

Assessment of Spatial Growth and Residents Satisfaction with Urban Infrastructure in Idah, Kogi State Nigeria

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This study examined the spatial growth and resident satisfaction with urban infrastructural in Idah. Mixed research method were adopted, Satellite imagery was utilized in evaluating spatial growth that have occurred within the data set periods, the classified image data were processed using ARC GIS (version 10.2) and Idrisi Software. Also, Field observations and questionnaire was employed for gathering requisite data on resident perception on infrastructural development satisfaction. Random sampling was used in questionnaire administration, a total of 215 questionnaires were administered and analyzed using frequency and percentages. The results showed that in 1987, farmland occupied 15.7km²; built-up 9.5km²; bare surface occupied 4.5km² and vegetation occupied 14.1km², while water body occupied 0.6km² of the total land area, however, in 2016, the farmland reduced due to urban growth, the farm land which was occupying 15.7 KM² in 1987 now reduced to 6.8 km²; built-up increased from 9.5 km² to 16.3 km². On the level of satisfaction on electricity supply, the study revealed that majority (81.4%) of the respondents are dissatisfied with the service of the Abuja electricity distribution company while 18.6% are satisfied with their services. The study further revealed that majority (92.1%) of the respondents are dissatisfied with water supply and sanitary service in the town.

Keywords: Spatial Growth, Resident Perception, Infrastructural Development Satisfaction

Urbanization refers to the process by which rural areas become urbanized as a result of economic development and industrialization. Demographically, the term urbanization denotes the redistribution of populations from rural to urban settlements over time. The past centuries has witnessed a profound shift in the world's population distribution from primarily rural to increasingly urban, (Richard, 2002; Attah, 2014). In today's increasingly global and interconnected world, over half of the world's population (54 per cent) lives in urban areas although there is still substantial variability in the levels of urbanization across countries (United Nations, 2014); Owoeye and Obayomi, (2015). In the developing world, Africa has experienced the highest urban growth during the last two decades at 3.5% per year and this rate of growth is

expected to continue till 2050. Projections also indicate that between 2010 and 2025, some African cities will account for up to 85% of the population. Cities are perceived as places where one could have a better life; because of better opportunities, higher salaries, better services, and better lifestyles. The perceived better conditions attract poor people from rural areas. People move into urban areas mainly to seek economic opportunities (Bhatta, 2010).

Several studies have been carried out on urbanization and population growth, but majority of the studies focused primarily on Urban Expansion (Tokula and Ejaro 2017; Ukoje 2016; Kaifang *et al.*, 2016; Kavitha *et al.*, 2015; Alabi 2007), others centered on housing provision, cost and quality (Aribigbola, 2008; Aribigbola, 2009; Aderamo and Ayobolu, 2010; Aluko, 2010; Fatusin and Aribigbola 2013); several others looked at urbanization and public health system (Attah, 2014). However, only few documented studies have examined the resident perception on infrastructural development satisfaction (Fadairo and Taiwo 2009; Owioye and Obayomi, 2015). The study of Fadairo and Taiwo (2009) was an appraisal of government initiative and not an in-depth quantitative social survey research, thus this study make use of Population data, social survey and filed work to ascertain the different infrastructural provision and its adequacy. The development, spatial evolution and spatial organization of urban forms are major research themes in the urban studies and human geography communities. Urban infrastructure covers a wide range of services and facilities, namely road, drainage, waste disposal, electricity, schools, communication, water, primary health services, and housing as the key ones. Idah town saddles strategic roads and is the traditional headquarter of Igala kingdom, host to a Federal polytechnic and a school of health technology. There is therefore the need, to understand the spatial growth and resident satisfaction with urban infrastructural development.

STUDY AREA

Idah is located in the south – west of Kogi state on longitude 5° 45' East and latitude 7° 5' North. Idah is bounded to the north and west by Igalamela/Odolu local government, to the south by Ibaji local government and to the west by Agenebode in Edo state across the River Niger. The population of the study area is 64,320 persons (NPC 2006) with a landmass of 956.11 hectares. Idah falls between the tropical wet and dry climate base on Koppen's climate classification. The

climate of Idah is affected by two major air masses, the tropical maritime air mass and the tropical continental air mass; the two seasons is dictated by the movement of the two air masses. The wet season starts from March to middle November and the dry season in the other hand start from November to February. The dry season and the wet season are influenced by the prevailing winds, which are winds from the Sahara desert and Atlantic ocean respectively. Relative humidity is over 80% in the morning and about 50% in the afternoon. The mean annual temperature is over 27 °C.

