

Examining the Environmental Impacts of Abandoned Public Recreational Open Spaces in Lokoja, Kogi State, Nigeria

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ABSTRACT

Recently, in Lokoja, areas originally designated as open spaces and green areas are being systematically replaced deliberately by other land uses. This study is aimed at examining the environmental impacts of abandoned public recreational open spaces in Lokoja, with specified objectives to identify the existence of the open spaces in the towns; investigate the landscaping and management of available open spaces; and to determine the impacts of abandoned open spaces. The study is GIS-based, as it made use of Landsat and ETM to extrapolate the effects of abandoned open spaces. The study found out that there is a decrease in open space between 1986 and 2016, with the percentage decrease being -10%, as a result of loss of natural vegetation (0.1%) by anthropogenic activities. Besides, abandoned open spaces reduce the recreational values and comforts of residents thereby making life very irksome; reducing the recreation quotient of urban users. Therefore, there is the need to create an open space vanguard in terms of inclusive and participatory planning and design. Emphasis should be placed on mass enlightenment programmes to sensitise the user population of the need to patronise recreational outfits.

Keywords: open space, built-up area, spatial resolution, Landsat image, public recreation, urban area, abandoned green spaces.

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INTRODUCTION

Open space in an urban setting had been described as a vacant land, either within a built-up or developed environment, mostly existing as gardens and recreations grounds or underdeveloped land which has value for recreational purposes, amenity, conservation and other natural resources, historic or scenic land scopes or areas of outstanding natural beauty such as water bodies, valleys, hills, maintains, (Abiodun, 2014; Denicson, 2017; Amajuba, 2016). Lokoja being an emerging large city had begun to show the characteristics of urbanization where inadequate consideration and neglect for the landscape and open space development is experienced. It has been observed that green grasses are continually being

converted to building area due to largely pressure from increased population and in most cases occasioned by political and economic conditions (Alphosus, 2017). Recently, in the study area, regions originally zoned as open spaces and green areas are being systematically replaced deliberately by other land uses. Multidimensional activities such as economic and transportation have all been merged into one sphere (Alanga, 2017). This is contrary to what used to obtain where schools and public establishments, acquire vast land with 70% left as open space and the remaining 30% built up area. It has been found that, today, even schools do not have football fields or adequate sized playground. What used to be open

spaces have now been transformed into several uses, such as areas of construction of temporary kiosks for commercial purposes, refuse dumps, siting of illegal structures, areas of defecating etc. It is therefore pertinent to recover this land in order to redress the best use and functions. This study aims at examining the environmental impacts of abandoned public recreational open spaces in Lokoja, with specified objectives to identify the existence of the open spaces in the towns; investigate the landscaping and management of available open spaces; and to determine the impacts of abandoned open spaces. Robert (2016) defined a city as an area of relatively large diverse and permanent settlement of socially heterogeneous individuals. In terms of functions, it is a region of organized and effective use of space, a ceremonial centre having symbolic meaning, a cosmic symbol, powerful enough to organize areas. Open spaces could be classified as functional and non-functional; it is functional when it serves a particular purpose and vice versa and it could also be described as public or private. While the private open space is owned by private individual, public open spaces area usually owned by government. The idea of having open spaces is not new in the study area; this idea can be traced to ancient times where open spaces were used by the public as meeting places for people from heterogeneous backgrounds. The public domain exists as a spatial shell which crystallizes into public space. This space dictates the relationship between the city and the public as a well-designed public space maintains the delicate balance of the proper functioning of the city (Gobster, 2014; Hultin, 2015).

The function of the public open spaces in Nigeria has been traced to the pre-colonial times when cities were designed with spaces incorporated in the Northern Nigeria; they function as market spheres, horse riding spheres, areas preserved for Durbar, Hawwan Daushe and Hawwan Nassarawa. 'Fillin Sukuwa', usually situated in the front of the emir's palace or other designed areas of the town. Similarly, in the west they function as ground for festivals and recreations and areas of open market (Oja Oba). In the eastern part of Nigeria, they function as debating ground (Ilo) and point of meetings and wrestling grounds. These occupies large open areas shaded by Awbu trees; with widely spreading branches and abundant foliage which adds more to the scenic value of the town (Mostowska, 2015). In the colonial era, the town planning ordinance of 1928 recognized the importance of use of open spaces, after the outbreak of bubonic plague. They were set up to be used as buffer zones around buildings in the Government Reserved Areas (GRA), to cordon the spread of diseases. The recent town planning laws of 1992, backed by decree 88 also encourages the setting aside of open spaces.

