

SOFT LANDSCAPING AND ITS IMPACT IN ENHANCING THE STATUS OF NIGERIAN URBAN CENTRES: A CASE OF JOS CITY CENTRE, NIGERIA

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ABSTRACT

A city centre is the central commercial, cultural and social centre of a city where natural and man-made physical objects combine to create a vibrant urban environment with modern amenities in order to serve the needs of all people. Little attention has been given to appropriate landscaping of our houses, neighborhood, towns and cities in recent times. This is traceable to a number of factors among which are, industrialization, agriculture, environmental pollution (noise, air, water, land) urbanization, street open trading, level of awareness have exerted negative impacts on the environment especially in the urban centres. The urban image of the city centre of Jos reveals that there is no functional and interesting landscape elements to modify and beautify the environment, the dryness one experiences in the day usually has side effect on the city dwellers. The immediate pictures queue reveals poorly maintained accents at traffic roundabouts, air pollution, indiscriminate dumping of refuse, and ramshackle structures as a result of street open trading, hawking etcetera. Therefore, the aim of this paper is to examine the positive impact of soft landscaping in enhancing the status of Nigerian urban centres. The study area is Jos the capital of Plateau State situated in the North-Central geopolitical zone of Nigeria. Data for this paper was gathered through site survey, case study and literature review. This study posits that appropriate landscaping beautifies our private dwellings, government owned structures as well as creating pleasant scenes of our major roads, roundabout, recreation centers which invariably gives a healthy environment devoid of environmental hazards. The paper recommends that appropriate awareness programmes on values

of landscaping should be intensified to individuals, professionals, Government and Non-governmental organizations.

Keywords: Jos City Centre, Nigerian Urban Centres, Soft Landscaping.

INTRODUCTION

Modern urban centres are characterized by steel, and concrete covered spaces. Soil for planting in urban centres is limited since the areas that are not streets have concrete pavements for use by pedestrians (Acquaah, 2009). Urban areas indicated that industrialization, urbanization, construction of bridges, roads, and social amenities are on the increase, as people live in a world of stress and strain, unpleasant working conditions and crowded living places. The use of space is limited having cleared the vegetation for the purpose of constructing roads and erecting buildings in the urban areas, the vegetation that has the capacity for protective, aesthetic and/or medicinal purposes among others should be re-established (Adams, et al., 2002).

Landscaping is an integral part of our culture and plays an essential role in the quality of our environment, economic wellbeing of the people, as well as their physical and psychological health. It is a way of maintaining and enhancing the quality of human life by protecting the health of the biosphere and husbanding the key resources of the air, water, land and minerals.(Adekunle, et al., 2016).Landscape is one of the most cost effective tools for improving and sustaining the quality of the environment whether in the school environment, the city, the suburbs or the country(Adekunle, et al., 2016).

According to Fadamiro, et al., (2008),in the landscape of many Nigerian cities, certain elements of importance can be noted, they include plant materials such as trees, shrubs, ground covers and grasses, all are used in different areas of the design according to the required functions like accent, softening, screening, framing and shading. Not to be excluded are structural materials comprising of man-made elements, used for enclosed areas, surfacing and communication or movement in and connecting the open spaces provided. It is without a doubt that the gradual

process of urbanization, over the years, has altered natural landscapes and this has caused negative impacts on the physical environment.

However, in Nigeria, the practice, quality and patronage of city landscaping and such services is still at the early stages when compared to what obtains in more technologically advanced and developed countries. It is of great interest that colonialism helped change and introduce the practice of formal landscaping of some public buildings as well as Government Reservation Areas (GRAs), (Olubode, 2016). More recently, there has been an increase in the practice of city landscaping in cities such as Abuja, Calabar, Uyo and Lagos among others.

Nigerian architecture is not lacking in creativity. Taking into consideration the materials and technology available to it, creativity is not lacking in architectural massing and functional interior space arrangement. However, there is inadequacy in the landscaping of most sites in which these creative outputs are situated (Agbonome, et al., 2014). This paper, therefore, documents the impact of soft landscaping in enhancing the urban imagery of Jos City Centre. This is to be achieved objectively by firstly, examining the existing landscape pattern within the city centre. Secondly, to provide an appropriate planting scheme towards creating a functional and balance use of plant materials, and thirdly, to Re-design kerbs along road verges to direct and control vehicular movement.

