LANDSCAPE PLANNING AND ENVIRONMENTAL QUALITY IN TRADITIONAL URBAN CENTER: ARE THERE ANY IMPACTS

***AGBABIAKA Hafeez Idowu,**
OMISORE Emmanuel Olufemi,
DAUDU Abibat Adetoun,
KUYE Oluwaseun Abayomi

Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria
*Corresponding author: **Tel:** +2348067169480; **E-mail:** wisdomislifee@yahoo.com

ABSTRACT

The benefits and well-being associated with landscaping are numerous and capable of creating an overwhelming impact on the quality of human environment. Therefore, this study evaluated the impacts of landscape planning on environmental quality in Ibadan, Oyo State, Nigeria. Systematic sampling technique was used to select 97 residential houses accounting for 8% of the total houses in Old Bodija, while 67 residential houses representing 10% of the total houses in new Bodija estates were selected for questionnaire administration; therefore, 164 residents were sampled. The impact of landscape planning on the environment was categorized into physical, socio-cultural, psychological, economic and environmental component. Findings established that landscape planning has Impact on all the components of the environment, this was revealed by the result of the Relative impact Index (RII) producing the indicators that are mostly influenced by landscape planning (Physical components (parking facilities RII=5.80 and Dev +0.39), Socio-cultural (religion RII=5.09 and dev +0.09), psychological (interaction RII=5.89 and dev +0.43), economic (property value RII= 5.88 and dev. +0.50), environmental (air quality RII=5.78 and dev. +0.60). Therefore, the positive impacts of landscape planning on the environment outweighed the negative impacts and thus creating an aesthetic pleasing environment for human habitation.

Key words: Landscape, Landscape Planning, Landscape Planning Procedures, Residents' Familiarity, Environmental Quality, Impacts, Traditional Urban Center

BACKGROUND TO THE STUDY

Environmental quality is the total condition of the physical environment. The overall quality of an environment depends on the different condition of different environmental variables. Humans have always inhibited two worlds. First is the natural world of plants, animals, soils, air and water. The second is the world of social institutions and artifacts that man created using science, technology and political organization. Both worlds are essential to human lives, but integrating them successfully causes enduring tensions (Terwase and Theresa, 2013). Environmental quality influences decisions made on quality of life. This factor influences the value of property, and its social popularity generates economic benefits. Major basic need of human being in the environment includes high standards of living, security and a high scenic value (Cellmer, Senetra, and Szczepańska, 2012).

Ayeni (2012) stressed that individuals feel significantly better after exposure to nature scenes. Therefore, landscaping that includes trees, shrubs, lawns, gardens and flowers improve our quality of life. It enhances and helps the environment by cleaning the air,

controlling erosion and providing shelter to wildlife. In addition to nature is the man made elements which also contribute to the quality of life through visually pleasing environment. Shahli, Hussain, Tukiman, and Zaidin, (2014) established that plants are importance in providing aesthetic and pleasant environment for the community. Plants offer qualities that help to direct foot traffic in the landscape, moderate the environment around the home, hide objects, or lead the eye and stimulate other senses like smell and feel. The basic elements that plants contribute to the landscape in order to express the principles of design are form, texture, and colour. This means residential landscapes can provide an opportunity for people to experience nature in the middle of urban areas and create a beautiful visual image of the community (Williams and Tilt, 2006)

Landscaping plays an essential role in the quality of our environment, affecting our economic well-being and our physical and psychological health (Alex X. Niemiera, 2015). Ibimula (2014) described landscape planning as the work of planning, designing, and supervision of beautification works in the area usually containing buildings. This planning work are organized through the use of basic principles of unity, balance, accents, focalization, scale, proportion, harmony and rhythm, variety, sequence and emphasis. Landscaping aims at shaping the environment, for the comfort of man. Kingsley and Christopher (2014) perceived landscape as the art and science of restructuring the man- made environment in order to create harmony with nature. They identified landscape planning as a tool for urban improvement which aims at enhancing the beauty and aesthetic quality of the environment. They highlighted the advantages of landscaping as a strategy for improving the environmental quality. A direct contact with nature, particularly a well-designed landscape can facilitate relaxation, restorative effects; contribute to quality of life, reduction of psychological-stress, improvement to physiological-physical health, and reductions in blood pressure (Morris, 2003; Southeast England Development Agency (SEDA) 2005; and Thompson, et al, 2007).