Open spaces have been found to support natural systems which have direct benefit to the human society. This could be as factors of climate moderation, areas of groundwater

recharge, flood control, air and water pollution abatement. This could be envisaged if the monetary value of this benefits is calculated of the cost damage that could result if this benefits were not available or if public expenditures were required to construct or replace the functions of the natural systems.

MATERIALS AND METHOD

Study area

Lokoja town is located in Kogi state, of the old Kabba province at the confluence of the Niger and Benue Rivers (Figure 1). The town lies on the western bank of the river Niger at an altitude of 45 to 125 m. The northern part the town is dominated by a high plateau, the partridge, which reaches an altitude of 400 m above mean sea level. Geographically, Lokoja is located between latitude 7° 49' north of the equator and longitude 6° 44' east of the Greenwich meridian. Lokoja town which is also the headquarters of Lokoja Local Government Area and it is centrally and strategically located. It serves as the gateway to the North and the South of Nigeria.

It shares common boundaries with Koton-Karfe, (Kogi LGA), Kabba/Bunu, Ajaokuta, Bassa and Adavi Local Government Areas. The history of Nigeria cannot be complete without the name of Lokoja. The town as it is known today has a long-standing history; the area has contributed in no small measure to the socio-political development of Nigeria before, during and after the colonial periods. In 1904, Lord Lugard moved the headquarters of his administration from Lokoja to Zungeru to enable him subdue other Northern towns under British flag. Lokoja is the first headquarters of Northern Nigeria immediately after the amalgamation of the North and South of Nigerian in 1914.

However, in the year 1945, Lokoja became provincial headquarters of Kabba province. By 1954, the area was named Kwara Native Authority with Koton-Karfe division, Kakanda, Kupa, Eggan, Oworo and Lokoja Districts fused into one native authority for administrative convenience with Lokoja as headquarters. But this name was later changed to Federal Native Authority. It is worthy to note therefore, there were only two Federated Native Authorities in the entire Northern Nigeria. When General Gowon's administration broke the country into twelve states on 27th May, 1967 and thus West Central (later Kwara State), the area was renamed Kogi division, and from here the erstwhile provinces of Kabba and Ilorin were merged to be known as Kwara State.

After 1976 Local Government reforms, the name was changed once again to Kogi Local Government Area, which comprised six districts of Lokoja, Koton-Karfe, Oworo, Kupa, Kakanda and Eggan. Furthermore, on 27th August, 1991, when Babangida administration created

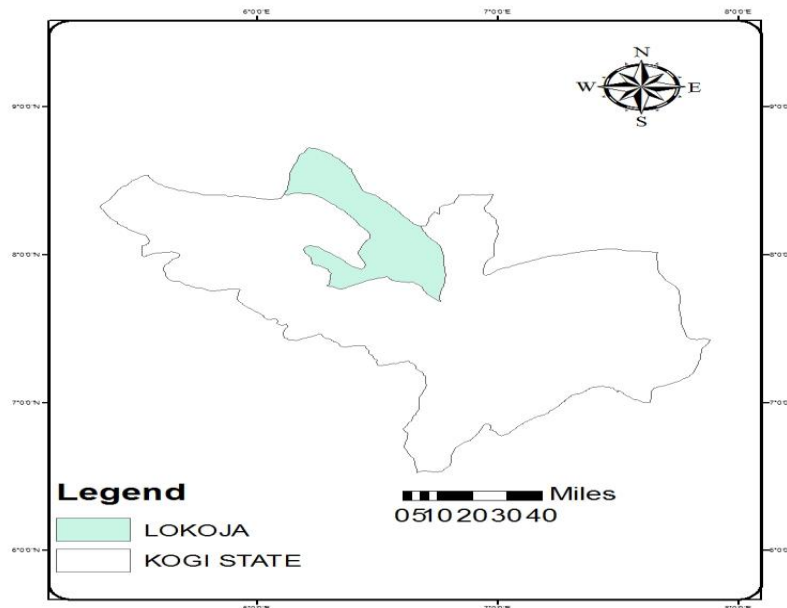


Figure 1. Location Map of Kogi State Showing Lokoja.