LITERATURE REVIEW

Concept of Landscape

Landscape as an essential part of the environment which includes topography, vegetation and associated plants and soil, water bodies, is one of the most visual needs of people (Igwe, et al., 2018). Williams and Tilt's study (as cited in Igwe, et al., 2018) opined that an effective landscape design can become an integral part of a good community environment. A well-defined landscape space can enhance the quality of living areas which meets people's preferences. Landscape is thus defined as 'scenery of natural and man-made features within the built and natural environment defined by man's interaction and activities within his

surroundings', which often manifest in man-made landscape (Ayeni, 2012). Landscaping is an integral part of our culture and plays an essential role in the quality of our environment, economic wellbeing of the people, as well as their physical and psychological health. Landscaping spaces are organized through the use of the basic design principles of symmetry, unity, balance, accents, focalization, scale, proportion, harmony and rhythm, variety, sequence and emphasis. Smith's study (as cited in Adekunle, et al., 2016) believes that it is a way of maintaining and enhancing the quality of human life by protecting the health of the biosphere and husbanding the key resources of the air, water, land and minerals. Landscape is one of the most cost effective tools for improving and sustaining the quality of the environment whether in the school environment, the city, the suburbs or the country. On the other hand, landscape design as noted from researchers (Ayeni, 2012; and David, 2017) the art of modifying an area for aesthetic or practical reasons.

The landscape designer, the architect and the landscape architect are all involved in modifying the environment for aesthetics and recreational purpose (Ayeni, 2012). An effective landscape is enjoyed by everyone, from residential areas to urban parks. The functionality, the beauty and compatibility with the natural environment are the result of the combined efforts of the landscape designer, the landscape architect and the architect to give an aesthetically pleasing environment (Ayeni, 2012).

Landscape Elements and their uses within the Built Environment

Landscape design materials are basically divided into two major categories based on the application and the way they appear. These are:

- i. **Hard landscapes:** are the inorganic materials which are inert in nature (stationary) and the synthetic elements of space (Ayeni, 2012;Adekunle, et al., 2016;); these include the roads, buildings, paths, wall fences, paved areas, sculptures and statues, engineering bricks, metals, carvings, glass and plastics. Others include paving, wall steps, ramps, sculpture; out-door lightening and road furniture-benches.

- ii. **Soft landscape:** refers to the living or natural materials used in landscaping (Ayeni, 2012;Adekunle, et al., 2016); these include vegetation, plant materials (grasses, screens and hedges and trees) and water bodies including artificial falls, ponds, lakes, pool and fountains

Elf's study (as cited in Adekunle, et al., 2016) argues that a well-designed landscape will help in the reduction of soil erosion, global warming, conservation of natural resources, and pollution prevention. This is because plants and trees used for landscaping can absorb carbon (IV) oxide from the atmosphere (major contributor to global warming), improve air quality and screen busy streets from traffic noise.

Role of Vegetation in Landscape Design

Plants play a vital role in a community's scenic beauty, the character of the local landscape and the overall quality of the environment. Despite their benefits, plants are disappearing faster than we think. Just imagine what our streets and neighbourhoods would be like without plants! Benefits of establishing and protecting plants include:

Environmental Value-

- i. **Air Purification:** Particles of air pollutants are absorbed by leaf surfaces or they may be deposited on the leaves as they fall on the soil, they are absorbed. Kecher's study (as cited in Mbah, 2001) indicated that quantified pollution remediation by plants and showed that 85% of lead from vehicles can be removed by a shelter belt of trees. Landscaping plants mask fumes and disagreeable odour by replacing them with more pleasing scents or absorbing them. Air flow modification caused by these plants affects transport and diffusion of water pollutants and energy. Trees particularly and other plants through their growth processes act as a sink for atmospheric carbon dioxide, the predominant greenhouse gas (Mbah, 2001). Accordingly, to Mbah, (2001), increased trees in the landscape will potentially slow the accumulation of atmospheric CO₂. In addition, the production of CO₂ by fossil powered generating plants will be reduced and energy conserved. Some plants such as *Eucalyptus saligna*, *Brunfelsia hopeana*, *Nerium oleander* etc produce sweet scent capable of neutralizing the

polluted air thereby making the air fresh for human consumption.

