



## Environmental Impacts of Landscape Elements among Urban Residents

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*This study analyzed the environmental impacts of landscape elements among urban residents in Jos North local Government Area (LGA) of Plateau state, Nigeria. A multistage sampling technique was employed to select residents in the study area. The data collected for this study was obtained from both primary and secondary sources. Data for the study were analyzed using; descriptive statistics and weighted average index analysis. The results revealed that several elements were significantly available to residents in the study area. Also, landscape elements in the study area have significant environmental impacts. To ensure sustainable ecological benefits; development of landscape elements, improved and effective utilization of available elements, adoption and development of appropriate management techniques are strongly recommended.*

### 1.0 Introduction

Over the last decade, many studies have been published about the aesthetic evaluation of landscapes. Many of them have examined differences between the visual perception of landscapes affected by human activities and the perception of natural landscapes (Simoni, 2003; Van den Berg and Koole, 2006). These findings are useful for understanding how the perception of a landscape varies among the people living in it, and how land-use planning reflects this perception (Tempesta 2010). Studies dealing with visual perception of the landscape have mostly evaluated landscape images as a whole (Palmer and Hoffman 2001; Arriaza et al. 2004). It is important for the perception of the landscape to know not only how the overall landscape is perceived, but also how individual elements located in the landscape are perceived (Rogge *et al.*, 2007). It is important to know elements that are generally considered by the public to be positive e.g. water, greenery, historic rural buildings, etc. (Arriaza et al. 2004; Bulut and Yilmaz 2008; Tempesta 2010), and also elements generally considered to be negative e.g. wind turbines, power poles, panel buildings, etc. (Arriaza et al. 2004; Bulut and Yilmaz 2008; Svobodova *et al.*, 2013). A number of studies (Kaltenborn and Bjerke 2002; Arriaza et al. 2004) have confirmed that the most positively evaluated landscape images have water elements, followed by images with plenty of vegetation and a traditional agrarian environment. The importance of the type of woody plants was confirmed by Sklenicka and Molnarova (2010), who examined preferences for various types of vegetation, and confirmed that the highest preference was for managed coniferous and wild deciduous forest elements. High ratings are awarded to landscapes that are visually well balanced; hence all of their elements fit well together. However, Tempesta (2010) found that some man made elements (e.g. traditional farm buildings, churches) are more favored in the landscape than some natural elements. Molnarova et al. (2012) point out the importance for the perception of the landscape of the overall aesthetic value of the landscape in which an anthropogenic element is set. In practice, it is important to know how the landscape preferences for individual elements differ in various landscape types, and thus to know whether one and the same element is perceived differently in different types of landscapes.

Landscape, as a term, has many definitions and has been subject to a wide range of disciplines. A landscape is the visible features of an area of land, its landforms, and how they integrate with natural or man-made features. A landscape includes the physical elements of geophysically defined landforms such as (ice capped) mountains, hills, water bodies such as rivers, lakes, ponds and the sea, living elements of land cover including indigenous vegetation, human elements including different forms of land use, buildings, and structures, and transitory



elements such as lighting and weather conditions. Combining both their physical origins and the cultural overlay of human presence, often created over millennia, landscapes reflect a living synthesis of people and place that is vital to local and national identity(<https://en.wikipedia.org/wiki/Landscape>). Landscape is a complex phenomenon which evolves continuously through time and space (Simensen *et al.*, 2018). It is a reflection of both natural processes and cultural changes throughout time. Landscapes can be a product of either only natural processes (natural landscapes) or human intervention on natural ecosystems (cultural landscapes) (Kaymaz, 2012). The character of a landscape helps define the self-image of the people who inhabit it and a sense of place that differentiates one region from other regions. It is the dynamic backdrop to people's lives. Landscape can be as varied as farmland, a landscape park or wilderness. The Earth has a vast range of landscapes, including the icy landscapes of polar regions, mountainous landscapes, vast arid desert landscapes, islands, and coastal landscapes, Densely forested or wooded landscapes including past boreal forests and tropical rainforests, and agricultural landscapes of temperate and tropical regions. The activity of modifying the visible features of an area of land is referred to as landscaping(<https://en.wikipedia.org/wiki/Landscape>). Since landscape involves a subjective experience, it encompasses a perceptive, artistic and existential meaning (Antrop, 2005; Kaymaz, 2012).

