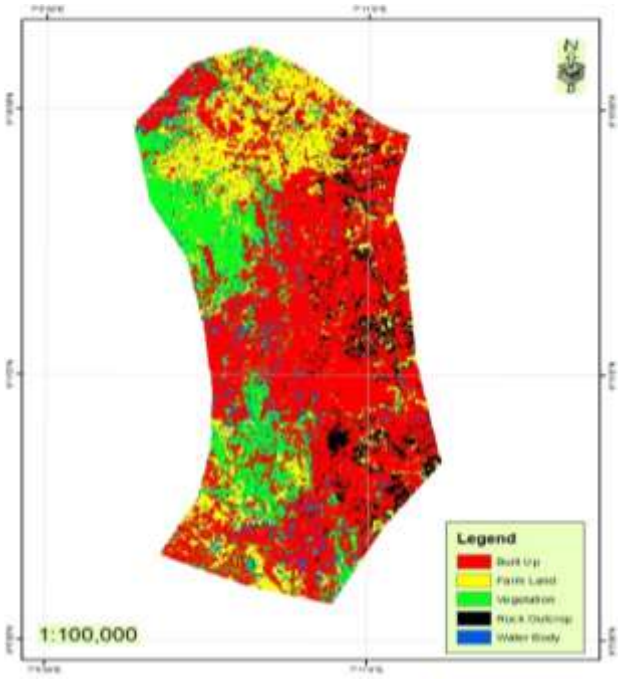
in the study areas. There was an increase of built up areas from 40.4883 (Km2) (29.72 %), in 2008 to about 72.20 (Km2) (52.97%), in 2018, an increase of 12.4817(Km²) (23.25%)

Also, Agricultural land also decreased from 53.3538 square kilometre (39.16%) in 2008 to 24.56 (Km²) (18.02%) in 2018 which may be attribute to the influx of people to the as a result of increasing population pressure on the available land.

Vegetation on the other hand decreased from 23.5413 (Km2) (17.28 %) in 2008 to 21.40 (Km²) (15.70%) in 2018, which is attribute to cutting down of trees for domestic such as charcoal as well as for business, increased land for farming and settlement expansion. Rock outcrops covers an area of 8.9244 (Km2) (6.55%) in 2008 but increases to 10.41(Km²) (7.64%) in 2018 which is attributed to people increased influx to the area because of it closeness to the nation's capital, therefore more rocks are been breakdown to give way for construction of houses and other developmental activities in the area. Finally, Water body cover a land mass of 9.9396 (Km2) (7.29 %) in 2008 reduce further to 7.73 (Km²) (5.67%) in 2018.



Fiqure 4.3: Classified 2018 Land use/Landcover Map of the study area
Source: Author's Analysis, 2018

Table 4.1 Land use landcover statistics for (1993, 2008 and 2018)

Classification Category	1993		2008		2018	
	Area (Sqkm)	Area covered (%)	Area (Sqkm)	Area covered (%)	Area (Sqkm)	Area covered (%)
Built up	15.8931	11.67	40.4883	29.72	72.2016	52.97

Farm land	58.2417	42.72	53.3538	39.16	24.5574	18.02
Vegetation	26.0721	19.12	23.5413	17.28	21.4029	15.70
Rock Outcrop	22.9896	16.86	8.9244	6.55	10.4085	7.64
Water body	13.1301	9.63	7.7337	7.29	7.7337	5.67
Total	136.3266	100	136.3266	100	136.3266	100

Source: Author's Analysis, 2018.

Conclusion

This research work demonstrates the ability of geospatial techniques in the analysis of urban sprawl. The results obtained from this study revealed that there has been a continuous increase in build-up areas throughout the study period. There has also been a progressive increase of urban areas throughout the study period. The period of between 2008 and 2018 had the highest expansion of urban areas.

Recommendation

Owing to the continual increase in urban sprawl in both extent and the rate in the study area, the following are recommended:

a) There is need for a regular monitoring of urban expansion and development by the state Government in the study area especially with the aid of geospatial techniques for better decision making.
b) There is need for all stakeholders like Ministry of Land and Survey, Ministry of Environment, State Development Board and NGOs in urban land use management to ensure strict adherence to urban land use legislations.

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ASSESSMENT OF PARKING FACILITIES: THE CASE OF ANYIGBA TOWN IN KOGI STATE NIGERIA

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Abstract

Parking is an integral component of the transport system. It plays a crucial role in the management of traffic and congestion. On-street parking constitutes one major problem that makes traffic situation chaotic in Nigerian cities. The paper aimed at examinng the nature of parking along Ajaokuta-Anyigba road and Lokoja-Ankpa roads in Anyigba town Kogi State with a view to making appropriate planning proposal. The aim was achieved through examining the nature of land use along the roads, determining the nature of traffic and parking along the routes, examining the road capacity, examining the role of stakeholders in the provision and management of parking facilities in the study area. Relevant literatures were reviewed. The research work adopted the physical survey method. Various surveys were conducted using several instruments, data collected was analyzed using statistical tools, from which fact and findings were made. It reveals that, owing to lack of designated Parking space, motorist to opt for parking along the busy road which obstruct traffic flow and increased travel time. Also, it reveals that 82% of the on-street parking were generated by [redacted] the resident due to lack of parking spaces in there residents and their commercial activities which attracts much cars and the parking space. Recommendations were made such Parking along the road should be made illegal and punishable and the government and other stakeholders involved in the provision and management of parking facilities.

KEYWORDS:
Planning, Parking, Parking space, On-Street parking, Off-Street parking, Roads and Vehicles.