The vegetation of the study area is predominantly guinea savannah type which is characterized by discontinuous canopy, shrubs and tall grasses giving the area a park appearance. The wooded savannah trees found in the area include economic trees such as locust bean, shear butter trees, timber, mahogany and obeche. Idah is predominantly an Igala speaking settlement, with the Igalas making over 80% of the population; other ethnic groups in Idah include Yoruba, Igbo, Hausa and Nupe. The economic activities people engaged in Idah ranged from primary to tertiary activities. Farming and fishing are important activities owing to its proximity to the River Niger. There are quite a number of small – scale industrial activities such as bakery, palm oil milling, block making, sachet water and soap making but lack of proper industrial development as the only sanitary ware industry established by the state is now moribund. Tertiary activities include; civil service workers in local, state and federal agencies in the town, transportation and telecommunication.

collected were geometrically corrected. The overall accuracy level of the Landsat TM (1987), Landsat TM (2001), Landsat ETM (2016) was found to be 91.79, 98.60, and 87.43 percent. imagery supervised classification was done by using maximum likelihood algorithm. A set of homogenous pixels were selected and algorithm was trained to classify the data based on 'training sites'. size, shape, location, number of pixels, number of training sites for a particular class, placement, and uniformity were some of the characteristics considered while assigning the training sites. Error of misclassification was rectified by manually re-coding the class after comparison with Google Earth imagery of the same date, wherever it was available. The final results of the classified imagery data were processed using ARC GIS (version 10.2) and Idrisi Software.

Field work and Questionnaire were employed for gathering requisite data on resident satisfaction with urban infrastructural development. A multi-stage sampling procedure was used for this study. The Idah town comprises of eight ward namely Ede, Ega, Ichala, Igalaogba, Igecheba, Sabon Gari, Ugwoda and Ukwaja Ward. Four wards were selected from the eight wards at random. Two communities were then chosen each from the eight wards using table of random numbers with efforts made to exclude rural areas because consideration for the assessment is giving to the urban areas. The total number of eight (8) communities selected were randomly sampled for questionnaire administration. The population of the study is 64,320 persons. In order to determine the exact number of respondents for the survey, the Yaro Yamane formulae of (1964) cited by Anatsui and Fagbemi (2014) for the determination of sample size was employed. The Yaro Yamane formula is expressed below:

$$n = \frac{N}{1 + N(e)^2}$$

Where N = Population of study location(s)

n = Sample size

e = Sample error (taken at 0.058 at 96% (confidence level))

A total of 215 questionnaires were administered. Data obtained from the questionnaire were analyzed statistically using frequency and percentages in order to assess the resident's perception on infrastructural development satisfaction.

DISCUSSION OF FINDINGS

Land use land cover change

The actual spatial urban growth and land use changes in Idah town that occurred from 1987 to 2016 are shown in Figure 2 and 3 respectively. These figures give a clear assessment and comparison of the results of spatial urban growth. The results showed that in 1987, farmland occupied 15.7km²; built-up 9.5km²; bare surface occupied 4.5km² and vegetation occupied 14.1km² while water body occupied 0.6km² of the total land area. In 2001, the farmland reduced to 14.7 km² making up 33.1% of the total land area; built-up increased from 9.5km² to 13.1 km² representing 29.5%; vegetation reduced to 7.5 km² representing 16.9%; bare surface increased to 7.3 km² covering 16.4%, while water body occupied 1.8km² representing 4.1% of the total land area. However, in 2016, farmland and vegetation land use continue to reduce in favour of the built-up, bare surface and the water body. The farmland reduced to 6.8 km² covering 15.3%; built-up increased to 16.3 km²; vegetation reduced to 5.7 km² and bare surface increased to 12.2 km², this shows that anthropogenic activities have consistently increased leading to the creation of more pave surfaces, a steady increase in anthropogenic land uses inevitably leads to a decrease in the other land uses. Water body also **increase** to 3.4km², the increase in the water body can be attributed to the dredging of river Niger. The changes observed in land uses mostly on the increase in built-up in the study period were attributed to the increase in infrastructural development, road construction and expansion of residential areas to meet the accommodation needs of students. Also, increase in human population and administrative structures resulted in the consumption of other land uses especially farmland that progressively decreased in size from 1987 to 2016. This result is consistent with the findings of Lakshmi, 2006; Rawat, Virekanand and Manish (2013); Etim and Dukiya (2013) and Nanda, Hajam, Hamid and Ahmed (2014) where loss in agricultural land was attributed to urban expansion.

