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## **Comparative Analysis of Urban Environmental Challenges in Minna and Suleja, Niger State, Nigeria**

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### **ABSTRACT**

The fast rate of urban growth has brought an increased pressure on the available facilities and services beyond the reach of an average urban dweller and this is not without negative consequences. This study aimed at comparative analysis of the challenges of urbanization in Minna and Suleja. Landsat imageries of 1995, 2005, and 2015 of Minna and Suleja were classified and used to compare the changes in land use in Minna and Suleja. Population density ratio was used to compare the rise in population and its density in the study area. Likert scale was used to compare the level of effect of the identified challenges in the study area, this also measured and compared the living condition in the study area. The result shows that the increase in the growth of the built-up area in Minna at 6.70% in 1995 to 34.85% in 2015 is faster than in Suleja at 3.84% in 1995 to 17.32% in 2015, which implies that Minna has grown more than Suleja. The density of population in Suleja is rising faster than that of Minna over the years of study, with Suleja having a density of 11,161.93/km<sup>2</sup> and Minna with a density of 10,202.84/km<sup>2</sup>. The analysis of the urban challenges showed that the urban problems are more intense in Suleja than in Minna with Suleja falling between the scale of 1–1.5 (bad) and Minna between the scale of 1.51–2.4.9 (fair). Finally, the living standard in Minna is better than Suleja with Minna falling between the scale of 2.51–3.49 (good) and Suleja between the scale of 1.5–2.49 (fair). The research generally reveals that Suleja is exposed more to urbanization challenges than Minna. It is recommended that a metropolitan management board should be introduced to enforce the use of the master plan

**Keywords:** Comparative, Analysis, Urban, Environmental Challenges

### **1. INTRODUCTION**

Our world presently is faced with social transformation; villages are fast growing into towns and towns into cities. This transition is such that one can hardly differentiate between the livelihoods of most towns from cities where development is the order of the day. It is therefore necessary to assess the impact and rates at which areas develop in order to derive strategies for conservation and exploitation of resources, especially as it concerns the land. Many peripheral areas around the urban centres are rapidly assuming most characteristics formerly associated with urban settlement, thus, the difference between urban areas and rural areas have become so open to the point that a large number of town planners and geographers believe that it will be hard to distinguish between the two (Okafor & Onokerhoraye, 1986) as referred to by (Owoeye, 2013).



Minna and Suleja have attained a huge level of development, as is the case with most parts of Nigeria, and all over where it has been evaluated that Nigeria in particular, has one of the noteworthy city development rates. Having urban communities placed among the many fast developing on the earth. The nation is not just the fastest urbanization; its experience has additionally been unique in scale. This process has induced a huge array of city centres (Oladunjoye, 2005); this has resulted in the development of cities with major problem of poor quality of living, which has led to the deterioration of the environment. (Ajala, 2005; Jiboye, 2009). Nevertheless, considering that the degenerating state has hindered developing nations and thus influenced the fiscal, social and national development (Ogunleye, 2005). By this, the developing world faces a noteworthy number of challenges, which is the approach wherein to adapt to the expanding urbanization and its attendant undesired results on the city communities' environment and additionally the overall wellbeing of the entire populace (Jiboye, 2011).

The emergence of Minna and Suleja as ancient towns has attracted rural dwellers and other merchants and the proximity of Suleja to the federal capital territory have resulted to an increased population. It is not surprising to watch as the demographic weight, brings on an extraordinary demand for land space. As an aftereffect of the demand created by the interest in land space, most undeveloped areas generally assumed control by rural migrant to fulfil their urban land needs. This attack as a rule prompts uncontrolled and disorderly improvement, while such neighbourhoods/groups need essential infrastructural facilities. The fast rate of improvement likewise brings about tumultuous advancement inside these same zones. It is against this foundation that we need to look at the relative difficulties of urbanization in Minna and Suleja, Nigeria.