From the forgoing, it is crystal clear that benefits and well-being associated with landscaping are numerous and capable of creating an overwhelming impact on the quality of human environment. Therefore, it is imperative to evaluate the impacts of landscape planning on environmental quality in Ibadan, Oyo State, Nigeria.

STUDY AREA

Ibadan is the capital of Oyo State; located in the South West of Nigeria It lies within latitude 7° 19’ 08” and 7°29’ 25” of the equator and longitude 3° 47’ 50”and 4° 0’ 22” (See Fig.1). Ibadan North LGA was created on 27th September, 1991. The local government area lies between longitude $3^{0}53^{1}$ and $3^{0}56^{1}$East of Greenwich Meridian and latitude 7^{0} 23^{1} and $7^{0}29^{1}$ North of Equator, with a total land area of 27.562 km^{2}. The population of the LGA is 308,119, with an annual growth rate of about 3.2% (NPC, 2008). Politically, the local government area comprises of 12 wards (Oyo State Independent Electoral Commission, 2014). The astronomy growth of Ibadan came as a result of the establishment of the Nigerian Premier University College in 1948 and the University College Hospital in 1957 as well as designation of Ibadan as the capital of Western region in 1952. These developments brought about notable physical development and restructuring such as the Secretariat Office complex, Bodija Housing Estate in 1959 designated to provide accommodation for increasing number of professionals and ease the pressure on other existing GRAs in Agodi and Jericho. Bodija is a district in Ibadan North local government. It is bounded in the west by Ido and Ibadan North-west, in the East by Lagelu, Egbeda and Ibadan South East local government respectively; and bounded in the North by Akinyele local government. The region gained prominence with the development of Bodija Estate shortly after the Independence of Nigeria.

There are two of such Estates within the region. Old Bodija and New Bodija. It is a well-planned and landscaped environment.

