EVALUATION OF SPATIAL GROWTH DYNAMICS IN THE PERI-URBAN RESIDENTIAL NEIGHBOURHOODS IN MINNA, NIGERIA.

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ABSTRACT

Spatial development of the peri-urban had been attributed to the challenges confronting the cities in the areas of housing, infrastructure provision and unemployment. This study examined the rate of spatial development at the peripheral residential neighbourhoods of Minna, Niger State. Cluster sampling technique was employed for selection of suitable Peri-urban residential neighbourhood sites within Minna metropolis. Four sets of satellite imageries obtained were used; that is, the Thematic Mapper for 1986, the Enhance Thematic Mapper plus for 1996, the Enhance Thematic Mapper plus for 2006 and the Enhance Thematic Mapper plus for 2012, five (5) spatial growth dynamics (Bare-Land, Built-up, Disturbed Vegetation, Undisturbed Vegetation and Water body) were evaluated within the study area between 1986 – 2012. Results obtained revealed vividly the emerging role of peri-urban in city expansion. Proper planning and management of bare surfaces, investment in mass housing projects and preservation of agricultural land were recommended for easy integration of the peri-urban into the city fabrics and for the achievement of the desired sustainable development.

Keywords: *Peri-Urban, Spatial-Growth, Image Classification, Clustering Technique and Geospatial Techniques.*

INTRODUCTION

In consonance with predicted acceleration in growth rate of cities which is mainly characterized by increased built-up areas in urban cities and a reduction in open spaces/forest areas (United Nations, 2004; Haub, 2007; Hardoy, Mitlin, and Satterthwaite, 2001) as a result of natural increase in urban population, net rural-urban migration (Firoz, 2004) and global economic integration (Cohen 2004); the socio-physical menace of such inorganic expansions (Pacione, 2005; Oladapo and Olotuah**,** 2007) continue to increase to worrisome level.

The Nigerian urban centres are faced with rapid growth and development, which contribute to land use change(Fabiyi, 2006). These cities are witnessing high rate of environmental deterioration and are rated among urban areas with the lowest livability index in the world; with only about 20% - 30% of the Nigerian urban population enjoying decent urban life (Adedeji and Eziyi, 2010) and between 52% and 70% living in poverty using nationally defined poverty lines; while a staggering 70% live in slum conditions (UNDB Report, 2009).

Minna and virtually all other urban areas of Niger State are currently experiencing uncontrolled and unplanned growth; most especially at the urban fringe. The most visible evidence of this development is the large and rapidly growing informal and squatter settlements at the peripheral areas. Research has shown that over 70% of the population of Minna lives in slums and squatter settlements (Niger State Government, 2009a).

This study seeks to observe the rate of spatial growth in the peripheral residential neighbourhoods of Minna.

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JUSTIFICATION OF STUDY

Much attention has been drawn to the concepts of peri-urban interface in recent times due to the rapid growth being experienced by the city which has in turn create increase in demand for land in the urban fringe. This development has drawn the attentions of researchers to the impact of urban growth on the peri-urban region.

Some earlier research efforts on peri-urban area include: Peri-urban agriculture, Livelihood and poverty (Mandere, Ness and Anderberg, 2010 and Olayiwola, 2013), spatial growth and land use dynamics of peri-urban areas (Fabiyi, 2006), Spatial growth of Minna (Adamu, 2012; Morenikeji, 2013), impact of city growth on vegetation and livelihoods of peri-urban dwellers (Musa, Usman and Isaiah, 2013). However, not much has been done on assessment of spatial growth at the Minna peripheral residential areas. It is based on these identified gaps that this study sets to examine the rate of spatial development in the peri-urban residential areas of Minna.

AIM AND OBJECTIVES

The aim of this study is to assess the rate of spatial development in the peripheral residential neighbourhoods of Minna, Niger State. To achieve this aim, the specific objective is to:

1. Examine the rate of spatial growth of peripheral residential neighbourhoods in Minna, between 1986 and 2012.

STUDY AREA

Minna is located on Latitude 9°37' North and Longitude 6°33' East and occupies a land area of about 884 hectares (Maxlock, 1979). Minna is encapsulated by the Bosso Local Government Area. It is about 145 kms by road from Abuja, the Federal capital of Nigeria. The Minna metropolis has grown to engulf suburb settlements such as Bosso, Maitumbi, Dutsen Kura, Kpakungu Shango and Chanchaga. Maxlock (1979) opined that, Minna is underlain by homogeneous basement complex of mainly gneiss and magnetite. The north eastern part of the city is characterized by a more or less continuous steep outcrop of granite which limit any urban expansion in that direction.