The fast rate of urban growth comes with a smearing effect that changes the face of happenings within societies. The increased level of urbanization and increased population growth has propelled housing problem that has become a battle for countries at varying levels of severity (Omole, 2000; Owoeye, 2010). These manifest a series of urban problems including overcrowding, slums and the development of ghettos that have psychological, environmental, cultural and social impacts affecting the urban built environment.

The pressure of urban growth has brought an increased pressure on the available facilities and services among urban dweller. This presents them with the option of living in the fringes of towns (Olotuah, 2012). It has further propelled the movement from rural to urban centres, to influence rapid population growth in urban centres.

Minna and Suleja are ancient towns that have grown over time to serve as local government headquarters as well as a centre of trade and commerce. These two have attracted a lot of people into their domain and as well resulted into their immense growth. Zubairu & Adedayo (2013)



revealed that Suleja is a satellite Town of Abuja, Federal Capital of Nigeria, made up of three Local Governments, Suleja, Tafa and Gurara contributing about 80% (6,400 km<sup>2</sup>) of the total area of FCT. Development in these towns is now toward the urban fringe where unplanned settlements are coming up, with little or no facilities and services to meet the need of the households. Osuide & Dimuna (2005) also identified urbanisation to be the development of a country without adequate supply of housing, infrastructure and amenities. The quality of living is below standard and in a deplorable condition, living the inhabitants and the environment in great danger.

The location of Minna and Suleja and their built-up has attracted a huge number of persons especially from the low class of the society into the urban area has again contributed to the rising pressure on the available housing. Morenikeji *et al.* (2015) reveals the remarkable growth of Minna that is influenced by its position as the capital of Niger State while Suleja is a local government in Niger State and also serves as a satellite Town to Abuja the Federal Capital of Nigeria. Housing quality in Nigerian towns is influenced by the impact of urbanisation on the environment of the urban built environment.

The study was therefore aimed at having a comparison of the challenges of urbanization that are faced in Suleja and in Minna. with the objectives of examining the changes in land use of Minna and Suleja in the past twenty years, examine the population density ratio and identify urban challenges in the area of study (Suleja and Minna).

## **1.2. Study Area**

Minna is linked up to all parts of the country by road, FCT, is only 150km away. Minna is also linked up with Kano and Ibadan and Lagos by rail. Minna lies on latitude 9° 37'N and 9° 49' N, longitude 6° 37'E and 6° 50' E respectively, seated on a substantial vault of cellar of idiosyncratic ornament push which is product of gneiss and magnitude to the north (fig 1a) (Minna grasp Plan, 1980).

Suleja on the other hand is a major settlement in Niger state located north of the FCT, Suleja emirate lies between latitude 9° 6' 13.8 " and 9° 17' 49.35 "N of the equator and longitude 7° 6' 58.6 and 7° 12' 18.41 "E. It has a territory of 136.33 sq. Km, with a total populace of round (635,314 individuals) as at 2012. Suleja most times is taken as part of Abuja because of its closeness and also because of its initial name as Abuja before the Nigerian government adapted the name as the name of its capital 1976. Suleja Emirate is constituted of three nearby Governments, to be designated Suleja, Tafa and Gurara. In spite of everything, the social and fiscal influence of Suleja city covers the two different regional governments (fig 1b).