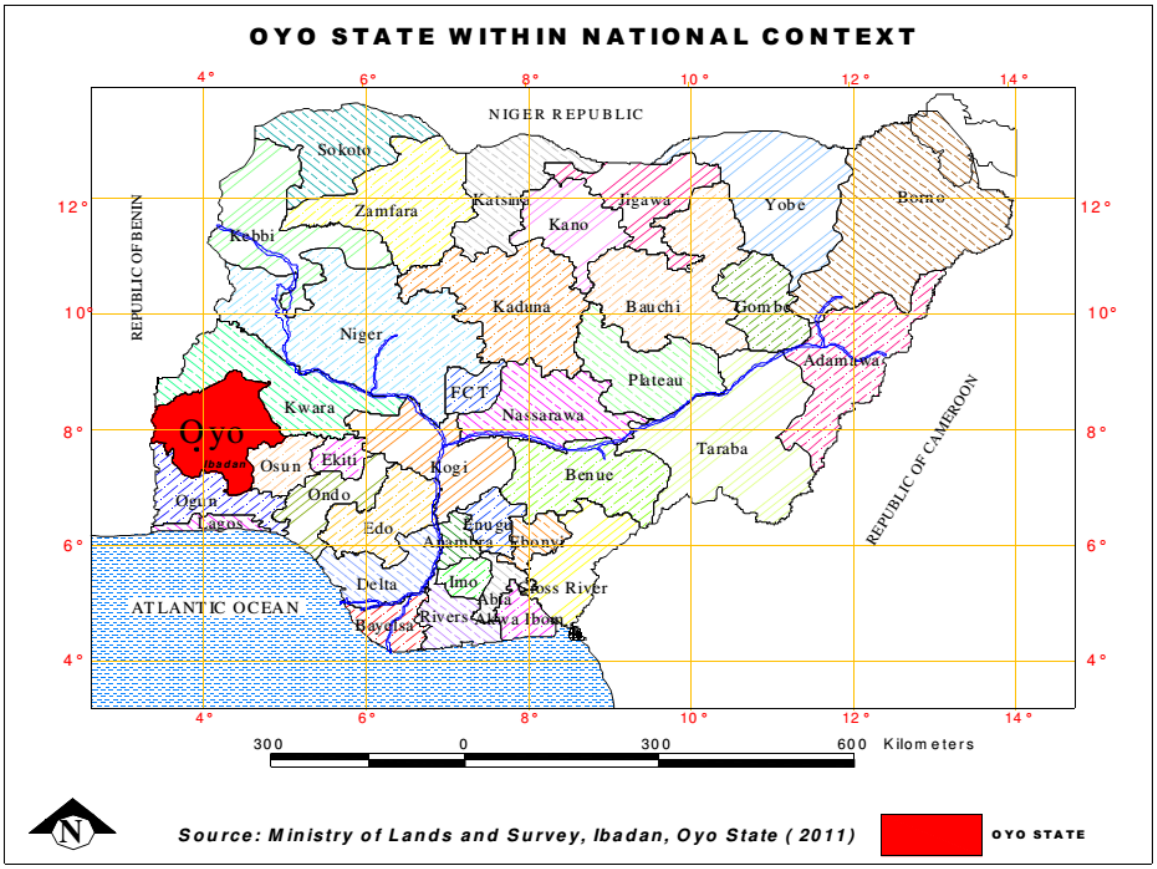

Figure 1: Map of Nigeria showing Ibadan

RESEARCH METHODOLOGY

Questionnaire administration was used to collect primary data for the study. There were 1,208 residential houses in old Bodija, and 656 residential houses in new Bodija (Oyo State Property Development Corporation, 2015). Systematic sampling technique was used to select 97 residential houses accounting for 8% of the total houses in Old Bodija, while 67 residential houses representing 10% of the total houses in new Bodija estates were selected for questionnaire administration. In this case, the first building sampled at the new Bodija Estate was selected at random and every subsequent 10th building was sampled, following the line of accessibility. The same thing was done at the old Bodija Estate but the first building was selected at random, and every subsequent 8th building was sampled. Therefore, the total number of buildings sampled in the study area was 164. One adult resident was contacted in each of the selected building (see table 1).

Table 1: Sample Frame and Sample Size

Stratification of Study Area	Total No. of Buildings	Sampled Building	Percentage (%)	Sampled Residents
Old Bodija Estate	1208	97	08	97
New Bodija Estate	656	67	10	67
Total	**1864**	**164**	**18**	**164**

Source: Author's Survey, 2016

Secondary data was obtained from Website of Oyo State Property Development Corporation, Ibadan North Local government, and Department of Geography, Faculty of Social Sciences, Obafemi Awolowo University, Ile-Ife. Information obtained includes: number of houses in Old and New Bodija Estates and maps. Data gathered was analyzed using frequency distribution, graphs, Mean Index (MI) and Relative Impact Index (RII)

Computation of Mean Index (MI) values of Environmental Quality in Table 2

Column 1: Identified component of environmental quality
Column 2: Number of individual perception of each components with 5 (Strongly Agree)
Column 3: Number of individual perception of each components with 4 (Agree)
Column 4: Number of individual perception of each components with 3 (Not Sure)
Column 5: Number of individual perception of each components with 2 (Disagree)
Column 6: Number of individual perception of each components with 1 (Strongly Disagree)
Column 7: Addition of individual respondent rating a particular environmental component and the respective weighted values. For instance, TWV for satisfaction with homes and yards = (61×5) + (31×4) + (34×3) + (20×2) + (18x1) = 589
Column 10: Mean Index (RPI) equals Total Weighted Value (SWV) divided by addition of individual respondents rating each environmental component. For instance, mean value for satisfaction with homes and yards=$\frac{589}{164}$ = 3.59
Column 11: The deviation equals to total Mean Index for all the 11 components subtracted from mean value for each variable e.g$\frac{36.23}{11}$= 3.29, Deviation (MI -$\overline{MI}$) = 3.59 – 3.29 = 0.30

Computation of Relative Impact Index (RII) of Landscape Planning on Environmental Quality values in Table 5