Table 1: Land use/land cover

Land use type	1987 (km ²)	%	2001 (km ²)	%	2016 (km ²)	%
Farm Land	15.7	35.4	14.7	33.1	6.8	15.3
Vegetation	14.1	31.8	7.5	16.9	5.7	12.8
Built Up	9.5	21.4	13.1	29.5	16.3	36.7
Bare Surface	4.5	10.1	7.3	16.4	12.2	27.5
Water Body	0.6	1.3	1.8	4.1	3.4	7.7
Total	44.4	100	44.4	100	44.4	100

Source: Analysed Satellite Imagery 1987, 2001 and 2016

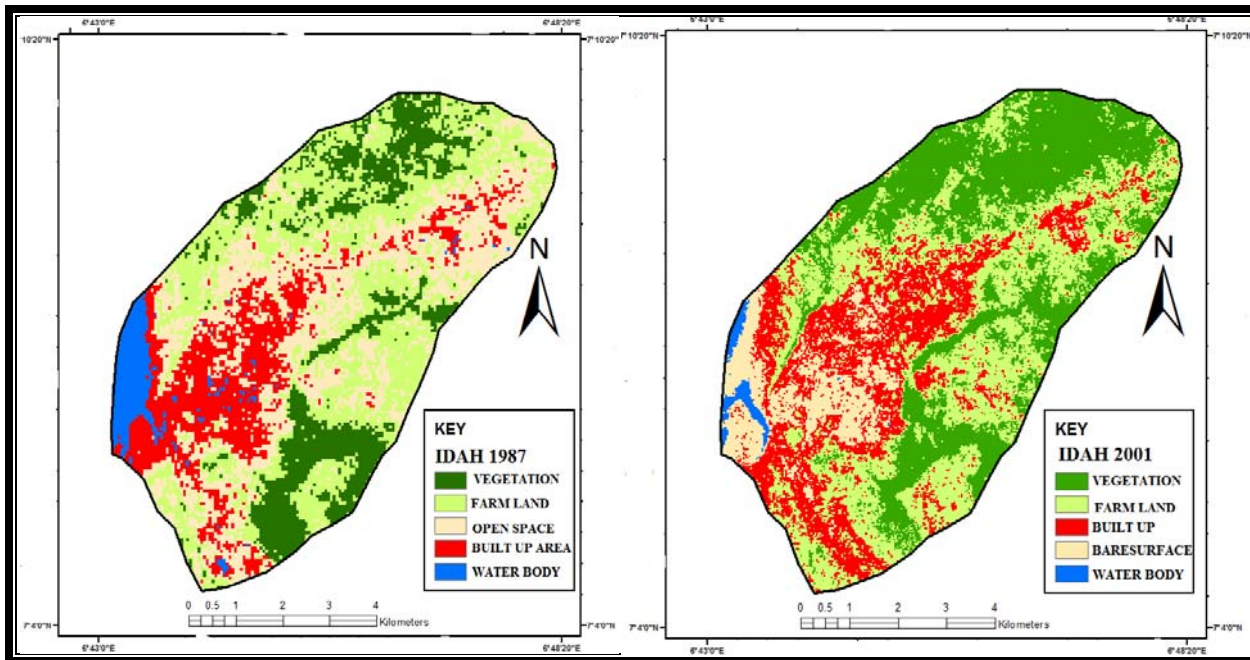


Fig. 2. Land use Land Cover Change of Idah
Source: Analyzed Satellite Imagery 1987