Kogi State, which was carved out of the old Kwara and Benue States, the area was named Lokoja Local Government Area while Koton-Karfe, now an autonomous local government area bears the name Kogi Local Government Area (Datti and Dogwo, 2004). The creation of Kogi State with Lokoja as the capital brought about influx of population due to its status as an administrative headquarters. All these brought about development of the town which gave birth to Department of Urban and Regional Planning of the Ministry of Environment and physical development change of planning and the monitoring physical development in the town. Lokoja has a population of about 77,516 in 1991 which increased to 195, 261 in 2006, with 100,573 males and 94,688 females (NPC, 2006).

METHODOLOGY

In setting out to examine the extent of loss of abandoned open spaces in the study area, land sat TM (Thematic Mapper), Land sat ETM (Enhanced Thematic Mapper) 1986 and 2016 were acquired. Then, the thematic data was collected using a 30 metric ground resolution cell, except for the thematic band with 120 m resolution cell. The first image was acquired 10th December, 1986 while the land sat ETM was acquired on 11th November 2016. It was the same spatial resolution as Land sat TM. It was however to be noted that spectral classification do not adequately identify urban extent, particularly in

heterogeneous urban fringes (Newland and Anthony 2017; Puranny 2017) and that census-defined urbanized areas and the proxy measures of the structure of land do not account for the commercial industrial or transportation components of urban land use; but choice was made based on other reported differences between land cover and land use, and the common practice of employing land cover to study physical processes.

The factors for assessing the environmental impacts of abandoned recreational open space property, such as insecurity, environmental pollution, obesity, and investors repellent was first rated by weight, then by proportion and impact score percentage. The scoring was done ascribing +1 to +10 for positive impacts, and -1 to -10 for negative impacts (Nelmar, 2015). The overall summation was expressed in percentages (Table 2).

The images were classified using ARCGIS 10.4, into various land uses which are, built Area, open spaces, vegetation and water bodies. The built-up areas were areas characterized by a higher percentage of construction materials such as Asphalt, concrete and buildings, while the undeveloped areas are mainly the cultivated areas and the natural vegetation; which surround the developed areas. However, bare lands and open spaces were not differentiated within these developed lands, but for the purpose of this work, bare surfaces, open spaces and areas of natural vegetation cover were all considered as open spaces as opposed to built-up areas. It will have been necessary to also include areas of cultivation but was not so, since it may give a

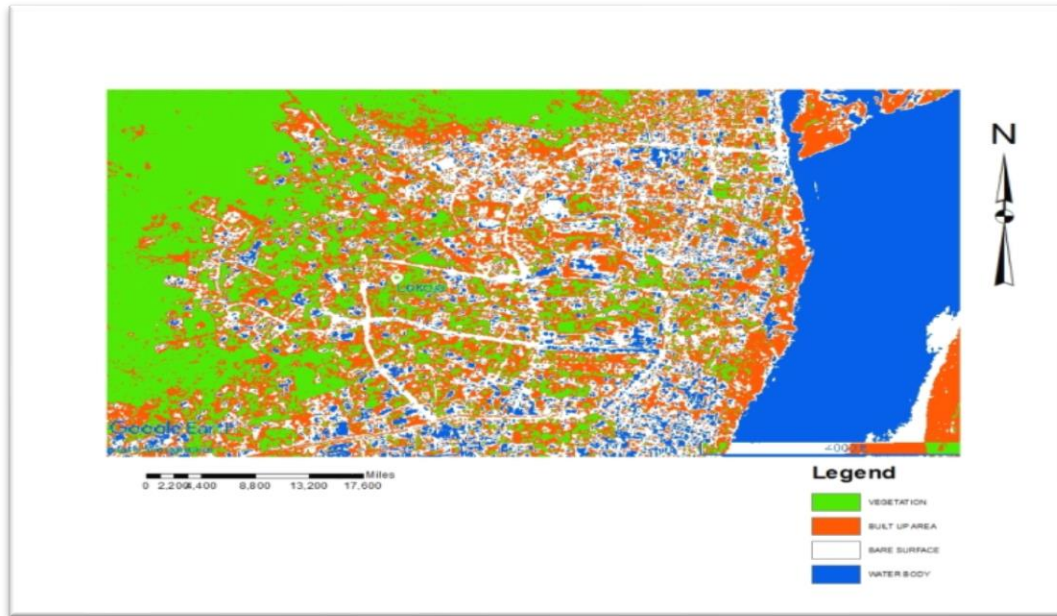


Figure 2. LULC of Lokoja, 1986.