Column 1: Identified environmental component variables
Column 2: Number of individual impact's rating of each environmental component with 7 (Extremely High)
Column 3: Number of individual impact's rating of each environmental component with 6 (Very High)
Column 4: Number of individual impact's rating of each environmental component with 5 (Moderately High)
Column 5: Number of individual impact's rating of each environmental component with 4 (Low)
Column 6: Number of individual impact's rating of each environmental component with 3 (Moderately Low)
Column 7: Number of individual impact's rating of each environmental component with 2 (Very Low)
Column 8: Number of individual impact's rating of each environmental component with 1 (No Impact)
Column 9: Addition of individual respondent rating a particular environmental component and the respective weight values. For instance, TWV for Air = (33×7) + (50×6) + (57×5) + (24×4) + (0x3) + (0x2) + (0x1) = 912.
Column 10: Relative landscape planning Impact Index (RII) equals Total Weight Value (TWV) divided by addition of individual respondents rating each planning procedure. For instance, RII for Air=$\frac{912}{164}$ = 5.56
Column 11: The deviation equals to mean of relative landscape planning index for all the categories of environmental components subtracted from RII value for each variable e.g. for physical components variables $\frac{54.07}{10}$= 5.4, Deviation for Air (RII -$\overline{RII}$) = 5.56 – 5.4= 0.16
Column 12: Square of values in column 10 e.g. $(0.16)^2$= 0.0256
Column 13: Is the ranking of the environmental components variables as impacted by landscape planning in the order of the highest positive deviation to the least negative deviation.

Computation of RFI values

Column 1: Identified landscape planning procedures in landscape planning
Column 2: Individual familiarity's rating of each landscape planning procedure with 5 (Very Familiar)
Column 3: Individual familiarity's rating of each landscape planning procedure with 4 (Familiar)
Column 4: Individual familiarity's rating of each landscape planning procedure with 3 (Not Sure)
Column 5: Individual familiarity's rating of each landscape planning procedure with 2 (Slightly Familiar)
Column 6: Individual familiarity's rating of each landscape planning procedure with 1 (Not at all Familiar)

Column 7: Addition of individual respondent rating a particular landscape planning procedure and the respective weight values. For instance, SWV for use of naturalistic design = (43×5) + (35×4) + (18×3) + (41×2) + (27x1) = 518.

Column 10: Residents' Familiarity Index (RFI) equals summation of weighted value (SWV) divided by addition of individual's rating each planning procedure. For instance, RFI for use of naturalistic design=$\frac{518}{164}$ = 3.16

Column 11: The deviation equals to mean of relative familiarity index for all the 11 procedures subtracted from RFI value for each variable e.g$\frac{39.44}{11}$= 3.59, Deviation (RFI -$\overline{RFI}$) = 3.16 – 3.59 = -0.43

Column 12: Square of values in column 10 e.g $(-0.43)^2$= 0.1810

Column 13: Is the ranking of the planning procedures in the order of the highest positive deviation to the least negative deviation

RESULT AND DISCUSSION

Residents' Perception of Environmental Quality of the Study Area

The overall quality of the environment of a particular area will depend on the different conditions of environmental variables. This is supported by Abdulghani and Nurwati (2012) who argued that satisfaction with social, economic and physical conditions of the environment tend to contribute to the overall satisfaction of an environment, which in turn affects positively the overall feelings toward life. For the above reason, the study examined the perception of respondents on the quality of their environment. Sirgy and Cornwell (2002) identified 17 components of the environment which contributes significantly to one's overall assessment of the quality of an environment. These components are distributed under 3 categories and they are physical, social and economic components. Of these 17 components, eleven important ones were used in this study. These components include satisfaction with homes and yards, satisfaction with landscape in the neighbourhood, satisfaction with street lighting in the neighbourhood, satisfaction with crowding and noise level in the neighbourhood, satisfaction with outdoor play space, satisfaction with people living in the neighbourhood, satisfaction with crime level in the neighbourhood, satisfaction with sense of privacy, satisfaction with the cost of living in the community, satisfaction with the neighbourhood improvement and satisfaction with home value in the neighbourhood