Perception is the process in which information is derived through senses, organized and interpreted. It is an active process which takes place between the organism and environment (R. Kaplan & S. Kaplan, 1989). This suggests that information is central to organism's survival and essential in making sense out of the environment, to which perception is assumed to be oriented. Perception of our environment helps us to understand and react to our environment. Environmental perception is different to object perception in many ways (Forster, 2010; Ungar, 1999); the components of the environment are diverse and complex. Therefore, perception of the environment is not immediate and it takes time. According to Carlson (2002), there are two basic modes of perception; autocentric, which is subject, centered, and allocentric, which is object centered. He explains that sensory quality and pleasure are involved in auto centric senses, while allocentric senses involve attention and directionality. He states that vision (except color perception) is mostly autocentric, and most sounds (except speech sounds) are autocentric (Carlson, 2002). The perception of the physical environment is not merely a physiological phenomenon. It is also influenced by the individual's experiences, and both social and cultural factors. Knox and Marston (2003) points out that " *Different cultural identities and status categories influence the ways in which people experience and understand their environments*". Thus, perception of our surrounding environment is learnt, selective, dynamic, interactive and individual (Lee, 1973). There is a mutual relationship between people and their physical environments which influences each other. Thus, landscape architects must acknowledge that perception of the environment plays an essential role in comprehension of this relationship. The localization of Landscape perception makes it difficult for outright generalization. Thus, human interaction with the landscape and the perception of what the landscape present at any particular time is reflected in these interactions in our natural and cultural heritages, landscapes need to be protected and managed in the context of sustainable development. This study aims to find out how individual elements in various types of landscape are perceived, focusing not only on an assessment of specific elements, but also on whether this evaluation is influenced by the type of landscape in which the element is located, and to what extent the characteristics of the respondents have an impact on the evaluation.

## 1.1 Objectives of the Study

The broad aim of the study was to analyze the environmental impacts of landscape elements among urban residents in Jos North local Government Area (LGA) of Plateau state, Nigeria, while the specific objectives were to:



- i. identify elements of landscape available in the study area; and
- ii. evaluate the environmental impacts of landscape elements.

## **2.0 Methodology**

### **2.1 Study Area**

This study was carried out in Jos North Local Government Area (LGA) of Plateau State. It is located between longitude 8°40N & 9°50E and latitude 9°40'N and 10°45'E. Jos North LGA has a near temperate climate, though located in the tropics. It has an average temperature of between 18°C-30°C, with annual rainfall of 1,300mm -1,500mm per annum (FAOSTAT, 2009). The LGA has one district (Gwong district) and fourteen (14) wards namely Naraguta A, Naraguta B, Abba na Shehu, Ibrahim Katsina, Ganagare and Tudun wada, Janta ,Garba Daho, Tafawa Balewa, Jos Jarawa, Ali Kazaure, Sarkin Arab, it has an upland area with undulating hills mountains, out crops forest reserves, rivers settlements, fertile agricultural land for dry and rainy season farming (FAOSTAT, 2009).

### **2.2 Sampling Techniques**

A multistage sampling technique was employed to select residents in the study area. The first stage involved the purposive selection of 4 wards out of the 14 wards in Jos North Local Government Area. The second stage involved the random selection of 5 communities in each of the 4 wards. In the last stage, from compiled lists of residents a random selection of 10% from a sample frame of 1,670 respondents from each of the 4 wards were selected, which gave a total sample size of 167 residents. However, only 150 questionnaires were retrieved and used for the purpose of this study.