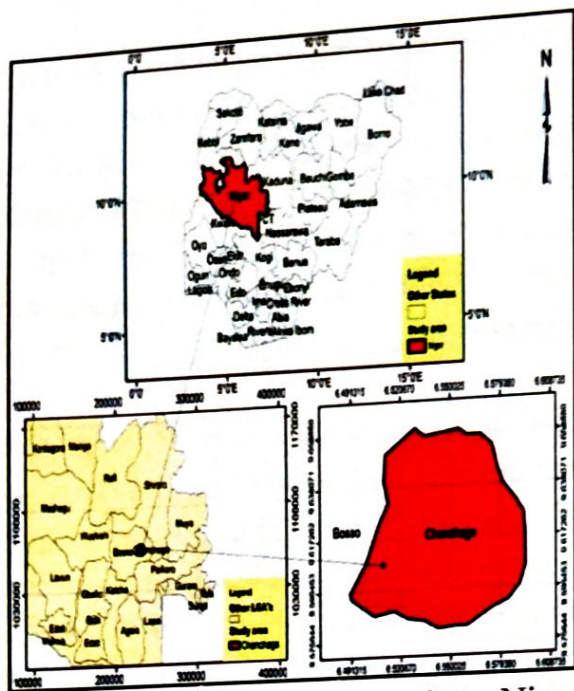


Figure 1a: The Study Area (Minna, Niger State)

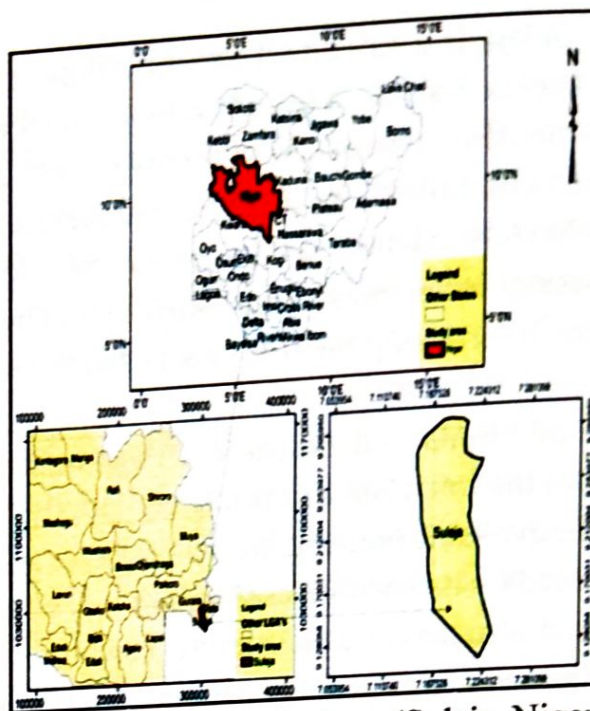


Figure 1b: The Study Area (Suleja, Niger state)

## 2. METHODOLOGY

The primary sources of data used were obtained from resident of Minna and Suleja using questionnaire to give feeders of the feelings about the environment in which they live. The secondary data used were remote sensing satellite imageries downloaded from Global Land Cover Facility (GLCF). The data was used to assess the changes in land use over the period of study 1995 to 2016 by classifying each of the satellite image into different land cover. Also primary data was collected from the Nigerian Populations Commission to project the population growth and also its density in the town over the period of study. Simple random sampling was used to take opinion of the sampled population in the study area. The population of the 1991 and 2006 where collected as base years to project the population of Minna and Suleja over the period of study. It was divided by the projected growth of the town to give us the population density on the available land in Minna. The information gotten from the questionnaires were assessed using likert scale and at the end, the results were presented on maps and tables.

## 3. RESULTS AND DISCUSSION

### 3.2. Land use change in Minna from 1995 to 2016

Figure 2 present the land use maps of Minna between 1995 and 2016 and table 1 shows the percentage land cover. From figure 2, the Built-up area had changed from 4.85km<sup>2</sup> (6.70%) in 1995 to 11.98km<sup>2</sup> (12.57%) in 2006, farmland reduced from 52.24km<sup>2</sup> (72.17%) in 1995 to 37.61km<sup>2</sup> (51.97%) in 2006, vegetation surface increases from 11.39km<sup>2</sup> (15.74%) in 1995 to 13.66km<sup>2</sup> (16.55%) in 2006 and bear ground increased from 3.90km<sup>2</sup> (5.38%) in 1995 to 37.61km<sup>2</sup> (18.87%) in 2006