- ii. **Modification of Temperature:** Landscape planting especially trees and shrubs modify solar radiation, for example through provision of shade. The amount of radiant energy absorbed stored or radiated by buildings and concrete surfacing in the living environment is significantly reduced by shading. Evapotranspiration in planted landscapes helps reduce sensible heat which warms air and the result is reduced temperature. It is estimated that tree planting around houses reduces energy for cooling by 10 to 50% and in temperate climate where heating may be needed, it is reduced by 4 to 22% (NNA/ISSA, 1991; Mbah, 2001).
- iii. **Water Quality:** Plants help anchor soil and reduce storm water runoff, saving the high costs of drainage ditches, storm sewers, and other “engineered solutions” to storm water management. A Street lined with 32’ tall trees can reduce runoff by almost 327 gallons, allowing cities to install smaller and less expensive water management systems. Reducing runoff also decreases topsoil erosion and the amount of silt and other pollutants washed into streams, rivers and lakes (A Handbook of Landscape, 2013).
- iv. **Erosion Control:** Trees and shrubs could serve as shield to cover the bare soil while holding the soil together and their roots serving as barriers against run-offs. The characteristic features of plants in land reclamation and erosion control is that their strong spreading roots help to hold the soil particles together (Adams, et al., 2002). Most of the incidences of soil erosion in urban centres can be minimized if appropriate and well planned tree planting is combined with other developmental activities.

Trees such as *Terminalia catappahas* strong spreading roots that can hold the soil together. Planting of drought resistant trees such as *Azadirachta indica* and *Acacia spp* in the Northern part of the country could be effectively used to checkmate the deleterious effects of wind storm common in Kano, Borno and Sokoto States. Ogigirigi’s study (as cited in Adams, et al., 2002) found that the wind breaking effect of trees has caused the reduction of wind speed by as much as 30%-50%. Trees and shrubs should be systematically arranged

in the direction of the prevailing wind in order to form strong obstruction and resistance against the speed of turbulent windstorm and consequently check its devastating effects.

- v. **Lower Heating and Cooling Costs:** plants have demonstrated the ability to reduce heating and cooling costs and counteract the “heat island” effect in urban environments. Urban areas with little vegetation can experience temperatures of up to seven degrees higher than those with tree cover. This translates into significantly higher energy costs to cool buildings. Properly established plants can cut heating and cooling costs by as much as 12 % and reduce overall power demand (A Handbook of Landscape, 2013).
- vi. **Reduced Noise Pollution:** Noise pollution is an often overlooked problem. Excessive or unwanted sound has negative physical and psychological effects. Noise can come from many sources, especially roads and highways. Trees can play an important role in deadening unwanted noise. Sound waves are absorbed by a tree’s leaves, branches, and twigs. Studies suggest that belts of trees 100’ wide and 45’ long can cut highway noise to half (A Handbook of Landscape, 2013).
- v. **Humidity Control:** Humidity is a measure of the amount of water vapor in the air (Ahrens, 2007). As long as heat present, the heat energy will be absorbed by moisture and released to the air in exchange for the use of heat energy. Plants in general increase the humidity of the site. They can therefore increase the thermal comfort during hot, dry seasons, although the plants have to be watered regularly. The plants take water from the soil, and when this water evaporates from the leaves it increases the relative humidity while lowering the air temperature. Pools and ponds behave in a similar manner. Water evaporating from the surface increases relative humidity while reducing air temperature (Adedeji, et al., 2010).

Health Value-

There is mounting evidence that stress and noise have an impact on our physical and psychological health. Trees and vegetation can affect our mood and help relieve stress. Plants include *Araucaria spp*, *Grevillea robusta* and *Agava sisalana* (A Handbook of Landscape, 2013).

Shelter-

The shade of trees is welcomed by man and beast alike, providing essential shelter in the hottest climates. Trees are often used as windbreaks to shelter sensitive crops (A Handbook of Landscape, 2013).

Aesthetic Value-

Our cities lack adequate trees to modify and beautify the environment. Plants provide a variety of aesthetic values and accentuate the architectural design of buildings. Avenue plants such as *Thujaaplicata*, *Lagaestromia indica*, *Caryotamitis*, *Juniperus chinensis*, *Huracre pitanson* our roads and pedestrian walkways create a safer restful and scenic view and provide shade to the pedestrians and other road users.

Trees in a single or double row have strong visual impact. This arrangement is suitable for the urban or built environment (Adams, et al., 2002; Okoronkwo, 2017).

METHODOLOGY

Source of Data

Data was drawn from primary and secondary sources. The secondary data involves the use of information already in existence and this was sourced largely through literature review. Primary data used was acquired through field survey, and case study.

Research Method

The research method employs the descriptive and case study research method on various city centres so as to obtain data to be used in carrying out the research. The case study method was adopted so as to study Jos City Centre with a view to extract relevant data from it while the descriptive method uses the data so obtained to provide deep insight into roles of plants in landscaping.