METHODOLOGY

Geospatial techniques were employed in determining the spatial growth of the slums areas under study. Four different years were considered for the study (1986, 1996, 2006 and 2012) and four sets of satellite imageries were obtained for the years in question that is, Thematic Mapper for 1986, Enhance Thematic Mapper plus for 1996, Enhance Thematic Mapper plus for 2006 and Enhance Thematic Mapper plus for 2012. All the imageries were gotten from the National Centre for Remote Sensing; Jos. Table 1 shows the properties of the imageries acquired.

Table 1: Summary of Satellite Images Used

S/No	*Image year*	*Date Captured*	*UTM Zone*	*WRS Path and Row*	*Data set*	*Spatial Resolution (m)*
1	Minna 1986	27-12-1986	31N	P189 R53	TM	30 meters
2	Minna 1996	16-11-1996	31N	P189 R53	ETM^+	30 meters
3	Minna 2006	31-09-2006	31N	P189 R53	ETM^+	30 meters
4	Minna 2012	22-09-2012	31N	P189 R53	ETM^+	30 meters

Source: Author, 2014

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Employing the ArcGIS 10.0 software all relevant image pre-classification tasks such as image geo-referencing, shape file creation (for each zone) and vector to raster clipping of the created shape files on the image were performed .

The image bands being in TIFF Format were then imported into the ILWIS 3.3 Academic software where the bands (4, 3 and 2) of the imageries were combined therein creating false colour composites that will enhance easy discrimination of built-up area and other feature classes of interest prior to definition of the training sets regions to be used in the classification process.

"Training sets" were created on all the imageries imported on ILWIS 3.3 Academic software; and they include: Built-up area, Water body, Disturbed Vegetation, Undisturbed Vegetation and Bare surface (Table 2). The training sets were subjected to a supervised (full Gaussian) Maximum Likelihood Classification.

Table 2. Feature Classes considered during image classification

S/N	*Classification*	*Description*
1	Bare Surface	Includes vacant unimproved lands.
2	Built-up area	Comprises of all residential, commercial and industrial areas, village settlement and transportation infrastructure which reveals evidence of development.
3	Disturbed Vegetation	Vegetation distorted by human activities and comprises of all agricultural activities and semi nature vegetation such as trees, shrub land deciduous, coniferous and mixed forests, palms, orchids, herbs, gardens and grasslands.
4	Undisturbed Vegetation	Comprises of land affected by minimal human activities of which the forest canopy is still maintained.
5	Water body	River, permanent open water, lakes, ponds, streams, canals and reservoirs.

Source: Adapted from ILWIS 3.3 Academic software, 2014.

Sampling Procedure

Cluster sampling technique was adopted in the selection of sample areas for the study. The study interest being the peripheral residential neighbourhoods surrounding Minna Town were zoned into three clusters namely; South-West peripheral, North-West peripheral and North-East peripheral zones with each zone representing a cluster.

Two neighbourhoods were randomly selected within each cluster (zone) to ensure equal representation from each zone. The selected neighbourhoods formed the sample areas for this study. Barkin-Sale and Shango were selected from the South West while Fadikpe and Dutsen-kura (Gwari) were selected in the North-Western zone and the North-Eastern zone has Bosso and Maitumbi (Table 3.0 and Figure 1). Two neighbourhoods (Bosso Estate and Army Barracks) were exempted from the random sampling exercise because these neighbourhoods are pre-planned before development.