Residents were asked to rate their level of agreement with these identified components based on a five point Likert Scale, which are: *strongly agree, agree, not sure, disagree and strongly disagree*. This was calculated using Mean Index. To calculate the mean index for the perception of the environmental components, each of the Likert Scale was respectively assigned a value of 5, 4, 3, 2, and 1. The Total Weighted Value (TWV) for each of the components identified was calculated and presented in Table 2. The index for each component was arrived at by dividing the TWV by the total number of responses. The TWV for each of the components was obtained through the addition of the product of the number of responses to each component with the assigned weighted value. In other words, the closer a respondent's Mean Index of a component to the total Mean Index $\overline{MI}$, the higher is assured of the resident's level of agreement to such environmental component in the study area and the farther a respondent's mean index to the total Mean Index $\overline{MI}$, the lower is assured of the residents' level of agreement to such environmental component perception.

Residents' response on their satisfaction with the indicators adopted for measuring environmental quality in the study area established that the mean index ($\overline{MI}$) for Physical component is 3.46, while that of social component is 3.39 and the mean index ($\overline{MI}$) for economic component is 3.02. The study revealed that out of the 11 identified environmental components, 4 were above the mean, and 7 were below the mean. It further revealed that the environmental components with highest perception of mean index of 3.66 were "satisfaction with crowding and noise level in the neighbourhood" and "satisfaction with sense of privacy"

which both have a positive deviation about the mean of 0.20 and 0.27 respectively. The next to these two were "satisfaction with homes and yards", and "Satisfaction with cost of living in the community" with mean index of 3.59, and 3.51 and positive deviation about the mean of 0.13, and 0.56 respectively.

Table 2: Mean Index of Environmental Quality Perception of the Study Area

Components of Environmental Quality	**Rating and weight Value**					**Mean**	**Deviation**	
	SA (5)	A (4)	NS (3)	DS (2)	SD (1)	TWV	MI	**(MI-$\overline{MI}$)**
Physical $\overline{MI} = 3.46$								
Satisfaction with homes and yards.	305	124	102	40	18	589	3.59	**0.13**
Satisfaction with landscape in the neighborhood.	115	316	39	90	4	564	3.44	**-0.02**
Satisfaction with street lighting in the neighborhood.	125	172	135	64	19	515	3.14	**-0.32**
Satisfaction with crowding/noise level	275	156	144	8	18	601	3.66	**0.2**
Total	**820**	**768**	**420**	**202**	**59**	**2269**	**13.83**	
Social $\overline{MI} = 3.39$								
Satisfaction with outdoor play space.	105	236	126	60	12	539	3.29	**-0.1**
Satisfaction with people living in the neighborhood.	120	256	87	40	27	530	3.23	**-0.16**
Satisfaction with crime level in the neighborhood	200	256	33	34	32	555	3.38	**-0.01**
Satisfaction with sense of privacy.	265	240	42	34	20	601	3.66	**0.27**
Total	**690**	**988**	**288**	**168**	**91**	**2225**	**13.56**	
Economic $\overline{MI} = 3.02$								
Satisfaction with the cost of living in the community.	220	172	93	90	1	576	3.51	**0.56**
Satisfaction with the neighborhood improvement.	100	104	120	126	12	462	2.82	**-0.13**
Satisfaction with home value in the neighborhood.	85	120	105	118	20	448	2.73	**-0.22**
Total	**405**	**396**	**318**	**334**	**33**	**1486**	**9.06**	

*varied based on multiple responses. Total respondents =164.
Source: Author's field survey, 2016

Findings presented in table 3 further buttressed the analysis of table 2 by revealing the overall perception level of the respondents. This was achieved by comparing the individual mean of each environmental component with the total Mean Index$\overline{MI}$ to determine the ones above the total mean and the ones below. Any individual mean of a component above the total mean was considered high while any individual mean of an environmental component below the total mean $\overline{MI}$was considered low which resulted into computation of the table below. In general, 59.6% of the total population of respondents perceived the quality of the environment to be high while 40.4% perceived it to be low. It was concluded therefore, that the environmental quality of Bodija was perceived by majority of the respondents to be high. In other words, larger percentage of the residents was satisfied with the components of their environment.