Explanatory Profile of the Case Study – Jos City Centre

Jos is situated at about N9° 55' 48" and E8° 53' 24" in the Nigerian middle belt. (Figure 1 & 2) The city is situated at the northern edge

of a pear-shaped upland known as the Jos Plateau. This upland stretches for approximately 104km. from north to south, and 80km from east to west covering an area of about 8,600km² or 860,000hectares. It maintains an average height of 1200m (4000ft) above sea level peaking at about1766m (5829ft) in the Shere Hills (Archives of National Centre for Remote Sensing Jos, 2007). Jos city has an equable climate with average monthly temperatures ranging between 21°and 25°C (69°and77°F), average humidity of 60% and average annual rain fall of 1,400mm (56").

Jos falls within the tropical savannah region and as with most parts of the tropics, has two major seasons based primarily on the basis of rain fall and humidity levels. The two seasons are the rainy and dry season (harmattan season) characterized by the dominance of the moisture laden southwest winds and the very dry and dusty north easterly winds with the associated easterlies respectively (Archives of National Centre for Remote Sensing Jos, 2007).

Photographic survey of the city's major streets was used to gather qualitative data from different sites across the city. Observable areas of concern which were particularly considered included scenes of major streets, buildings and walls. Photos taken were labeled as "Plates" and each assigned a numeric identification. This research design was adopted in order to have firsthand information about the scenic and 'environmental beauty' of the city's major streets.

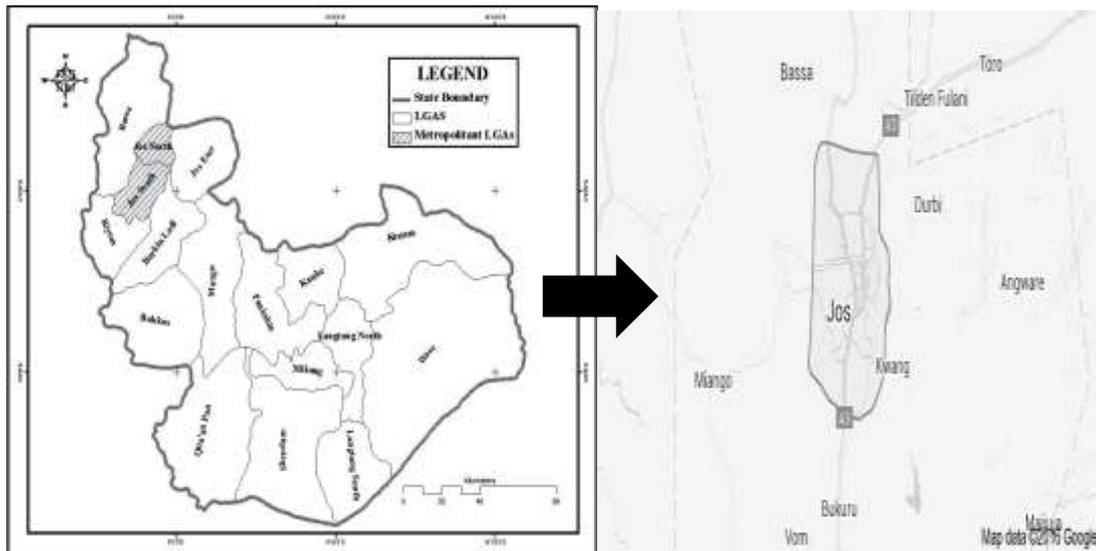


Figure 1: Map of Plateau State. Figure 2: Map of Jos.

Source: Adapted from Sati, 2015. Source: Adapted from Okoronkwo, 2017.