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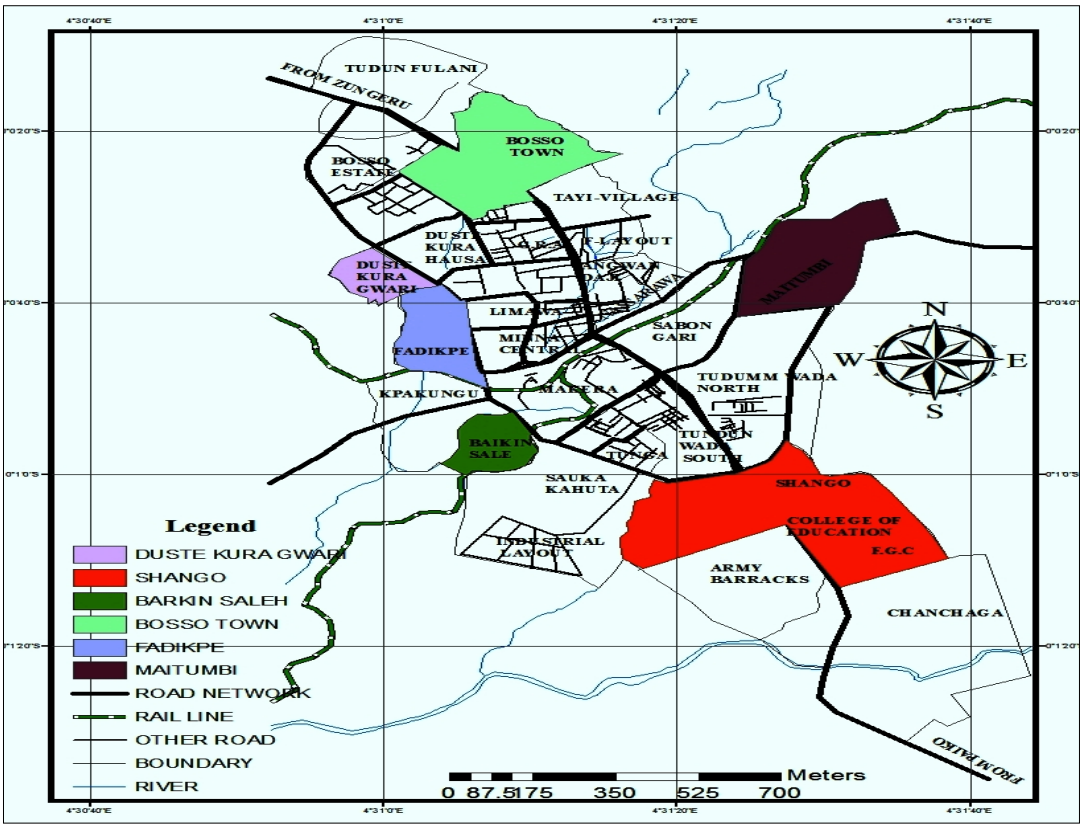

Figure 1: Sampled Peripheral Residential Neighbourhoods in Minna.

Source: Author, 2014.

Table 3. Sampled Peripheral Residential Zones

S/N	*ZONES*	*NEIGBOURHOODS*
1	**South-West**	**Barkin-Sale** and **Shango**.
2	**North-West**	**Dutsen-Kura (gwari) and Fadikpe**.
3	**North-East**	**Bosso** and **Maitumbi**.

Source**:** Field Work, 2014.

RESULTS

Presented in this section in graphical and tabular view is the result obtained from the classification for each of the features under study. Each feature presented individually in sub-sections 6.1 – 6.4 (Tables 4 – 13 respectively).

Analysis of Changes in Bare Surface Area in Minna Peri-Urban

The image analysis reveals that bare surfaces in the selected neighborhoods under study increases and decreases in area coverage over the study period. A leap-frog pattern of change in the bare surface was discovered in Dutsen Kura, Barkin Sale, Maitumbi and Shango neighborhoods. This pattern was characterized mainly by a mixture of both increases and decreases in bare surface within the study areas. Table 4 shows the area covered by the changes (in km^2) over the years; continuous decreasing pattern was observed in Fadikpe and Bosso neighborhoods (Table 4).

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Bare surface area decreased in three neighborhoods (Fadikpe, Barkin-sale and Bosso) and increased in the other three selected neighborhood (Dutsen-kura, Shango and Maitumbi). Shango gained the highest land coverage in bare surface area with a percentage increase of 561.5%; while the highest loss in bare surface area was experienced in Barkin-sale with a percentage decrease of 98.1% (Table 4).

Table 4: Bare Surface Areas in Minna Peri-urban Neighborhoods (1986-2012)

SN	*Neighbourhood*	*Area in Km^2 1986*	*Area in Km^2 1996*	*Area in Km^2 2006*	*Area in Km^2 2012*	*Percentage Change (1986-2012)*	*Remark*
1	Dutsen-kura	0.40	0.85	0.36	0.59	47.5	Increase
2	Fadikpe	0.76	0.22	0.31	0.37	51.3	Decrease
3	Barkin-sale	1.59	0.17	0.43	0.03	98.1	Decrease
4	Shango	1.69	1.19	1.69	11.18	561.5	Increase
5	Bosso	3.12	2.07	1.92	1.40	55.1	Decrease
6	Maitumbi	1.96	1.68	0.29	7.67	291.3	Increase
	TOTAL	9.52	6.18	5.00	21.24	123.11%	

Source: Author, 2014.

