

# Severity of Human Activities on the Landscape in Tropical Climate a Case Study of Zamfara State

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## **Abstract**

*The current trend is agricultural activities have shifted that attention of people on the need for landscape preservation. Generally, Landscape is important, not just as scenery but because it links culture with nature, and the past with the present. It has many values, not all of them tangible (such as sense of place); and it matters to people. Thus this paper assesses human activities within the study area that leads to excessive stretch on the landscape arranged in their order of severity. Three local Governments were studied (Gusau, Tsafe and Marafa local government Areas) by means of physical inspection, interview and well-structured questionnaire was adopted for this purpose adopting a random sampling method in the administration of the questionnaires. A total of 70 questionnaires were distributed, out of which 60 were properly completed and returned, each local government being administered with twenty (20) questionnaires. Data collected were analysed using SPSS version 19.0. The result revealed among others that Bush burning is the highest contributor to the alteration of the landscape of the area; this was followed closely by deforestation activities and then the inadequate drainage network in the area under study. Thus, it is recommended that regulations be enacted that will regulate the bush burning activities as well as deforestation in the area. Also government should also endeavor to construct good drainage network in order to help in contributing to the quest of the landscape preservation.*

**Keywords:** *Human Activities, Landscape, Tropical Climate*

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Date of Submission: 01-03-2022

Date of acceptance: 12-03-2022

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## **I. INTRODUCTION**

As a result of very fast demographic, socio-economic and technological changes, the level of modification of the landscape is increased. It is of particular importance to determine the intensity of the dominant geomorphologic processes, as well as a level of its modification in relation to anthropogenic factor (Slavoljub & Ivica, 2015).

In 21st century a number of critical changes drive variety of environmental problems which not only effect the local landscape but also the whole world, the landscape changes display a resolute image of environmental crises (Çelik 2013). The environment provides all of functions and services which are driving

tools for the life, men modified the landscape in more than one way to fulfil the needs in everyday life. Human are the actors and landscape are symbolic representation on nature and environment(Riley & PMu2015)

The destruction of forest, water flooding, runoff and other vegetative cover is one of the major causes of several disasters in the environment. In spite of the immense benefit derived from plants, it is being destroyed at an alarming rate. It is on record that the tropical forest is declining fast and that Nigeria is among the worst affected countries. The rate of decline is estimated at about 10% in Nigeria (Anyanwu,2013)

With the rising technology, man became a major modifier of the biosphere, The activities that greatly modify natural vegetation include crop cultivation, grazing, lumbering, quarrying, bush burning and urbanization leads to near total obliterating of the natural vegetation which is been replaced by building, concrete surfacing (Arola, 2018). In the cause of industrialization, urbanization and development of intensive agriculture many of the environmental hazards confronting man are created. Not limited to run off are other environment hazards caused by the absence of soft landscape materials such as water pollution, noise, flooding, pest emergence, soil wash etc. in a major factor leading surface run off and other environmental hazard in Zamfara state.

One of the properties of landscaping is such that Landscaping can change the microclimate around a building by 20 - 25 degrees. According to the US Dept. of Energy, energy-efficient landscaping can save up to 30% on home heating bills. Savings for cooling can be even more. Tests in Florida showed a 50% reduction in air conditioning costs. Most people can save at least a few hundred dollars a year by properly reworking their yard. This can also increase the value of your home since buyers will pay more for a house with low utility bills. Thus, as it relates to Nigeria, there are considerable number of aspect to be considered in landscaping such as; sunlight, water, soil, and color of your house. Some of these aspects have been covered by a form of landscaping referred to as the 'cultural landscaping'.

Cultural landscaping has been defined by the world heritage committee as distinctgeographicalareas or properties uniquely representing the combined work of nature and of man. The world heritage committee has identified and adopted three categories of cultural landscape, ranging from:

- i. Those landscape most deliberately 'shaped ' by people
- ii. Full range of combined work
- iii. Those least evidently shaped by people (yet highly valued ).