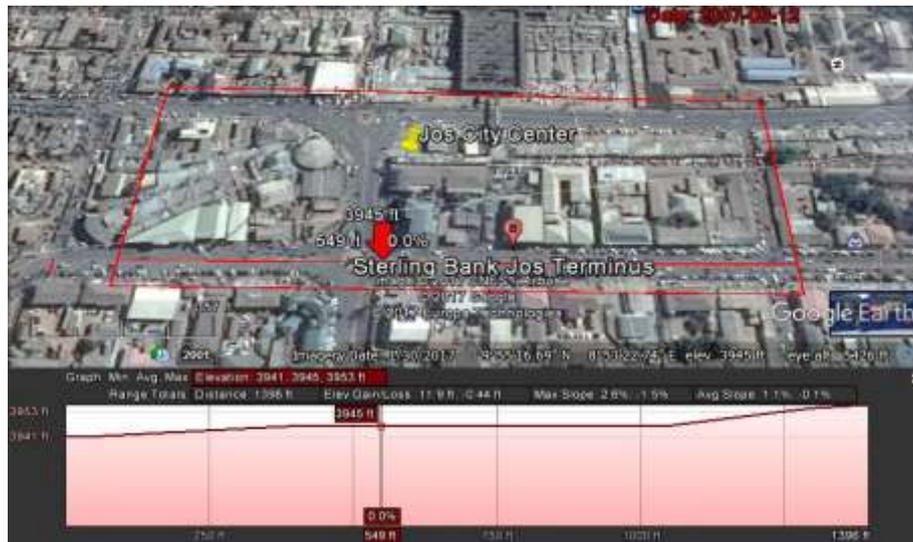


Plate i: A Cross Section of the City Centre
Source: Google Earth Map, 2017.



Plate ii: A Cross Section of the City Centre
Source: Google Earth Map, 2017.

RESULTS AND DISCUSSION

A tour around the major streets of the city centre reveals no functional and interesting landscape and improper waste management culture as well as defective sanitary system allows for the gradual accumulation of municipal waste on the streets. This is evident from Plates ii to ix. Picture on Plate ii shows the roundabout of an iconic edifice but not landscaped. Plate iii shows trash piled on the median strip along the major road. Plate iv and v are pictures of clogged and blocked drainages. Plate vi reveals absence of soft cape elements which provide shade and beauty to the environment, while Plate vii reveals the scene of car parking on the median strip. The picture in Plate viii is of paved surfaces with no softscape elements to reduce the impact of solar radiation and Plate ix shows illegal trading activities at the city centre.

Photographic images gotten during the course of this study however gives a negative sanitary and hygiene picture and reflection of the traders' poor waste management practices and character. Poor waste management not only result in unsightly scenes, but also become sources of environmental health hazards and pollution, blocked roads and drainages resulting in flooding, municipal roads deterioration, prevention of attractive landscape as well as the erosion of touristic values of the environment,

which have been described by Sulaiman (2010) as being anti-tourism.

Physical factors and natural landscape have played significant roles and have been emphasized in environment contrast (Adebitan et al., 2017). Pictures shown in Plates ii to ix depict of unappealing landscaped sights within the Jos city centre. A roundabout is expected to be beautified to serve as tourist attraction but in Plate ii, an unkept roundabout landscape can be seen. The use of a planting scheme is meant to provide an aesthetical appeal and enhance circulation within the environment (Table 1)

Photographic Illustrations of Present Situation of Jos, City Centre



Plate ii: Lack of landscape elements at the roundabout **Plate iii:** Dumping of refuse on median strip road

Source: Author's Field Survey, 2018.

Source: Author's

Field Survey, 2018.



Plate iv: Clogged and blocked drainage with trash inside it **Plate v:** Broken drainage

Source: Author's Field Survey, 2018.

Source: Author's Field Survey, 2018.



Plate vi: Absence of soft scape elements on median strips **Plate vii:** Cars parked on the median strip

Source: Author's Field Survey, 2018.

Source: Author's Field Survey, 2018.

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Plate viii: Paved surfaces with no soft scape elements **Plate ix:** Absence of hard scape and soft scape centre to reduce the impact of solar radiation. Elements to reduce impact of solar radiation

Source: Author's Field Survey, 2018.

Source: Author's Field Survey, 2018.



Plate x: Display of goods on the road hindering **Plate ix:** Illegal trading activities at the city centre to reduce the impact of solar radiation. of the median strip.