Four neighbourhoods lost bare surface areas to other uses between the years 1986 and 1996. Amongst all the selected neighbourhoods, Bosso suffered a continuous loss in bare surface area throughout the study period. The highest increase in bare surface area in Minna peri-urban was noticed in Shango within the study period with an area increase of 9.49km^2 (Table 5)

Table 5.0: Magnitude of Change in Bare Surface Areas of Minna Peri -urban Neighbourhoods

SN	*Neighborhood*	*Magnitude of Change (km^2) 1986 – 1996*	*Magnitude of Change (km^2) 1996 – 2006*	*Magnitude of Change (km^2) 2006 – 2012*	*Magnitude of Change(km^2) 1986 – 2012*
1	Dutsen-kura	0.45	-0.49	0.23	*0.19*
2	Fadikpe	-0.54	0.09	0.06	*-0.39*
3	Barkin-sale	-1.42	0.26	-0.40	*-1.56*
4	Shango	-0.50	0.50	9.49	*9.49*
5	Bosso	-1.05	-0.15	-0.52	*-1.72*
6	Maitumbi	-0.28	-1.39	7.38	*5.71*

Source: Author, 2014.

Analysis of Changes in Built-Up Area in Minna Peri-Urban

Built-up area comprises of all residential, commercial and industrial areas, village settlement and transportation infrastructure which reveals evidence of development. Analysis of land use changes in Minna peri-urban reveals significant increase in land coverage of built-up areas in all selected peri-urban neighborhoods.

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Barkin-sale experienced the highest percentage increase of 708.5% in built-up area over the study period. Built–up area increased consistently in Barkin-sale from a land area of 1.99km^2 in 1986 to an area of 16.09km^2 in 2012; while Maitumbi experienced the least growth rate (90.8%) in built-up areas over the study period (Table 6.0).

Table 6. Built-up Areas in Minna Peri -urban Neighborhoods (1986-2012)

SN	*Neighborhood*	*Area in Km^2 1986*	*Area in Km^2 1996*	*Area in Km^2 2006*	*Area in Km^2 2012*	*Percentage Change (1986-2012)*	*Remark*
1	Dutsen-kura	*3.81*	*5.85*	*11.04*	*14.69*	285.6	Increase
2	Fadikpe	*3.87*	*4.52*	*5.65*	*12.36*	219.4	Increase
3	Barkin-sale	*1.99*	*4.06*	*12.24*	*16.09*	708.5	increase
4	Shango	*7.92*	*15.61*	*35.03*	*36.59*	362	Increase
5	Bosso	20.07	28.65	*49.24*	*53.63*	167.2	Increase
6	Maitumbi	*10.22*	*11.77*	*18.40*	*19.50*	90.8	increase
	TOTAL	47.88	70.46	131.60	*152.86*	219.26%	increase

Source: Author, 2014.

This implies that development activities increased in the neighborhoods with the specified period. Significant development activities within Fadikpe neighborhood were noticeable with the year 2006 and 20012. However, all sampled neighborhoods experienced consistent increase in built-up area throughout the study period (table 7.0).

The highest magnitude of change in built-up area in five neighbourhoods (Dutsen-kura, Barkin-sale, Shango, Bosso and Maitumbi) under study occurred between the year 1996 and 2006. This implied that development activities increased in the neighbourhoods within the specified period. Significant development activities within Fadikpe neighbourhood were noticeable within the year 2006 and 2012. However, all sampled neighbourhoods experienced continuous increase in built-up area throughout the study period (Table 7).

Table 7. Magnitude of Change in Built-up Areas of Minna Peri -urban Neighbourhoods

SN	*Neighbourhood*	*Magnitude of Change (km^2) 1986 – 1996*	*Magnitude of Change (km^2) 1996 – 2006*	*Magnitude of Change (km^2) 2006 – 2012*	*Magnitude of Change(km^2) 1986 – 2012*
1	Dutsen-kura	2.04	5.19	3.65	10.88
2	Fadikpe	0.65	1.13	6.71	8.49
3	Barkin-sale	2.07	8.18	3.85	14.10
4	Shango	7.69	19.42	1.56	28.67
5	Bosso	8.58	20.59	4.39	33.56
6	Maitumbi	1.55	6.63	1.10	9.28

Source: Author, 2014.

Analysis of Changes in Disturbed Vegetation Area in Minna Peri-Urban

Disturbed Vegetation implies vegetation that has been distorted by human activities. This comprises all agricultural activities and semi nature vegetation such as trees, shrub land, orchids, herbs, gardens and grasslands. This class of land use increases and decreases in area coverage throughout the study period within all the sampled neighbourhoods (Table 8.0).