The cultural landscaping by different tribes and nations has existed over centuries and varies from one place to another. It has served as a mark of identification of the various people groups which they preserve for centuries and also exhibit it whenever they move and settle. The cultural landscape of people tells history of the people as well as indicating their social values and social life. For long plant existing in their immediate environment has been used in folktales and proverbs of some tribe for example, the Zaria city \Kaduna state is covered with numerous*Ceibapentadra* (silk cotton). The people inhabiting the city have used it in their proverb which state that "the silk cotton tree is more faithful than a Zaria woman" this indicates that their trees are always their but their women may be here today and tomorrow they are gone to marry another man. Zamfara state also has it peculiarities emphasized in the community landscape, these peculiarities and their relevance in retaining the cultural norms and value is what this work emphasizes Gidado, &Alao, 2018).

Similarly, because we cannot forever continue to abuse our surroundings and still expect a healthy, attractive community, we must learn to balance our needs with those of the environment. Thus, the work also seeks to emphasize the benefit of landscaping. Beneficial landscaping as another form of landscaping attempts to build on the relevance of landscaping and in addition emphasizes on the need of protecting and conserving our natural resources

Beneficial landscaping, sometimes referred to as natural or native landscaping though it is more than that, contains a number of principles that revolve around balancing our needs and sense of beauty with those of nature (our ecosystems) because, in the long run, they are interrelated (El-Shafie 2010).

Environmental hazard as the word is understood today hardly existed in the early centuries, however early 1950 when men became more aggressive and exploitative on the natural resources thereby, pitting away the natural vegetation cover that protected the landscape; particularly the soil from runoff, drought and wind erosion. Also with the frequent reoccurrence of water flood and dam runoff in the local government under study there is a pressing need to emphasize the relevance or importance cultural landscaping to the communities and in the preservation of the communities social value

Landscaping is still at its infancy in Nigeria and there is a need to build up the cultural landscaping in Nigeria which will serve as a guide to planning of landscaping and development in the country. The zamfara like many other tribes in Nigeria have a unique landscaping structure in their villages. The traditional and cultural landscaping of the Zamfara is fast changing or even disappearing without being studied and documented. The good aspects of this could be lost and the bad aspects could continue to be repeated. Thus there is need to emphasize the importance of landscaping necessitated the research work(Erickson, 2010).

Thus this paper assesses the various human activities that impacts the landscaping of the area in their order of severity with a view on getting the respondents opinion on measure to maintain the landscape by means of landscape architecture to combat environmental hazard such as runoff and draught. The study focused on the following local government areas of Zamfara State: Gusau, Tsafe and Marafa local government. The research work is restricted to the establishment of the importance of landscaping in the itemized areas above.

Furthermore, in lieu to achieve the aim of this research, the research work is limited to only problems facing the environment such as runoff, flooding and wellbeing of man that consequently have an effect on the landscaping of the environment.

## **II. LITERATURE REVIEW**

### **CONCEPT OF LANDSCAPE ARCHITECTURE**

According to Garret Eckbo, he stated that by natural providence, humans are social beings and do not anticipate to live in isolation. There are levels of spaces for people to occupy and operate. Landscape architecture is a profession that is saddled or concerned with the responsibility of enhancing the qualities of the various levels of spaces that human beings occupy. Therefore landscape architecture as a profession has the responsibility to provide convenience at all level of spaces for people to function well. Landscape architecture has roots in the design of public outdoor spaces.

It could also be defined as the art and science 'of modifying land areas by organising natural, cultural or constructed elements according to a comprehensive aesthetic plan. (Saleh-Bala, 2010).

Landscape projects can be small, medium, or large. It can cover a single family residential unit or large packs, commercial and industrial development, institutional projects, planning and analysis, land and water reclamations and conservation projects, oil spillage, runoff control interior landscape architecture, historic preservation and restoration, landscape arts and art sculptures, roadside improvement, flood control, -cemetery and crematoriums, street beautification, and theme parks (Saleh-Bala, 2010).