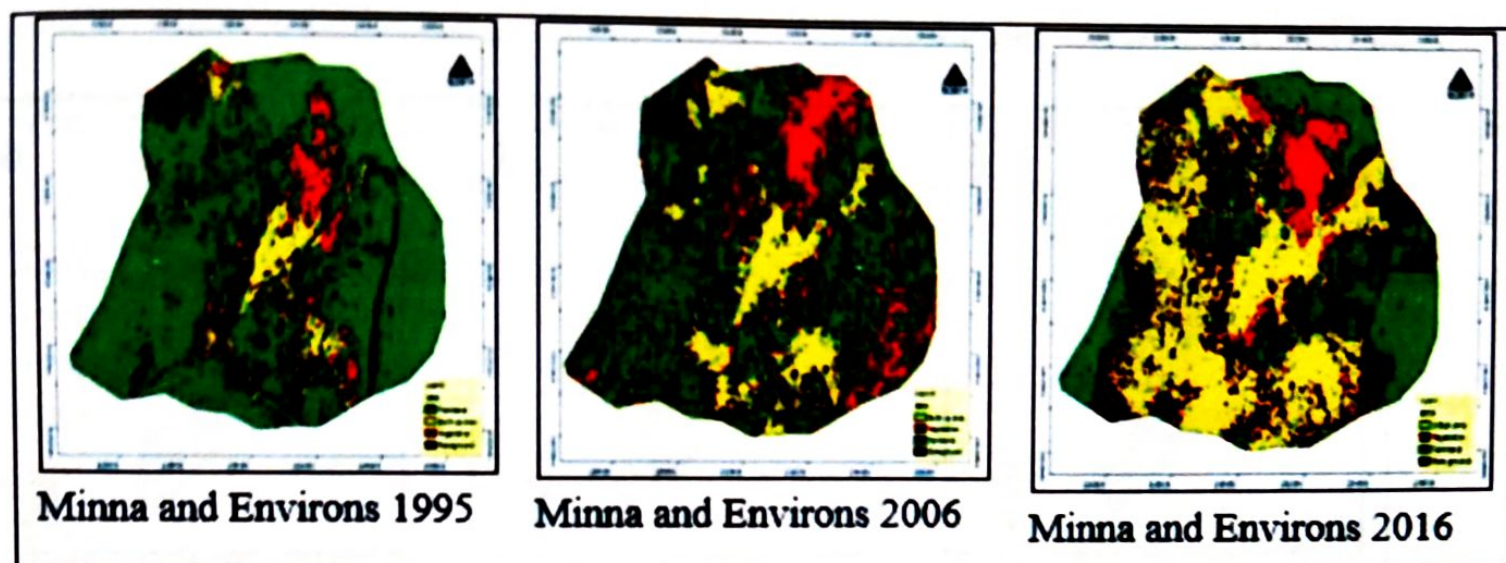


Figure 2: The land use change in Minna within the period of study (1995 - 2016)

Table 1: Land use/ land cover change in Minna and Environs from 1995 to 2016

Features	Area		Area		Area (%)	
	(sq/km)	(%)	(sq/km)	(%)	(sq/km)	(%)
	1995		2006		2015	
Farmland	52.24	72.17	37.61	51.97	21.40	29.57
Built up area	4.85	6.70	11.98	12.57	25.22	34.85
Bare ground	3.90	5.38	37.61	18.87	20.03	27.68
Vegetation	11.39	15.74	13.66	16.55	5.70	7.87
<b>Total Area</b>	<b>72.36</b>	<b>100</b>	<b>72.36</b>	<b>100</b>	<b>72.36</b>	<b>100</b>

Table 1 reveals an increase in the built up area from 11.98km<sup>2</sup> (12.57%) in 2006 to 25.22km<sup>2</sup> (34.85%) in 2016, farmland decreased from 37.61km<sup>2</sup> (51.97%) in 2006 to 21.40km<sup>2</sup> (29.57%) in 2016, vegetation decreased from 13.66km<sup>2</sup> (16.55%) in 2006 to 5.70km<sup>2</sup> (7.87%) in 2016 and bare land increased from 37.61km<sup>2</sup> (18.87%) in 2006 to 20.03km<sup>2</sup> (27.68%) in 2016. Figure 4.5, Figure 4.6, figure 4.7 and figure 4.8 further shows that in between the period of study, there has being a change in landuse in Minna.