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Barkin-sale neighbourhood experienced the highest decrease in disturbed vegetation during the study period. It increased from land area of 16.59km^2 in 1986 to an area of 17.16km^2 in 1996 and later decreased to land area of 11.82km^2 and 8.04km in years 2006 and 2012 respectively; representing 51.54% decrease in area coverage within the study period. Disturbed Vegetations increased in Fadikpe and Shango neighbourhoods; a percentage increase of 33.78% and 30.88% respectively (Table 8.0).

Table 8. Disturbed Vegetation Areas in Minna Peri -urban Neighborhoods (1986-2012)

SN	*Neighbourhood*	*Area in Km^2 1986*	*Area in Km^2 1996*	*Area in Km^2 2006*	*Area in Km^2 2012*	*Percentage Change (1986-2012)*	*Remark*
1	Dutsen-kura	*22.80*	*20.77*	*16.20*	*14.28*	37.37	Decrease
2	Fadikpe	*21.61*	*31.09*	*30.78*	*28.91*	*33.78*	*Increase*
3	Barkin-sale	*16.59*	*17.16*	*11.82*	*8.04*	*51.54*	*Decrease*
4	Shango	*101.89*	*118.60*	146.37	*133.35*	*30.88*	*Increase*
5	Bosso	102.34	79.83	*68.98*	*74.24*	*27.46*	*Decrease*
6	Maitumbi	*62.90*	*63.23*	*64.31*	*57.61*	*8.41*	*Decrease*
	TOTAL	*328.13*	*330.68*	*338.46*	*316.43*	*3.57%*	*Decrease*

Source: Author, 2014.

Dutsen-kura, Barkin-sale, Bosso and Maitumbi experienced decrease in disturbed vegetation land within the study period; loss of total land area of 8.52km^2, 8.55km, 28.10km^2 and 5.29km^2 respectively. The highest loss in disturbed vegetation land was experienced in Bosso neighbourhood while Shango neighbourhood experienced the highest gain (31.46km^2) in disturbed vegetation land area within the study period. Generally, land coverage for disturbed vegetation in Minna peri-urban increased between the year 1986 and 2006 and decreased sharply between the year 2006 and 2012. This indicates reduction in agricultural activities in Minna peri-urban due to increasing demand for agricultural land by other land uses. This has great implication on food security in the neighbourhoods and in the state as a whole (Table 9.0).

Table 9.0: Magnitude of Change in Disturbed Vegetation Areas of Minna Peri-urban Neighbourhoods

SN	*Neighbourhood*	*Magnitude of Change (km^2) 1986 – 1996*	*Magnitude of Change (km^2) 1996 – 2006*	*Magnitude of Change (km^2) 2006 – 2012*	*Magnitude of Change(km^2) 1986 – 2012*	*Remark*
1	Dutsen-kura	-2.03	-4.57	- 1.92	-8.52	Decrease
2	Fadikpe	9.48	-0.31	- 2.07	7.30	*Increase*
3	Barkin-sale	0.57	-5.34	- 3.78	-8.55	*Decrease*
4	Shango	16.71	27.77	- 13.02	31.46	*Increase*
5	Bosso	-22.51	-10.85	5.26	-28.10	*Decrease*
6	Maitumbi	0.33	1.08	- 6.70	-5.29	*Decrease*

Source: Author, 2014.

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Analysis of Changes in Undisturbed Vegetation Area in Minna Peri-Urban

Undisturbed vegetation comprises of those portions of land with evidence of minimal human activities, of which the forest canopy is still maintained. Forest cover in Minna peri-urban is on continuous decrease in all selected neighbourhoods within the study period. Undisturbed vegetation which occupied an area of 3.44km^2 in 1986 decreased to an area of 2.98km^2 in the year 1996 in Dutsen-kura neighbourhood. It further decreased in land coverage within the neighbourhood to an area of 2.80km^2 and 0.89km^2 in the years 2006 and 2012 respectively. Fadikpe neighbourhood witnessed forest cover decreasing from an area of 19.59km^2 in 1986 to a land area of 10.00km^2 in 1996. It further reduced in 2006 and 2012 to an area of 8.89km^2 and 4.19km^2 respectively.