Source: Author's Field Survey, 2018

Table 1: Planting Scheme and Specifications

S/No	Common Name	Botanical Name	Plant Type	Max.Height (M)	Canopy Spread (M)	Uses
1.	Sandbox	<i>Huracrepitans</i>	Tree			Shade
2.	Flamboyant Tree	<i>Delonixregia</i>	Tree	12	6	Shade/
3.	Siamea	<i>Sennasiamea</i>	Tree	3.2	5	Aesthetics
4.	Pine	<i>Pinuscaribae</i>	Tree	4	3	Shade
5.	Jacaranda	<i>Jacaranda filicifolia</i>	Tree	12	6	Shade/Wind
6.	Flea Tree	<i>Albizialebeck</i>	Tree			Break
7.	Pride of Barbados	<i>Caesalpinia pulcherrima</i>	Tree			Shade
8.	Teak		Tree	20	6	Shade
9.	Pongame oil Tree	<i>Tectonagrandis</i>	Tree			Shelterbelt
10.	Lemon-scented	<i>Millettiapinnata</i>	Tree			Shelterbelt
11.	Tree	<i>Eucalyptus citradora</i>		12	0	Shelter belt
	Masquerade Tree	<i>Polyalthialongifolia</i>				Avenue
12.		<i>Roystoneaoleracea</i>	Palm	1.5	3	plant
13.	Royal Palm	<i>Caryotamitis</i>	Palm			Avenue
14.	Fishtail Palm	<i>Codiaecumvariegatum</i>	Shrub	1.2	1.8	plant
	Croton	<i>Euonymus spp</i>				Avenue
15.		<i>Durantarupen</i>	Shrub	1.2	1.2	plant
16.	Euonymus	<i>Ixoracoccinea</i>	Shrub	1.2	1.2	Avenue
17.	Yellow Bush	<i>Hibiscus spp</i>	Shrub	2.0	2.5	plant
18.	Ixora	<i>Begonia obliqua</i>	Shrubs	0.5	1	Hedges
19.	Hibiscus	<i>Rosa sinensis</i>	Shrub	0.2	0.5	
20.	Begonia	<i>Bougainvillea glabra</i>	Shrub	1.5	1.2	Hedges
21.	Roses	<i>Codiaeumvariegatum</i>	Shrub	5	1.5	Hedges
22.	Bougainvillea	<i>Cestrum nocturum</i>	Shrub	1.8	1.2	Hedges
23.	Croton	<i>Begonia scharffi</i>	Potted	3	6	Hedges
24.	Queen of	<i>Caladium bicolor</i>	plant	0.5	0.3	Hedges
25.	theNight	<i>Dieffenbachia seguine</i>		0.5	0.3	Hedges
26.	Begonia		Potted	0.5	0.5	Hedges
27.	Caladium	<i>Calatheaornatha</i>	plant			Hedges
28.	Dumb cane	<i>Zoysiatenuifolia</i>	Potted	0.5	0.5	Scent plant
	Calathea	<i>Paspalumnotatum</i>	plant	0.05	-	Corner plant
29.	Zoysia grass	<i>Cynadondactylon</i>		0.2		Corner plant
30.	Bahia grass		Potted	0.05		Corner plant
	Bermuda grass		plant			Corner plant
			Grass			Lawn
			Grass			Lawn
			Grass			Lawn

Source: Adapted from: (Anthony, 2015; Khamis, 2017; Okoronkwo, 2017).

CONCLUSION

This research work has laid a good foundation for landscape design and planning of the city centre which is functionally efficient, user-friendly and beautiful. Urban centres need to be well planned, managed, organized and maintained. Plant materials of different kinds should be adopted in landscaping of the city centres in order to improve the aesthetic value. Trees of

different species should be introduced at car parks, strategic and organized open spaces to control global warming by maintaining the amount of carbon (IV) oxide in the atmosphere and also serve as wind breakers.

Another conclusion of note is the use of durable and good quality elements of landscape such as statue, fountain, and flower pots to improve the landscape outlook of the city centre. Based on the evidences of the pictures taken from different locations of the city showing absence of landscaping elements, improper waste disposal practices and indiscriminate dumping of refuse on major streets of the city, this study concludes that people value and know the benefits of living in an environment surrounded by landscape elements that occur naturally and artificially. A lot is expected from us to collectively work together as a team so as to change, preserve and maintain our environments from natural and man-made disasters.

RECOMMENDATION

This research advocates that professionals in landscape planning and other related disciplines (Horticulturists, Nursery workers, landscape planners, etc.) should be employed in the various ministries and organizations related with the management of city centre to handle issues of landscape design, planning and adherence to the proposed maintenance schedule. There is need for adequate funding of landscape projects as well as sensitization to residents on the importance an aesthetic environment as well as compels residents to show more concern and respect for the environment.

It is further recommended that placing of street sign posts should be done to enlighten and direct people within the city centre.

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Urban Centres: a Case of Jos City Centre, Nigeria

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Reference to this paper should be made as follows: Erekpitan Omoikhefe
Ola-Adisa et al (2019). The Diminishing Role of Architecture in the Building
Industry: A Case Study of Jos Metropolis. *J. of Environmental Science and
Resources Management* Vol. 11, No. 2, Pp. 17-36