### 3.3. Landuse change in Suleja from 1995 to 2016

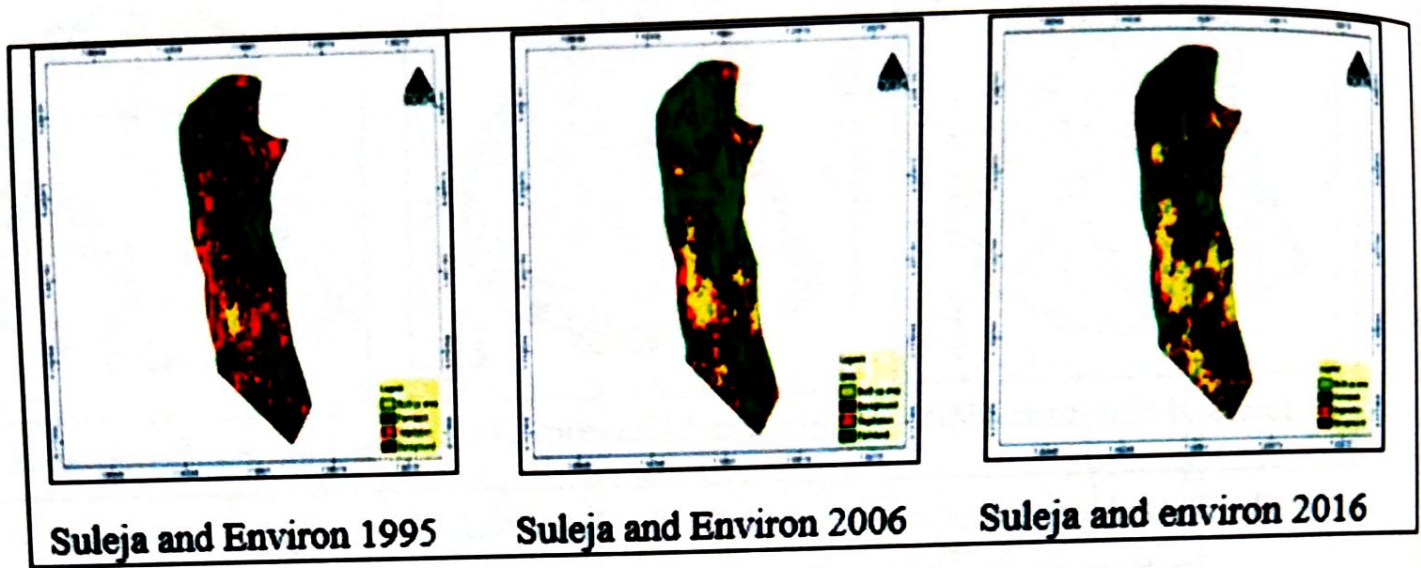


Figure 3: The landuse change in Suleja within the period of study (1995 - 2016)

Table 2: Landuse/ land cover change in Suleja and Environ from 1995 to 2016

Features	Area		Area		Area	
	(sq/km)	(%)	(sq/km)	(%)	(sq/km)	(%)
	1995		2006		2016	
Farmland	74.32	62.49	65.66	55.20	43.33	36.43
Built up area	4.57	3.84	11.85	9.96	20.60	17.32
Bare ground	8.83	7.42	13.88	11.67	42.26	35.53
Vegetation	31.20	26.23	27.54	23.15	12.77	10.73

### 3.4. Landuse/ land cover change in Suleja and Environ from 1995 to 2015

Table 2 reveals that the trend in Land use differs from 2005 to 2016 as shown in table 2. Vegetation still maintained its lead with area coverage of 12.77km<sup>2</sup> (10.73%), a decrease in farmlands to 43.33km<sup>2</sup> (36.43%). Built up land category increased by 6.63% occupying 20.60km<sup>2</sup> (17.32%) of the use of land. Bare land category increases with physical development increase to 42.26 km<sup>2</sup> (35.53%). A critical look at figure 3 further shows that there are changes in land use over the period of study in Suleja.