Table 3: Perception of Environmental Quality of the study area

Perception Level	**Frequency**	**Percentage**
High	96	59.6
Low	65	40.4
Total	**164**	**100**

Source: Author's field survey, 2016

Residents' Familiarity with Landscape Planning Procedures

In making decision about every aspect of landscape development, thoughtful procedures must inform this process so as to have a sustainable landscaped area. This notion is supported by the argument and suggestion of Marty (2007). Respondents were asked to rate their level of familiarity with the Marty (2007) suggested landscape planning procedures. This section therefore, evaluates the residents' level of familiarity with landscape planning procedures in the study area. The indicators for measuring procedural familiarity were evaluated using a five point Likert's scale rating with Resident's Familiarity Index (RFI) to determine the familiarity level of residents with the procedures. For the purpose of this study, a total of 11 procedures in three categories were used ***(Sustainable Landscaping Principle (5 Indicators), Sustainable Landscaping Maintenance (4 Indicators) and Professional Advice and Guidance (2Indicators))***. To calculate the Relative Familiarity Index (RFI), respondents were instructed to rate each variable using one of the five ratings: *Very Familiar, Familiar, Not Sure, Slightly Familiar and Not at all Familiar.* Each of this was respectively assigned with a value of 5, 4, 3, 2, and 1. The summation of the weighted value (SWV) for each of the variables is obtained through the addition of the products of all the number of responses to each procedure with the assigned weighted value. Mathematically, this is expressed thus:

$$SWV = \sum_{I=1}^{5} X_i Y_i \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{equation (1)}$$

Where: SWV is the summation of weighted value,

X_i is the individual rating of a particular landscape planning procedure

Y_i is the weighted value assigned to each landscape planning procedure

The Relative Familiarity Index (RFI) for each landscape planning procedure was arrived at by dividing the summation of weighted value by the addition of the number of respondents to each of the five ratings. This is expressed mathematically as:

$$RFI = \frac{SWV}{\sum_{i=1}^{5} P_i} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\text{ equation (2)}$$

The closer the Relative Familiarity Index (RFI) of a particular planning procedure to 5, the higher is assured of the residents' level of familiarity to such landscape planning procedure in the study area.

Findings from the analysis established as presented in Table 10 that the mean index for all the landscape planning procedures in the study area denoted by $\overline{RFI}$ was 3.59; it was also revealed that the variable or planning procedure with highest positive deviation of 0.39 about the mean was 'Employing the services of professionals and experts in the field of landscape planning and architecture'.While the planning procedure with the least negative deviation of -0.43was 'The use of naturalistic design'. The study also revealed from the analysis that 5 out of the 11planning procedures identified, had positive deviation about the mean $\overline{RFI}$. These procedures include the following with their respective positive deviation about the mean, Employing the services of professionals and experts in the field of landscape planning and architecture (0.39), avoidance of plants that require frequent replacement or regular maintenance (0.37), depending on professional judgment on all activities to be carried out (0.22) which ranked 1st, 2nd and 3rd most familiar planning procedure respectively. Similarly, performing a soil/climate analysis to determine appropriate plant (0.13) and using the right plant in the right place (0.03) was ranked 4th and 5th most familiar landscape planning procedure respectively.

Contrary to the above, the study revealed that 6 out of11 landscape planning procedures identified had negative deviation about the $\overline{RFI}$. These procedures include the following with their respective negative deviation about the mean, planting for long term by selecting healthy and long-lived plant varieties (-0.04), careful application of nutrients(-0.10) and water conservation (-0.11)which ranked 6th, 7th and 8th most familiar landscape planning procedure respectively. Also, procedures like energy conservation (-0.18) and Using integrated pest management method (-0.33) ranked 9thand 10th most familiar procedure respectively while use of naturalistic design was the least most familiar landscape planning procedure with -0.43 deviation about the mean.