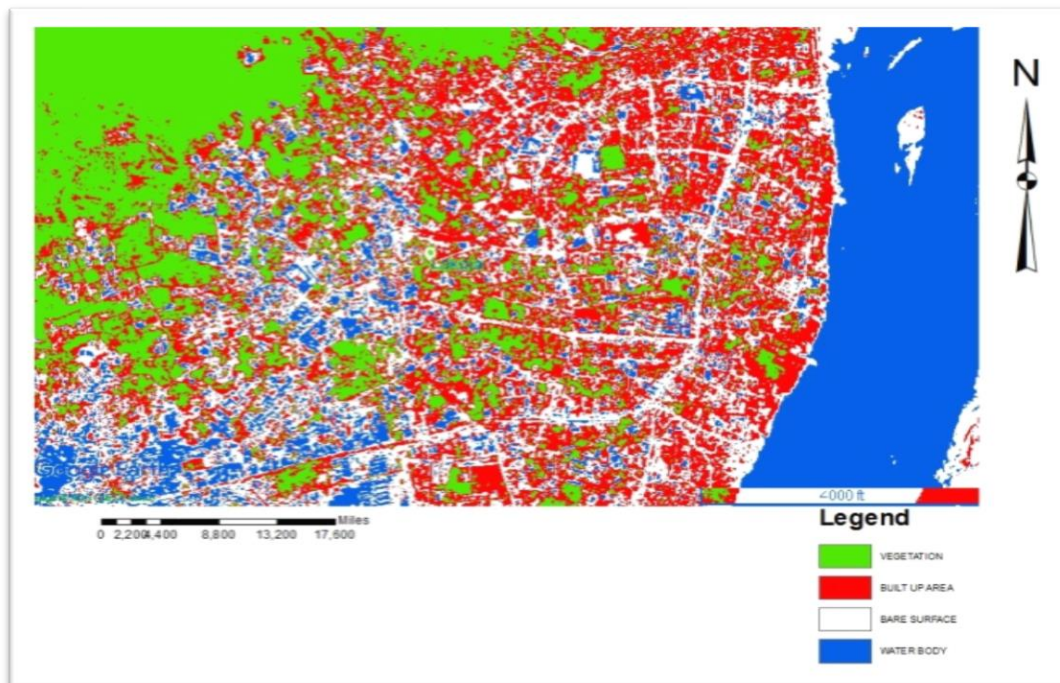


Figure 3. LULC of Lokoja, 2016.

misleading result because these areas are cultivated seasonally and areas of demarcation are a bit difficult to discern.

Figures 2 and 3 illustrate the temporal land use changes over the period of study that is, 1986 to 2016; this can be

compared to the figures on Table 1 and this shows clearly the trend of decrease in open space or bare surface from the year 1986 to 2016, where percentage decreased stage from -10%, which may be due to loss of natural vegetation due to anthropogenic activities.

Table 1. Land use distribution analysis and change ratio between 1986 and 2016.

Category	1986 [Area (km ²)]	2016 [Area (km ²)]	% Change (1986-2016)	Change Detection
Vegetation	17.11	17.57	5%	slight increase
Built up Area	13.14	15.98	10%	slight increase
Open spaces	13.21	10.28	-10%	decrease
Water body	14.59	14.55	0.1%	decrease

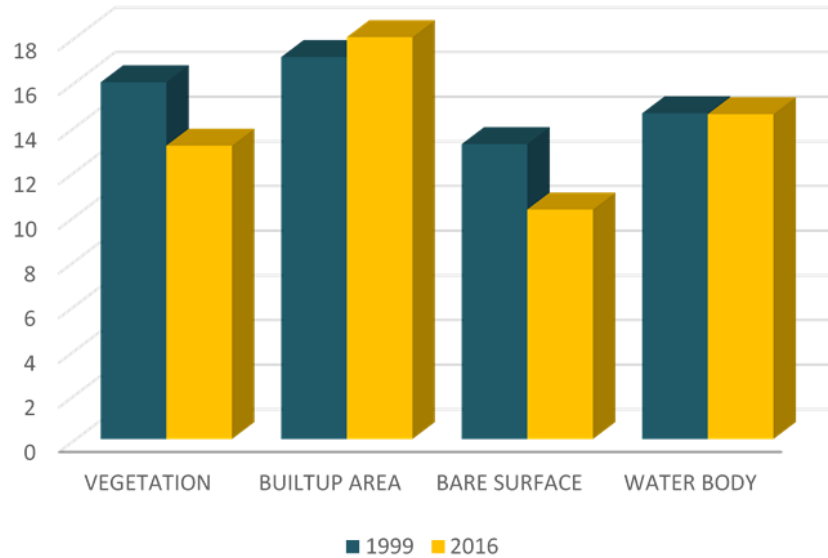


Figure 4. LULC of Lokoja, 1986 and 2016.