### 3.5. Population density ratio across the study area and its effect on available housing

The number of inhabitants in Minna and Suleja has encountered a remarkable development because of the movement and common expands (1991 to 2014; NPC, 2014). This has opened up shifted human exercises connected with area utilized, for example, developments and designing works, financial and other business exercises and urban extension. This can be seen from the expansions saw in the unfaltering ascent in developed area of Minna and Suleja land use map.



**Table 3: Population Density Ratio of Minna from 1995 to 2016**

<b>Year</b>	<b>Minna Populatio n</b>	<b>Minna Land Area (km2)</b>	<b>Populatio n Density</b>	<b>Suleja Populatio n</b>	<b>Suleja Land Area (km2)</b>	<b>Population Density</b>
1995	158648	4.85	32710.93	166941	4.57	36529.76
1996	162566	5.87	27694.38	171097	5.59	30607.69
1997	166582	6.89	24177.36	175358	6.61	26529.2
1998	170696	7.92	21552.53	179724	7.64	23524.08
1999	174912	8.94	19565.1	188785	8.66	21799.65
2000	179232	9.96	17995.18	193485	9.69	19967.49
2001	183659	10.99	16711.46	198302	10.71	18515.59
2002	188195	12.02	15656.82	203240	11.74	17311.75
2003	192843	13.04	14788.57	208300	12.76	16324.45
2004	197606	14.06	14054.48	213487	13.79	15481.29
2005	202487	15.09	13418.62	218803	14.81	14774
2006	207488	16.11	12879.45	224251	15.83	14166.2
2007	212612	17.13	12411.68	229835	16.88	13615.82
2008	217863	18.16	11996.86	235557	17.90	13159.61
2009	223244	19.18	11639.42	241423	18.92	12760.2
2010	228758	20.21	11319.05	247434	19.95	12402.71
2011	234408	21.23	11041.36	253595	20.97	12093.23
2012	240197	22.25	10795.37	259910	22.00	11814.09
2013	246130	23.28	10572.59	266381	23.02	11571.72
2014	252438	24.30	10388.40	273014	24.05	11351.93
2015	258438	25.33	10202.84	279812	25.07	11161.23

This study largely corroborates other similar studies on the impact of urbanization on land use and land cover changes in Nigeria and other parts of the world (Mashi & Alhassan, 2004). Population density was calculated for both Minna and Suleja; it was observed from Table 3 that the density was in a progressive pattern, Density of Suleja ranges from 7.04 km in 1995 to 17.09 km in 2012 and population density between 15,244 and 18,826. Minna also followed a similar pattern with 9.7km in 1995 to 35.2km in 2012



### 3.6. Assessing the living condition of residents in the study areas

Table 4: Consensus Opinion of Respondents in Minna

Infrastructural Facility and services	Sum	Mean score	Interpretation
Proximity to Health Facilities	1169	3.3	Good
Proximity to School	1186	3.8	Very Good
Housing	1097	3.1	Good
Proximity to Market	1049	2.9	Good
Availability of water supply	851	2.4	Fair
Electricity Supply	725	2.0	Fair
Refuse disposal and collection	1131	3.2	Good
Drainage facilities	1125	3.2	Good
Good Road Network	949	2.7	Good
Street lighten	953	2.7	Good

The following were used as a scale of measurement for the opinions:

- Bad = 1 – 1.5
- Fair = 1.51 – 2.49
- Good = 2.50 – 3.49
- Very Good = 3.50 – 4.49
- Excellent = 4.50 And Above

From the table 4, the consensus opinion of the respondents shows that the living condition of houses in Minna is good. This is because the scale shows that the conditions of these facilities that support the quality of housing mostly are on the average condition and thus they derive good value from them. This implies that housing is at a good level condition. Based on the analyses, two neighbourhood (Barikin Sale and Maitumbi) within Minna were sampled based on the availability of basic facilities available for the residents of the area.