### **Concept of Landscape Development**

According to Garret Eckbo, he stated that the environment is confronted with complex hazardous problems globally. The rate of deterioration is quite alarming and the comfort and convenience of man in the environment is in a precarious state. This is as a result of the rapid increase in population which as lead to the aggressive approach by man in making use of the natural resources thereby causing these natural elements to go extinct and calls for intervention which could only be redeemed through a systematic approach in landscape planning and development.

Landscape development is the actual transformation of a place from its original state to a desired state based on the provision in the master plan and design details pertaining to a particular site. The transformation involves the different levels of construction from preliminary to finishing stages.

However, before the actual transformation or implementation commences, detailed design of the accepted or adaptable alternative plan would be completed. The accepted alternative plan evolved from synthesis of information generated from the studies of the site or sites in the context of the existing natural and cultural element, the factors influencing their existence and the overall resistance factors.

Landscape development therefore, involves inventory of the natural and cultural elements at the site and the immediate context, the study and analysis of their nature, resultant interaction sustaining their existence and impact analysis in terms of opportunities and constraints.

Thus alternative and conceptual or functional plans will be generated considering the specific project requirement, design details of the selected alternative plan and final implementation through series of construction processes, Thereby generating an effective and functional landscape design for any category of projects. The process of site inventory, analysis and synthesis of information, generation of plans and design and construction details requires a broad base interdisciplinary and transdisciplinary approach involving basic knowledge in Architecture, urban and regional planning, arts, environmental engineering, environmental and behavioral Sciences, geography and geology, horticulture and forestry and the general public. In addition to acquiring the basic knowledge in these disciplines for landscape study planning and development, they are required for effective documentation and explanation of the schemes through common conventional graphic symbols and modeling techniques. (Ekweruo, 2000).

### **Landscape Development in the Tropical Environment**

The tropical environment as provided by nature is endowed with variation in vegetation, soil, and social factors. The differences in latitude and altitude distance from the sea ocean currents and amount of cloud cover are responsible for the variation in temperature which occurs within the tropics. Thus there is a seasonal variation which occurs in this environment, during the hottest month, close to the equator mean sea level, temperature of 27c - 30c are experienced while during the coolest are 24c - 27c.

In essence, within the tropics heavy precipitation is likely to occur in areas immediately around the equator. This is due to the high level of temperature throughout the year in such areas favouring the rising of the air. Also areas close to the sea likely experience heavy precipitation because of the prevailing winds which blows onshore throughout the year in such areas.

### **Research Methodology**

This section will elucidate the research work design and methodology for the study. This research work was carried out via an extensive literature review of relevant text books, journals and conference proceedings were the source of data for the study. The field survey was by means of a structured questionnaire and via a physical inspection of the communities under study as well as the interview of individuals where necessary for data collection instrument.

### **Population of the Study**

Zamfara State is a state located in north-western Nigeria. Its capital is Gusau. Until 1996 the area was part of Sokoto State. Although the people of Zamfara have over the years struggled to have autonomy, it was not until 1996 that the then Military Administration of the Late General Sani Abacha detached Zamfara State from the former Sokoto State. Zamfara is largely inhabited by Hausa and Fulani tribes. Other major tribes include the Zamfarawa mainly from Anka, Gummi, Bukkuyum and TalataMafara Local Governments areas. Gobirawa from Shinkafi Local Government. Gobirawa are those who actually migrated from the Gobir Kingdom. Burmawa are found in Bakura and Fulani are found in Bungudu, Maradun, Gusau and are also scattered all over the State. While in Tsafe, Bungudu and Maru Local Governments are found Katsinawa, Garewawa and Hadejawa. While Alibawa are found in KauraNamoda and Zurmi. Zamfara state has an area of 39,762 square kilometers. It has a population of 3,602,356 according to the 1991 census and contains fourteen local government areas. The state is bordered in the North by Niger republic, to the South by Kaduna State. In the east it is bordered by Katsina State and to the West by Sokoto and Niger States.