The analysis further revealed that the variance in the level of familiarity with the planning procedure was 0.0641 while the standard deviation was 0.2532 and the coefficient of variation in their level of familiarity with the identified planning procedures was 7.05% which connotes that the spread of the familiarity around the mean was low. In other words, the level of familiarity with landscape planning procedures among the respondents in the study area were close and not too far from one another.

Table 4: Residents' Familiarity Index (RFI) of Landscape Planning Procedures in the Study Area

Landscape Planning Procedures	**Rating and weight Value**									Rank
	VF (5)	F (4)	NS (3)	SF (2)	NF (1)	SWV	RFI	**(RFI-$\overline{RFI}$)**	**(RFI-RFI)^2**	
Employing professionals in landscape planning	54	73	20	13	4	652	3.98	**0.39**	0.1557	**1ST**
Avoidance of plants that require frequent replacement	58	70	18	7	11	649	3.96	**0.37**	0.1403	**2ND**
Depending on professional judgment in all activities	46	65	33	16	4	625	3.81	**0.22**	0.0504	**3RD**
Performing Soil/climate analysis	68	26	43	10	17	610	3.72	**0.13**	0.0181	**4TH**
Using the right plant in the right place	44	62	21	26	11	594	3.62	**0.03**	0.0012	**5TH**
Planting healthy and long-lived plant varieties	34	71	23	24	12	583	3.55	**-0.04**	0.0013	**6TH**
Careful application of nutrients	37	53	37	28	9	573	3.49	**-0.10**	0.0091	**7TH**
Water conservation	35	59	33	24	13	571	3.48	**-0.11**	0.0111	**8TH**
Energy conservation	52	33	33	23	23	560	3.41	**-0.18**	0.0308	**9TH**
Using integrated pest management method	26	51	39	35	13	534	3.26	**-0.33**	0.1059	**10TH**
Use of naturalistic design	43	35	18	41	27	518	3.16	**-0.43**	0.1810	**11TH**
Total							**39.44**		**0.7049**	

Source: Author's field survey, 2016

Average (Mean) $=\overline{RFI} = \frac{\sum \text{RFI}}{N} = \frac{39.44}{11} = 3.59$;

Variance $= \frac{\sum(RFI - \overline{RFI})2}{N} = \frac{0.7049}{11} = 0.0641$

Standard deviation $= \sqrt{\frac{\sum(RFI - \overline{RFI})2}{N}} = \sqrt{0.0641} = 0.2532$

Coefficient of variation $= \left(\frac{SD}{\overline{RFI}} \times 100\right)\% = \left(\frac{0.2532}{3.59} \times 100\right)\% = 7.05\%$

Impacts of Landscape Planning on the Quality of the Study Area

Landscape has been known to perform tremendous impact on the quality of environment and thereby increasing or decreasing the quality of environment. These impacts as identified by this study ranges from physical, socio-cultural, psychological, economic and environmental (Ibimula, 2014).

Positive and Negative Impacts of Landscape Planning on the Quality of the Study Area

This study identified both the positive and negative impacts that landscape may have on the environment to either increase its quality or decrease it. These impacts were otherwise categorized into 5 which are physical, socio-cultural, psychological, economic and environmental. Residents were asked to indicate which of the 34 identified environmental components had been negatively or positively impacted by activities of landscape planning in the study area. The frequency and percentage of positive and negative impact of landscape planning on each environmental component in the study area as indicated by respondents was as shown in the table 5 and Figure 2.