Table 2. Environmental impacts analysis.

Factors	Impacts Score (Weighted) (+)	Impact Score (Weighted) (-)	Impact ratio (±)	Impact (0.00%)
Insecurity	4	6	1/5	20%
Environmental Pollution	3	7	2/5	40%
Obesity	4	6	1/5	20%
Investors repellent	7	3	2/5	20%
Total	18	22	5/5	100

Impact rating +1 to +10 (positive), -1 to -10 (negative).

RESULTS

Figure 4 shows the land use land cover chart of the study area. It is obvious that the loss of open space will be appreciated further when the figures for open space, cultivated land and natural vegetation are combined, and these will give the total area of open space or bare surface for 1986 to be 13.21 sq.km while that of 2016 will now be 10.28sq km, which gives a high difference of loss of space of 3.10 sq.km, which can further be reduced to the year 2018 and beyond.

One can only imagine what will happen in the years to come if measures are not taken to moderate these problems.

Table 1 shows the trend of decrease in open space

between 1986 and 2016 periods, where percentage of decrease is placed at -10%, which may be due to loss of natural vegetation (10%) due to anthropogenic activities.

Similarly, water body decreased by 0.1% with built-up area and vegetation increased by 10% and 5% each. This implies that built-up area and vegetation influence negatively the available open spaces bringing about reduction in the available water body.

Table 2 indicated the factors (variables) that the impacts are being investigated. The Table 2 reveals that Lokoja has an insecurity impact index of -2 (20%), pollution index of -4 (40%), and obesity (biological health) impact index of -2 (20%). This by implication indicates that the

environmental impacts of abandoned recreational open spaces are on the negative, having environmental pollution, insecurity, and obesity as leading factors (80%).

DISCUSSION

Residents residing within the study area illegally dump refuse on the abandoned open spaces. The abandoned open spaces beg to be used as waste dumpsite for inhabitant of the location. This affects the environment by blocking the drainage and also causing pollution to the environment. The dumping of refuse in open space areas disfigures the urban setting and affects the urban aesthetics. Quite often abandoned open spaces in the study area are converted to hideouts for hooligans. The location of these criminal is a key setback to the survival of public recreational open spaces in this area.

The abandoned open spaces most times reduce the recreational activities of the inhabitant around the area. Some of the abandoned open spaces are covered with bushes, thus reducing the recreational value and diminish public open space activities; subsequently, different recreational activities are hindered.

New urban patterns could be generated through the use of vegetative enclaves. These are areas left as plot of vegetation or green areas, in order to induce proper urban growth (Nelmar, 2015). This vegetative enclave will serve as centre lines of organization of activities in the respective settlements within the urban areas, and this should however be which could be made possible when sustaining open space is seen as a critical economic issue integrated for sustaining our psychological health and ethical relationship to the non-human world (Gobster, 2004).

Policy instruments such as the following can be implored: Urban service boundary laws; this could be made to place restrictions or prohibition on existing open spaces. Incentive zoning, while the traditional zoning is concerned with avoiding negative externalities between land uses and works to limit conflicting issues, incentive zoning allows developers to build at higher densities in exchange for provision of social amenities and positive externalities such as parks and open spaces. In this way open spaces can be conserved and increased on the city landscape. This will be the product of the state police power. Transfer development rights (TDR); this assumes that development rights of a parcel of land, as part of the right to convert, can be sold and used in another parcel. The motivation of the TDR programme is for the preservation of environmentally sensitive areas, such as agriculture land, open space and historic landmarks.

The evolutionary trend of western city development attaches great importance to the provision of open spaces in human settlements. From medieval agora to renaissance city squares and baroque avenues each

civilization evolved urban open space system in response to the prevailing socio-cultural needs. One of the dominant issues in formal city planning is planning for beauty, which is rooted in urban open space development. The City Park Movement was conceived as an environmental solution to the decadence and social ill of eighteenth and nineteenth centuries industrial revolution characterized by urban congestion, depressed slums, pollution and embarrassing plagues.