The climate of Zamfara is warm tropical with temperature rising up to 38°C between March to May. Rainy season starts in late May to September while the cold season known as Harmattan lasts from December to February.

The population of this study comprises the responses of people living in the three local governments understudy: Gusau, Tsafe and Marafa local government Areas of Zamfara state. This study will require an assessment of the existing landscape within these local government as well as the measure of the awareness level of the people on the need for preserving the landscape of their environment irrespective of their agricultural activities.

### **Sampling Size and Administration Of Data Collection Instrument**

A total of seventy (70) questionnaires were distributed to respondents residing in the local government under study in Zamfara state and the major constrain is the security challenges experiences within the study area that made assessing the respondents very challenging owing to the fact that most of them cannot equally respond too google forms.. Emphases were given to the rural settlers of the local government area though the data collection at that level was via interview and inspection of the areas.

### **Data Collection Instrument**

The study sought data using a questionnaire through field survey as described below

#### **Questionnaire:**

The questionnaire was designed to be filled by respondents from the various local government areas under study. The questionnaire sought information in the following aspect human activities and landscaping of the environment:

- i. To identify the major occupation and activities of the people and how it affects the landscape of the areas under study
- ii. The people opinion or some of the natural methods of carrying out their activities that will help to improve the landscape of the area understudy.

### **Data Analysis**

The data collected for this study was subjected to various statistical analyses. The results of the analysis are presented in the forms of table for the purposed of easy comparism and clear expression of the findings. The field inspection carried out will also be presented via plates to further reveal the nature of landscape identified.

Item representing the perception of the respondents.

The numerical scores for the completed questionnaires provided an indication of the varying degrees of the use of the construction documents. To further analyse the data with a view to establishing the significance of

the variables considered, the Relative Importance Index (RII) was calculated for each document according to their frequency of use as suggested for use by Memon et al, (2006) and Othman et al, (2005) It was calculated using the formulae

$$RII = \frac{4n_5 + 3n_4 + 2n_3 + 1n_2 + 0n_1}{4N}$$

Where;

- n1= number of respondents for 'never'
- n2 =number of respondents for 'seldom'
- n3=number of respondents for 'sometimes'
- n4=number of respondent for 'often'
- n5=number of respondents for 'always'
- N=total number of respondents

RII ranges between zero to one. The four-point scale ranking was transformed to relative importance indices (RII) for each of the construction contract documents. The weighted average for each item was determined and ranks were assigned to each item, representing the perception of the respondents.

Results are classified into three categories as follows (Othman et al, 2005) when;

RII<0.60 -it indicates low frequency in use

0.60≤RII<0.80 -it indicates high frequency in use.

RII≥0.80 -it indicates very high frequency in use.

Data was also presented in graphic form namely pie charts, and tabulations. Descriptive analysis of data relating to rating/frequency, simple percentages were used to analyse data.

### **Data Presentation, Analysis and Discussion**

Data for this research was obtained from the opinion of the respondents gotten from a well-structured questionnaire. Other information presented was gotten from interview and physical observation as part of the field survey carried out within the area of study.

#### **Result of the field survey**

From the field survey carried out within the area of study it can be established that the area is experiencing serious problems of erosion and has no classified drainage channels which is a major contributor to the erosion of the area and consequently an effect on the landscape of the area. This observation can be clearly seen from the plates (See Appendix I)

From the plates, it can be seen that the trees in the area of study is sparsely spaced owing to the intensive deforestation activities being carried out in such areas. Hence inferences can be made from the plates on the nature of the relief of the area under study

#### **Percentage Responses of Administered Questionnaire**

The study was conducted using a questionnaire in addition to the field survey carried out. Seventy (70) questionnaires were distributed within the area of study with only sixty(60) of the questionnaires returned well filled giving a percentage response of about 85.7%as illustrated in table 4.1 below:

**Table 1: Percentage Response**

Category of Questionnaire	Frequency	Percentage (%)	Cumulative
Number returned	60	85.7	85.7
Number not returned	10	14.3	100
Total number distributed	70	100	

Source: Survey 2013

#### **Nature of the Respondents**

Table 2 presents the demography of the respondents and from the analysis, the following deductions can be made: 88.3% of the respondents were native of Zamfara state, giving a frequency of respondent of 53 out of the 60 respondent. The remaining 11.7% of the respondents were individuals from neighbouring state settled in the area. With regards to the highest educational qualification of the respondents, it can be established that 33% of the respondent claim to have a university degree, followed closely by 28.4% of the respondents having polytechnic diploma and the least percentage was 5% for respondents with WASC certificate. Hence, it can be established that a larger majority of the respondent have a fair idea of what landscaping imply owing to their educational exposure

The Table also presented the predominant occupation of the respondents, and the result revealed that a greater majority of the respondents were into farming making up to50%, this was followed closely by 30% of

the respondents who are civil servants. Hence it can be deduced that there is an intense use of the land for agricultural purposes.

Finally with regards to the respondent duration of residence in the area of study, 33.3% attested to have spent over 20yrs in the area, followed closely was 30% for those who have spent between 11-15yrs in the area and the least percentage of 16.7% for those who have not spent up to five years in the area of study.

**Table 2: Respondent Profile**

S/N	Profile	Option	Frequency (No)	Percentage (%)
1	Category of respondent	a) Natives	53	88.3
		b) None Natives	07	11.7
		<b>Total</b>	<b>60</b>	<b>100</b>
2	Highest qualification	a) Primary school Cert	8	13.3
		b) WASC/SSC/GCE	15	25.0
		c) Polytechnic Diploma	17	28.4
		d) University Degree	20	33.3
		<b>Total</b>	<b>60</b>	<b>100</b>
4	Occupation of respondents	a) Farming	30	50.0
		b) Fishing	03	5.0
		c) Hunting	07	11.7
		d) Animal Rearing	02	3.3
		e) Civil Service	18	30
		<b>Total</b>	<b>60</b>	<b>100</b>
	Duration of Stay in the Community	a) 0-5yrs	10	16.7
		b) 6-10yrs	12	20.0
		c) 11-15yrs	18	30.0
		d) 20yrs and above	20	33.3
<b>Total</b>	<b>60</b>	<b>100</b>		

**Source: Field Survey, (2018)**

### Activities Affecting the Landscape of the Environment

The opinion of the respondents with regards to the activities that affect the landscape of the area was analysed using the Relative Importance indices (RII) and from the result shown in Table 3, a ranking of which of the activities mostly affect the landscape of the area can be drawn

From the table it can be established that even though the whole activities identified has a major contribution on the alteration of the landscape of the area, the responded ranked 'bush burning' (RII=0.73) as the activities with the most severe impact on the landscape of the area. This was followed closely by Deforestation activities (RII= 0.71), and 'Inadequate drainage system in the environment (RII= 0.60) which ranked second and third respectively. Similarly, over grazing by animals leading to erosion and detail the ranking of other activities are as shown in the Table others as illustrate in the table above.