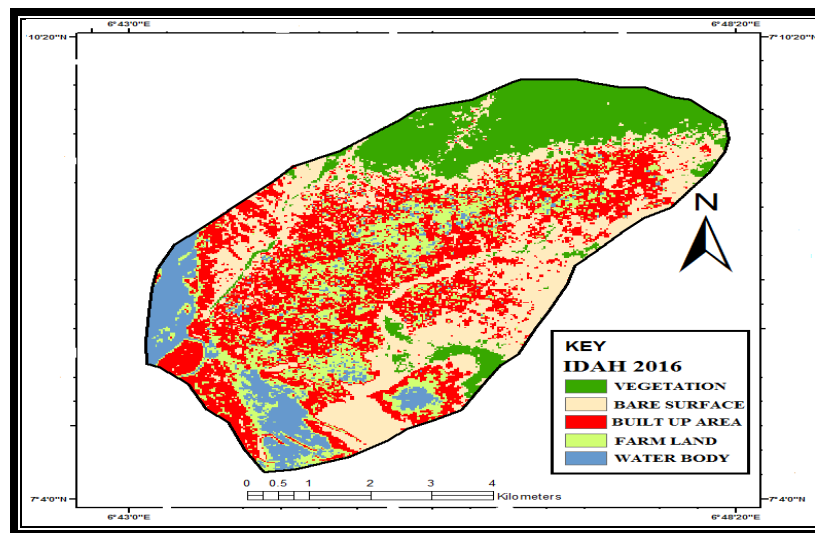


Fig. 3. Land use Land Cover Change of Idah
Source: Analyzed Satellite Imagery 2016

Levels of Households Satisfaction with Infrastructural Facilities

Infrastructural amenities play significant role in residential satisfaction of households in our urban areas. Cities have experienced an increase in demand for public services and for the maintenance and improvement of urban infrastructures (Barnes et al. 2001). The variables

included in this component for this study includes the government administrative offices, police station, post office, prisons, stadium, hospitals, patent medical stores/ pharmacy, communication network, court, banks, hotels/night clubs, shopping plaza, churches, mosques, burial ground, water works (government borehole), primary, secondary schools and tertiary institutions, fuel stations and market.

From Table 2, the study revealed that Idah town has 28 primary school, 18 secondary school and 3 Tertiary institution. The study also revealed that the town has 7 commercial banks, 4 communication network, 5 court, 15 fuel station, 32 patent and pharmacy shop, 10 private hospital and 1 government General Hospital. Thus this study want to see how satisfied the residents are with this infrastructural/ basic amenities.

Table 2: Infrastructural Facilities in Idah Town

S.NO.	INFRASTRUCTURAL DESCRIPTION	Numbers
1	Govt Admin offices	6
2	Primary Schools	28
3	Secondary Schools	18
4	Tertiary Schools	3
5	Police Stations	2
6	Post Office	1
7	Courts	5
8	Hospitals	11
9	Prisons	1
10	Stadium	3
11	Banks	7
12	Fuel Stations	15
13	Markets	2
14	Patent medical store/pharmacy	32
15	Communication network	4
16	Churches	42
17	Mosques	7
18	Hotels/ Night Clubs	8
19	Shopping Plaza	3
20	Burial Grounds.	4
Total		206

Source: Field survey, 2018

On the residents perception on level of satisfaction of educational institution, the study revealed that 30.2% (Table 3) of the respondents are very satisfied with the educational institution in the study area, 40.9% are satisfied with the educational infrastructural development, 21.9% are dissatisfied while only 7% are very dissatisfied. The result of the level of satisfaction of educational institution, which shows that majority (71.1%) of the respondent are satisfied is not surprising, study in table (2) further revealed that the study area is a host to two higher institutions, they are Federal Polytechnic Idah and Idah school of health technology, this institutions are known for high academic standard, 28 Primary schools and 18 secondary schools. However, the residents are more comfortable with the private nursery and primary schools in terms of high academic standard than that of government which are always marred with incessant strike action. The study is in agreement with a survey carried out by the World Bank (2002), which found that the Nigeria's infrastructure in terms of quality and quantity, is grossly inferior to that existing in other parts of the world.

Table 3 also shows the level of resident's satisfaction on health care infrastructures. The research revealed that on health care delivery, 17.2% of the respondents are very satisfied, 36.3% are satisfied, 32.1% are dissatisfied while 14.4% are very dissatisfied. It can be stated clearly that majority (53.5%) of the respondents are satisfied with health care delivery in the study area. It is worthy to note that the study also revealed that the study area has 11 Hospital (Table 2) that the residents of the area can access for their health issues.

Urban road transportation system is one of the important factors responsible for shaping the urban centres, based on the assumption that consumers rationally choose a form of transportation, according to their social and spatial position within the urban market. Majority (59.7%) of the respondents in the study area are satisfied with the means of transportation in the area. But on the level of satisfaction on road and drainage infrastructure, the study revealed that 7.4% are very satisfied, 19.5% are satisfied, 44.7% are dissatisfied while 28.4% are very dissatisfied, the result as presented in table (3), showed that majority (73.1) of the respondents are not satisfied with road and drainage infrastructure in the study area. Roads are commonly considered in modeling and forecasting urban sprawl (Yang and Lo 2003), because they are a

major catalyst of sprawl, so it is important to note that transportation amenities are fundamental to cities and its neighborhoods for the development of urban economy.