The concept introduced nature to the crowded cities and suburban township of America. Planned open spaces and natural recreational areas were conceived as escape valves for urban dwellers in search of relief from the social, physical and psychological oppression of the vices of industrial centres. While the city park movement continued to sharpen the form of American cities, Ebenezer Howard in 1902 introduced the "Garden City Concept" in England on the same philosophy of living with nature. The two concepts, City Park and Garden City Movement, globally influenced urban renewal programmes and new town development programmes of the twentieth century in spite of the advanced technological breakthrough and the foundation for the forthcoming information technology dispensation. Different factors are responsible for urban sprawl in Nigerian cities.

The unprecedented population increase in Nigerian cities continues to put pressure on the existing housing facilities. The inability of housing delivery to cope effectively with housing need culminate in pricing out the majority of the low income-earners from the housing market. Most affected groups are the immigrants from the rural hinterland that prefer to settle at the suburbs of the cities. Often times, this is responsible for the development of squatter's settlement at the peri-urban zones. Cities present unlimited socio-economic opportunities, particularly in the area of landed property development. The operations of the economic forces in the supply of land for commercial development within the city centre are encouraging city suburbs in the direction of residential property development. This has sufficiently propelled the greed for land speculation and hoarding at the suburbs. Hence, most of the layouts are not linked to others for accessibility purposes.

Another factor that is responsible for the promotion of urban sprawl is the inability of government to effectively develop their compulsorily acquired parcels of land in some cities. This is predicated on the non-readiness of government to pay compensations on un-exhausted resources in the acquired land to the owners. Thus, the unwillingness of the owners to fully release the acquired land to government and their continual disposal of the landed properties to individuals who continues to develop to fit taste, without seeking building license from the appropriate planning authorities for planning permit. Ineffectiveness of the development control tool further strengthens this practice. However, in spite of these

shortcomings, efforts are being made at different quarters to check the sprawling growth of Nigerian cities. While the undisputed efforts are constantly worked to curb the rapid rate of growth in city population, urbanization and its attendant problems have constituted huge challenges to the received knowledge (both in theory and in practice) in urban planning and management.

Urbanization as a demographic indicator, describes the concentration of population in urban areas following economic transformation and social modernization. United Nations estimates indicated that the world's urban population increased from 30% in 1950 to 54% in 2014, and is projected to grow by 2.5 billion people (about 66%) by 2050, with 90% of the increment concentrated in developing regions of Asia and Africa. In Africa, urban population increased from 15% in 1960 to 40% in 2010, and a further 60% increment is projected for 2050 (NPC, 2006).

This, therefore, calls for densification and preservation of open spaces for sustainable development. As a result of built densities, hazards such as noise and air pollution are likely to increase, since many of these problems are caused by transportation. Higher urban densities are also liable to damage open spaces within the cities, as well as the quality of life in overcrowded residential neighbourhoods. Robert (2016) in his study on peri-urban landscapes and coastal recreation, observed that in the course of events, urban life quality deteriorate because of the process of intensifying densities, the attractiveness of the suburbs and pressure on the population to leave the cities will rise. Thus, to avoid the continued process of suburbanization and damage to the open space outside the cities, care must be taken to ensure that higher densities are affected in such a way that does not jeopardize urban quality of life.

Conclusion

The implementation of town planning laws through special programmes as aforementioned will help in revitalizing open spaces, which will, in turn, improve the quality of life of the urban dwellers; it will also control urban expansion, where loss of biodiversity will also be minimized. There is the need to create an open space vanguard in primary and secondary schools in Lokoja to raise environmental and open space consciousness among the youths. It is also pertinent to support the establishment of design quality champions within Nigerian cities; and direct urban developments that promote bottom-up and quality driven approaches – both in terms of inclusive and participatory planning and design. More enlightenment programmes should be made a regular feature in media broadcasting. Result from the study shows; There is a percentage decrease in open space (-10%) and water body (0.1%) between 1986 and 2016. Residents residing within the planned region dispose their wastes on abandoned open

spaces, Abandoned open spaces often serve as hideout for hoodlums especially during nights and mid-day (lonely) periods, Abandoned open spaces reduce the recreational values and comforts of residents thereby making life very irksome, and plummeting the recreation quotient of urban users, Built-up area and vegetation had slight increase in the study area and Environmental pollution is most prominent in the ecological issues in the area.

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