**Table 3: The Factors Affecting the General Landscape of the Environment**

S/N	Activities That Affect The General Landscape	ΣF	MEAN	RII	RANK
1	Constructions done not in accordance to town plan	60	2.66	0.53	5 <sup>th</sup>
2	Indiscriminate Waste Disposal	60	2.43	0.47	7 <sup>th</sup>
3	Over Grazing from animal	60	2.70	0.54	4 <sup>th</sup>
4	Lack of Orientation on the importance of a good landscape	60	2.60	0.52	6 <sup>th</sup>
5	Deforestation activities	60	3.55	0.71	2 <sup>nd</sup>
6	Inadequate drainage system in the environment	60	2.98	0.60	3 <sup>rd</sup>
7	Bush Burning	60	3.64	0.73	1 <sup>st</sup>

**Source: Field Survey, (2018)**

**Where; 1= Never Affect, 2= Slightly Affects, 3= Neutral, 4= Slightly Affects, 5= Strongly Affects**

### Activities That Can Facilitate the Maintenance of the Landscape of the Area

The opinion of the respondents was also sought with regards some of the activities that can help in maintaining and preserving the landscape of the area. Their responses was also analysed based on the Relative Importance Indices (RII). The result of the analysis is given in table 4.7 below:

**Table 4: Activities That Can Facilitate the Maintenance of the General Landscape Features of the Environment**

S/N	Activities That Can Be Adopted To Maintain The Landscape Of The Environment	ΣF	MEAN	RII	RANK
1	Regulation to animal overgrazing that can lead to lead of weathering of the soil	60	3.20	0.64	4 <sup>th</sup>
2	Orientation of people on the need for good landscaped environment	60	2.85	0.57	6 <sup>th</sup>
3	Construction of good drainage network	60	3.35	0.67	3 <sup>rd</sup>
4	Adoption of a central waste disposal system	60	3.10	0.62	5 <sup>th</sup>
5	Regulation of bush burning activities	60	4.05	0.81	1 <sup>st</sup>
6	Regulation of deforestation activities	60	3.50	0.70	2 <sup>nd</sup>

**Source: Field Survey, (2018)**

**Where; 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree**

From the table above, the respondents ranked ‘Regulation of bush burning activities (RII=0.81); ‘Regulation of deforestation activities’ (RII=0.70) were ranked first and second respectively in the order of efficacy to be adopted in preserving the landscape of the area. Similarly, construction of good drainage as well as regulation and avoidance of overgrazing among other activities were identified as the top ranking activities that will help in preserving the landscape features of the area under study.

### III. CONCLUSION AND RECOMMENDATION

#### CONCLUSION

Based on the findings extracted from the responds and opinion of the respondents the following conclusions have been deduced

- i) Bush burning is a major activity that can lead to the alteration of the landscape of an area
- ii) Lack of good drainage network is one of the major contributors to landscape alteration especially as it’s a major contributor to erosion of the soil
- iii) Overgrazing can also lead to the alteration of the landscape of an are if not properly checked out regulated
- iv) Deforestation especial in the area of study is detrimental to the preservation of the landscape of the environment.
- v) Lack of orientation of the general public on the relevance of landscape preservation account for thr callous attitude of the general public in the use of the natural endowment of the area
- vi) The contribution of town planning bodies in the preservation of the landscape of the environment is very vital as it will help to eliminate the haphazard building of houses and other facilities which have effect on the areas in which they are located.

#### RECOMMENDATIONS

Based on the conclusions above, the following is recommended to enhance the preservation of the landscape of the area under study:

- i) Regulation of bush burning activities and the inaction of the laws that will enforce and penalize violators of such laws
- ii) Government and state shown try and construct good drainage channel as it will help to control runoff water that consequently erode the soil.
- iii) Overgrazing of animals to the point that the sodil is being endangered should be discouraged
- iv) There should regulation to the deforestation activities and a corresponding effort should be made to plant more trees ( A forestation)
- v) The general public be oriented on the need to preserve the landscape of an area with emphasis on the energy impact of some activities
- vi) These are need for the provision of a central waste disposals unit as this will help in checkmating indiscriminate disposal of waste within the area.

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Appendix I



Plate4.1:UnguwarGwazaGusau



plate4.2: Gidanbakotsafe Road



Plate4.3:WankeGusau



Plate 4.4: YandodoTsafe



Plate 4.5: hanyikarzaGusau  
Source: Survey, 2013



Plate4.6: furfiriGusau Road