### **2.3 Method of Data Collection**

The data collected for this study was obtained from both primary and secondary sources. The primary data for this research was collected through the use of well-structured questionnaires. : However interview schedules were also conducted on face to face basis. Secondary sources were drawn from the Internet, text, journals Diaries and magazines.

### **2.4 Analytical Techniques**

Data for the study were analyzed using; descriptive statistics (frequency distribution and percentages) to analyze objectives (i) and Weighted average index (WAI) to analyze objective ii.

#### **2.4.1 Weighted average index (WAI)**

Weighted average index (WAI) analysis is an Index ranking method that was used to evaluate the perceived impact of landscape in the study area. To determine the weight of each scale, each item was calculated by multiplying the frequency of each response pattern with its appropriate nominal value and dividing the sum with the number of respondent to the items. Responses for the components in objective are rated by using a three-point scale with the scoring order 3, 2 and 1 as high, moderate and low. A weighted average index (WAI) analysis was then estimated as adapted from (Devkota *et al.*, 2014); using the formula:

$$\frac{\sum f_i w_i}{\sum f_i} = WI \div \sum f_i \dots \dots \dots (1)$$

Where:

$\sum$  = Summation;

$F$  = frequency;

$W$  = weight of each scale;

$i$  = weight;

$WI$  = weighted index



### 3.0 Results and Discussion

#### 3.1 Landscape Elements

**Table 1: Distribution based Landscape Elements Available to Residents**

Elements	Frequency*	Percentage
Pedestrian walkways	105	70
Fence	97	64.7
Drainages	81	54
Trees	76	50.7
Shrubs	69	46
Rocks	55	36.7
Lawns	40	26.7
Sculpture	33	22
Streams/Rivers	27	15
Dams/Pools	15	10

Source: Field Survey, 2020; \* = Multiple Response

Table 1 revealed that the landscape elements available to residents in the study. The following were most prevalent in the study area; Pedestrian walkways (70%), Fences (64.7%), Drainages (54%), Trees (50.7%), Shrubs (46%), rocks (36.7%), Lawns (26.7%), Sculpture (22%), Streams/Rivers (15%) and Dams/Pools (10%). This corroborates with the findings of Rogge *et al.*, 2007; Arriaza *et al.*, 2004; Brady (2003) who also reported similar results.

#### 3.2 Environmental Impacts of Landscape Elements

**Table 2: Perception of Environmental Impacts of Landscape Elements**

Environmental Impacts	$\sum f_i w_i$	WI	Rank
Enhances physical environment	445	2.97	1 <sup>st</sup>
Improves aesthetic value	391	2.61	2 <sup>nd</sup>
Facilitates bio-physical interactions	352	2.35	3 <sup>rd</sup>
Facilitates sustainable development	339	2.26	4 <sup>th</sup>
Integrates sociocultural elements	321	2.14	5 <sup>th</sup>
Promotes ecological management	297	1.98	6 <sup>th</sup>

Source: Field Survey, 2020.



Table 2 revealed that the perception of environmental impacts of landscape elements in the study area and they include; enhancing physical environment (2.97). Improving aesthetic value (2.61), Facilitating bio-physical interactions (2.35), Facilitating sustainable development (2.26), Integrating sociocultural elements (2.14) and Promoting ecological management (1.98) as reflected by the mean scores. This corroborates with the findings of Blench (2003); Rogge *et al.*, 2007; Nohl, 2001 who also reported similar results.

#### **4.0 Conclusion and Recommendations**

This study analyzed the environmental impacts of landscape elements among urban residents in Jos North LGA, Plateau state, Nigeria. The results revealed several landscape elements available to residents in the study area and these elements have significant environmental impacts. Based on the findings of this study, the following recommendations are made for policy actions to improve the management and environmental impacts of landscape elements in the study area;

- i. Policy formulation to enhance sustainable development of landscape elements.
- ii. Formulation of policies to promote ecological management using landscape elements.
- iii. Adoption of policies that integrates effective utilization of sociocultural aspects of landscape elements.

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