Similarly, Barkin-sale experienced a loss of about 1.90km^2 in forest land within the study period; representing a total loss of 67.74% in forest land area, while, Shango's forest land area reduced to an area of 34.29km^2 in 2012 from an area of 103.91km^2 it occupied in 1986; a percentage loss of 67% in forest land area within the neighbourhood. Bosso neighbourhood also experienced a loss in forest cover; from area coverage of 11.71km^2 in 1986 to 6.77km^2 in 2012 (42.19% loss in forest land), while Maitumbi neighbourhood recorded a reduction in forest land area from land area of 12.93km^2 in 1986 to 3.23km^2 in 2012; representing 75.02% loss in forest land in the neighbourhood within the study period (Table 10).

Table 10: Undisturbed Vegetation Areas in Minna Peri -urban Neighborhoods (1986-2012)

SN	*Neighbourhood*	*Area in Km^2 1986*	*Area in Km^2 1996*	*Area in Km^2 2006*	*Area in Km^2 2012*	*Percentage Change (1986-2012)*	*Remark*
1	Dutsen-kura	*3.44*	*2.98*	*2.85*	*0.89*	*74.13*	*Decrease*
2	Fadikpe	*19.59*	*10.00*	*8.89*	*4.19*	*78.61*	*Decrease*
3	Barkin-sale	*5.89*	*4.67*	*1.57*	*1.90*	*67.74*	*Decrease*
4	Shango	*103.91*	*80.01*	32.32	*34.29*	*67.00*	*Decrease*
5	Bosso	11.71	23.44	*16.96*	*6.77*	*42.19*	*Decrease*
6	Maitumbi	*12.93*	*11.33*	*5.01*	*3.23*	*75.02*	*Decrease*
	TOTAL	*157.47*	*132.43*	*67.60*	*51.27*	*67.44%*	*Decrease*

Source: Author, 2014.

Within the study period, Dutsen-kura lost a total forest land area of 0.46km^2 between 1986 and 1996. Further losses in forest area were experienced between the years 1996 and 2012. Fadikpe lost a total forest land area of 15.40km^2 while Barkin-sale lost forest area of 3.99km^2 within the study period. Shango neighbourhood lost an area of 69.62km^2 of its forest land between 1986 and 2012, while Bosso and Maitumbi lost forest land areas of 4.94km^2 and 9.70km^2 within the specified period (Table 11).

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Table 11: Magnitude of Change in Undisturbed Vegetation of Minna Peri -urban Neighborhoods

SN	*Neighbourhood*	*Magnitude of Change (km^2) 1986 – 1996*	*Magnitude of Change (km^2) 1996 – 2006*	*Magnitude of Change (km^2) 2006 – 2012*	*Magnitude of Change (km^2) 1986 – 2012*	*Remark*
1	Dutsen-kura	-0.46	-0.13	- 1.96	-2.55	*Decrease*
2	Fadikpe	- 9.59	-1.11	- 4.70	-15.40	*Decrease*
3	Barkin-sale	- 1.22	-3.10	0.33	-3.99	*Decrease*
4	Shango	- 23.90	-47.69	1.97	-69.62	*Decrease*
5	Bosso	11.73	-6.48	- 10.19	-4.94	*Decrease*
6	Maitumbi	-1.60	-6.32	- 1.78	-9.70	*Decrease*

Source: Author, 2014

DISCUSSION OF RESULTS:

1. Bare surface changes in Minna peri-urban were on a downward trend between the year 1996 and 2006 increase greatly in the year 2012. It reduces from a total land area of 9.52km^2 in 1986 to 6.18km^2 and 5.00km^2 in 1996 and 2006 respectively. It however increase to an area of 21.24km2; representing a percentage changes of 123.11% within the study period (Figure 2). This indicates increasing supply of developable land within the neighbourhood.

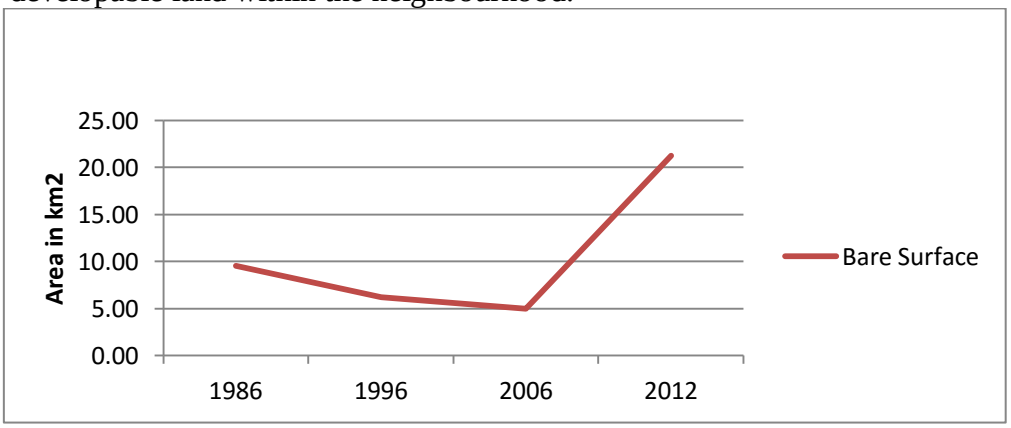

Figure 2: Changes in Bare surface Area in Minna Peri-urban from 1986 – 2012.