On the level of satisfaction on electricity supply, the study revealed that majority (81.4%) of the respondents are dissatisfied with the service of the Abuja electricity distribution company while a non significant percentage (18.6%) are satisfied with their services. The level of satisfaction on electricity supply is not surprising because from the interaction with the residents during the field work, the residents explained that the Abuja electrical distribution company only do give them light once in three days. Idah is part of the urban centres who make use of Geregu gas turbines station, efficiency and electric-power output of gas turbines vary according to the ambient conditions. The amount of these variations greatly affects electricity production, fuel consumption and plant incomes. However, the power sector in Nigeria over the years has been in a deplorable state due to inadequate maintenance of equipment, poor funding and inadequate infrastructural development, this has reduced the generation and distribution of electricity in the study area. This is in agreement with Sule, Ajao, Ajimotokan and Garba (2011) in their study on Compact fluorescent lamps and electricity consumption trend in residential buildings in Ilorin, Nigeria who revealed that the electricity demand in Nigeria far outstrips the supply, which is epileptic in nature.

The study further revealed that majority (92.1%) of the respondents are dissatisfied with water supply and sanitary service in the town. Easily accessible, potable, water supply is a prerequisite to good hygiene and sanitation, and hence, the general welfare of households. Just like Thuo (2013) reported in Kenya, the rapid urbanisation in Idah does not correspond with the availability of infrastructural facilities and social amenities. The World Bank report (1990) has established the link between infrastructure and poverty. According to World Bank (1990) access to at least minimal infrastructure services is one of the essential criteria for defining welfare. Consequently, the poor has been identified as those who are unable to consume a basic quantity of clean water and who are subjected to unsanitary surroundings with extremely limited communications which are beyond their immediate settlement. This study is in agreement with Oyesiku (1997) who opined that the pressure created by population growth from natural increase and migration on little investment in infrastructure and services in Nigerian urban areas is indeed so great that declines in quality and quantity of these are inevitable.

Table 3. Infrastructures and level of Respondents Satisfaction.

S/N	Variable	No. of Respondents	Percentage (%)
Health Care Delivery			
1	Very Satisfied	37	17.2
2	Satisfied	78	36.3
3	Dissatisfied	69	32.1
4	Very Dissatisfied	31	14.4
Road/Drainage Infrastructure			
1	Very Satisfied	16	7.4
2	Satisfied	42	19.5
3	Dissatisfied	96	44.7
4	Very Dissatisfied	61	28.4
Educational Institution			
1	Very Satisfied	65	30.2
2	Satisfied	88	40.9
3	Dissatisfied	47	21.9
4	Very Dissatisfied	15	7.0
Electricity/Power Supply			
1	Very Satisfied	08	3.7
2	Satisfied	32	14.9
3	Dissatisfied	84	39.1
4	Very Dissatisfied	91	42.3
Public Transportation System			
1	Very Satisfied	10	5.53
2	Satisfied	45	59.67
3	Dissatisfied	73	1.10
4	Very Dissatisfied	87	33.70
Water supply and sanitary services			
1	Very Satisfied	01	0.5
2	Satisfied	16	7.4
3	Dissatisfied	96	44.7
4	Very Dissatisfied	102	47.4

Source: Field Survey, 2018

Conclusion

The sustainability of the environment is a matter of necessity; urbanization must be complemented by the provision of basic infrastructures for it to be truly called a process that will bring life into any community. The spatial growth in the study area are not backed with corresponding investment in physical infrastructure such as water supply, though the town has water board but they are not functional, good roads, drainages, waste management systems and other public utilities. As a result of the lack of investment in these infrastructures and services. The study has shown that respondents are very satisfied with the educational institution in the

study area. Urban road transportation system is one of the important factors responsible for shaping the urban centres, based on the assumption that consumers rationally choose a form of transportation, according to their social and spatial position within the urban market, majority of the respondents in the study area are satisfied with the means of transportation in the area, but on the level of satisfaction on road and drainage infrastructure, the study showed that majority of the respondents are very dissatisfied with road and drainage infrastructure in the study area.

There is therefore need for Non Governmental Organizations, Community Based Organizations and other private individuals that are interested in the provisions of infrastructures to be involved in the process of the provision of infrastructure.

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