The following scale of measurement was used to interpret the Table 5:

- Bad = 1 – 1.5
- Fair = 1.51 – 2.49
- Good = 2.50 – 3.49
- Very Good = 3.50 – 4.49
- Excellent = 4.50 And Above



Table 5: Consensus Opinion of Resident of Suleja

<b>Infrastructural Facility and services</b>	<b>Sum</b>	<b>Mean score</b>	<b>Interpretation</b>
Proximity to Health Facilities	955	2.3	Fair
Proximity to School	980	2.4	Fair
Housing	819	2.0	Fair
Proximity to Market	1348	3.3	Good
Availability of water supply	860	2.1	Fair
Electricity Supply	969	2.4	Fair
Refuse disposal and collection	950	2.3	Fair
Drainage facilities	1132	2.8	Good
Good Road Network	856	2.1	Fair
Street lighten	634	1.5	Fair

Therefore, the respondent consensus opinion in Suleja on the living condition of houses in Suleja is fair. This is because the scale shows the level of satisfaction or the condition of this facilities that support the quality of housing mostly are not in proper condition and thus they derive fair value from them. This implies that housing is at a fair level condition.

From the consensus opinion on table 4 and table 5 in comparison shows that the living condition of houses in Suleja and Minna are on two different levels. Suleja is on a fair level and Minna on an average level (Good). Which means that Suleja is faced with more urbanization challenges that affect the living condition and the satisfaction from these facilities and services than Minna.

### **3.7. Implication of the Findings**

The statistical results obtained from the analysis on Landsat imagery of the selected area revealed that, the built up areas has increased. This growth extends to the core area of Minna and Suleja being impacted posing a threat to limited available resources in the areas.

The study revealed that increase in the built up areas is as a result of the increased level of migration from the rural areas. As a result of this development in the built environment, a lot of new buildings are springing up. To meet this increasing need, a reasonable amount of arable farmland has been converted to other uses.

The study also indicates that the peri-urban areas of Suleja is experiencing deficits in infrastructural provision needed for healthy and sustainable and where they are available, they seems not to be adequate in terms of their spatial distribution, distance to facility or service radius when related with space standards and functionality.

The result of the investigation into the problems faced by peri-urban life includes insecurity of tenure, insecurity of life and properties, low or no access to public infrastructure and poor physical growth.



#### 4. CONCLUSION

It has clearly shown from the study that the nature, pattern and rate of land use in both Minna and Suleja Local government areas of Niger state has changed over the years. The research shows that urbanization remains largely responsible significantly to the changes and modifications in the use of land and its cover in Minna and Suleja. The study revealed that there is a significant growth in the areas covered by built up land, farm lands and bear ground with a decline in vegetation cover due to massive changes as a result of the increased human population in the area which is a factors that have greatly influence the increased pressure on land and other environmental resources and even the loss of adaptive capacity for production which ultimately lead to the change in the social attitude. The effect of these changes on the physical environment calls for concern and the need to speed up measures for sustainable development to avoid serious environmental degradation.

#### 5. RECOMMENDATION

- It is recommended that a metropolitan management board should be introduced to enforce the use of the master plan
- There should be a constant monitoring of urban growth and changes in land use/land cover consequent on urbanization and put in place appropriate response mechanism in line with the towns and regional master plan.
- The increasing density ratio calls that the government should put in place an effective development plan to cater for the increasing population.
- There should be an improvement in environmental planning and education to help tackle the increasing urbanisation challenges.
- The government should have a proper projection in providing social amenities to meet the need of its citizens.

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