2. Land use/ land cover changes in built–up areas of Minna peri-urban were on the upward trend. Built-up areas increase significantly in all sampled neighbourhoods. This is an indication of increase in development activities-majorly residential in Minna peri-urban. This also implies that with continuous increase in demand for developable land in the peri-urban, other land uses like agricultural and forest land will be taken over to meet up with increasing demand (Figure 3).

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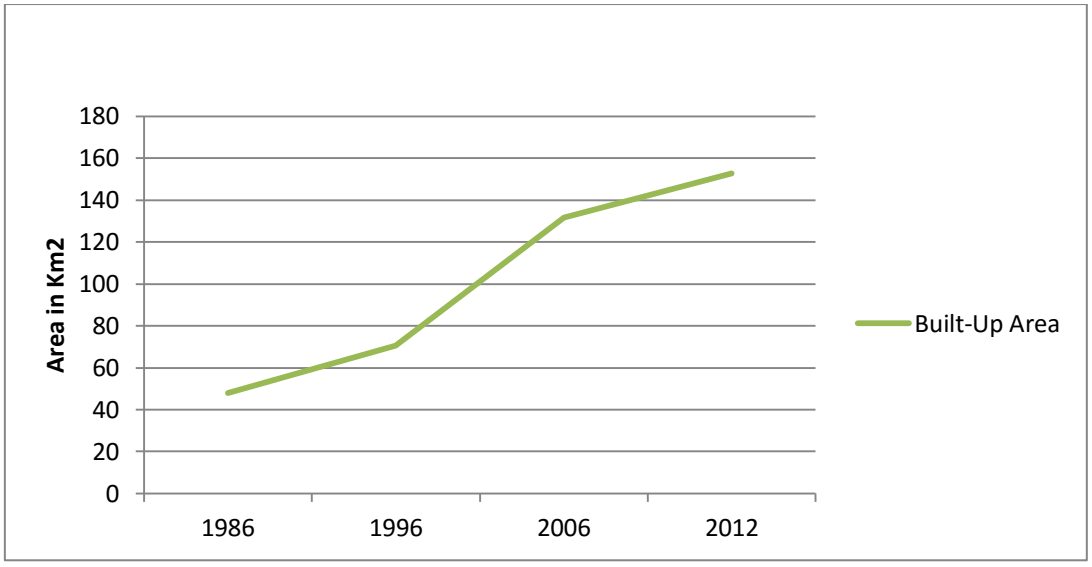

Figure 3: Changes in Built-up Area in Minna Peri-urban from 1986 – 2012.

3. Shango neighbourhood has the largest land area occupied by disturbed vegetation amongst the selected neighbourhoods as it occupied a total land area of 133.35km^2 in the year 2012. This probably is due to the fact that Shango neighbourhood is the largest amongst the selected neighbourhood in term of total land coverage while Barkin-sale neighbourhood has the least total land coverage and also the least area of 8.04km^2 for disturbed vegetation land area in the year 2012. This implies that agricultural activities thrives where there is an abundant of land for cultivation purposes (Figure 4).

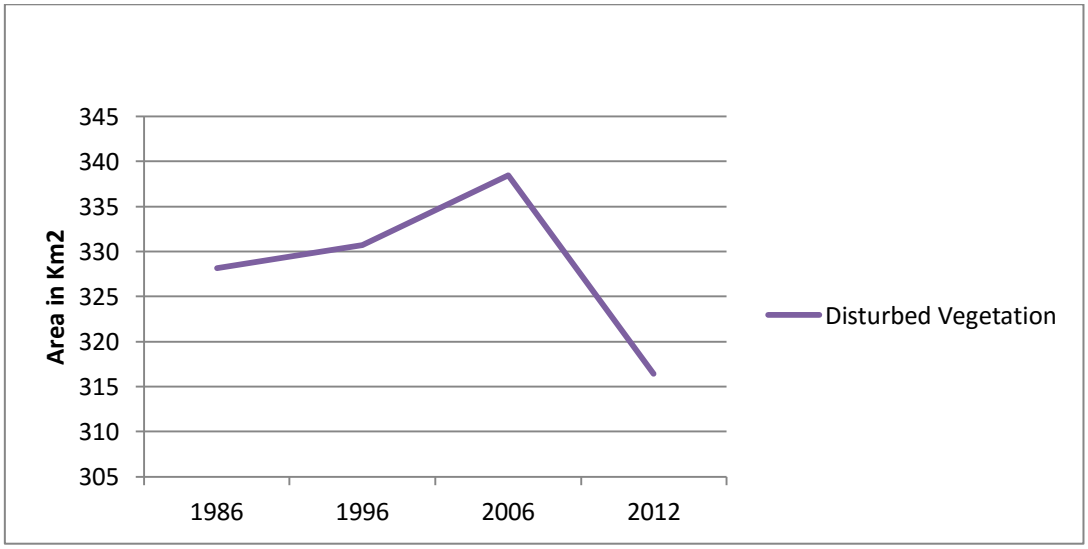

Figure 4: Changes in Disturbed Vegetation Area in Minna Peri-urban from 1986 – 2012.

4. Trend in forest land changes in Minna peri-urban is on an increasing and continuous decline; most especially between the year 1996 and 2006 and further decline in 2006 and 2012 respectively (Figure 5).

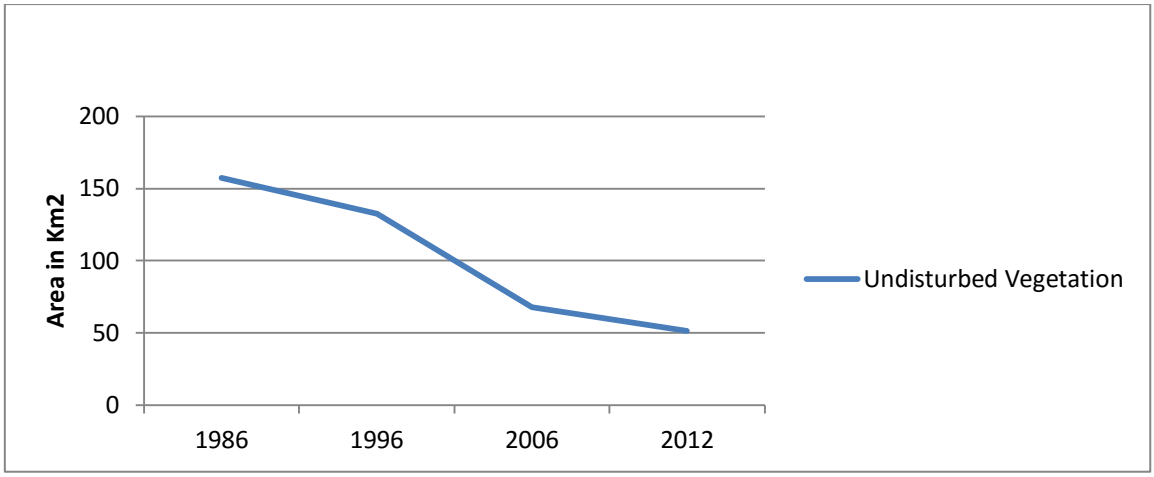

Figure 5: Changes in Undisturbed Vegetation Area in Minna Peri-urban from 1986 – 2012.

Source: Author, 2015.

CONCLUSION

The rate of spatial development across the selected neighbourhoods reveals vividly the emerging role of peri-urban in city expansion. This role should therefore be appreciated and harnessed positively by all stakeholders in ensuring prior planning, plan implementations, continuous monitoring and refurbishment of the existing facilities in order to enhance environmental quality and to prevent proliferation of slums in these areas. Controlled development will promote good living environment and also enhance real property value. This will further ensure easy integration of the peri-urban into the city fabrics for the achievement of the desired sustainable development. In the light of this study, the following are obvious:

1. The bare surface land area needs to be well planned and manage to ensure sustainable living and working environment.
2. The consistent increase in the built-up area over the years call for an urgent attention by government in terms of legislations and mass housing projects in-order to ensure the proper management and preservation of Land for future generations.
3. The downward trend in changes in disturbed vegetation in Minna peri-urban neighborhoods indicates a reduction in agricultural activities in Minna peri-urban due to increasing demand of what was supposed to be agricultural land by other land uses. This has great implication on food security in the neighborhoods and in the state as a whole.
4. Destruction and depletion of forest resources in Minna peri-urban has great implication on desertification and climatic change.

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