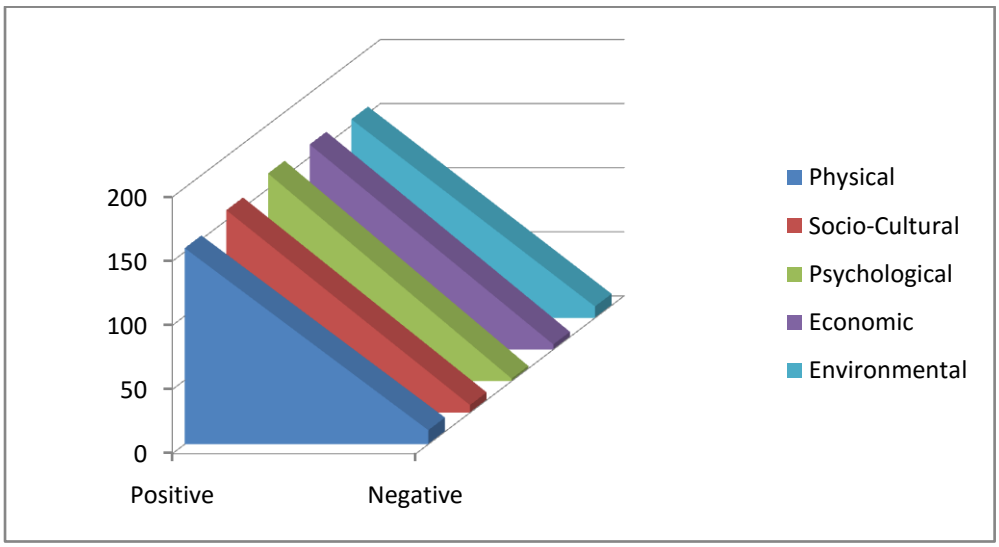

Figure 2: Positive and Negative Impact of Landscape on the Environmental Quality
Source: Author's field survey, 2016

As revealed in table 5, majority of the respondent rated the impact of landscape planning on identified environmental components positive. The mean percentage of landscape planning impact on psychological component variables had the highest percentage of positive responses which was 98.89%, followed by the average mean percentage of landscape impact on economic component variables which were 97.58%. The mean percentage of the impact of landscape planning on socio-cultural components was the third highest with 96.37%. However, the mean positive percentage of landscape planning impact on physical component variables was the lowest with 93.56% followed by the mean percentage of landscape planning impact on environmental component variables which was 94.34%. It was concluded from this analysis that the positive impact of landscape on the environment by far overweighs the negative impact. An assertion supported by Wylie (2007) and Ibimula (2014).

Table 5: Positive and Negative Impact of Landscape on the Environmental Quality

Impact	Frequency and Percentage			
	Positive	%	Negative	%
Physical	153	93.56	11	6.46
Socio-Cultural	158	96.37	6	3.63
Psychological	162	98.89	2	1.11
Economic	160	97.58	4	2.43
Environmental	155	94.34	9	5.66

Source: Author's field survey, 2016

Landscape Planning Impact Index on Environmental Quality

The impact of landscape planning on environmental quality of Bodija was further analyzed using a seven point Likert scale rating, to determine Relative landscape planning Impact Index (RII). To determine the impact of landscape planning on the identified environmental components, respondents were instructed to rate each environmental components variable using *Extremely High, Very High, Moderately High, Low, Moderately Low, Very Low and No Impact.* The environmental components as earlier mentioned were categorized into 5, with a total of 34 variables ***(Physical (10 Indicators), Socio-cultural (6Indicators), Psychological (7 Indicators), Economic (4 Indicators) and Environmental (7 Indicators))***. Each of the Likert scale value was assigned a value of7, 6, 5, 4, 3, 2, and 1. The index for each variable was arrived at by dividing the Total Weighted Value (TWV) by the total number of responses. The TWV for each of the environmental component identified was obtained through the addition of the product of the number of responses to each component with the assigned weighted value. The closer the Relative Impact Index (RII) of landscape planning of a component to 7, the higher is assured of the residents' rating of the impact of such environmental component on the quality of the study area.

Findings from the analysis of **physical components** category established as presented in table 6 was that the mean impact index of landscape planning on all the physical component variables in the study area denoted by $\overline{RII}$ was 5.41. It was also revealed that the physical component with positive deviation impact were 5 while the physical component with negative deviation impact were also 5. The physical component with the highest positive deviation impact (0.39) was 'parking facilities' which was ranked 1st on the table. Man, soil, housing and transportation network were the next rated variables under physical component with positive deviation impacts 0.35, 0.15, 0.08 and 0.00 respectively and ranking 2nd, 3rd, 4th and 5th on the table. In contrary, the physical component with the least negative deviation impact of -0.50 about the mean was'street furniture and utilities' which was ranked 8th on the table. This was followed in increasing order on the table by 'sanitation and engineering services' with a negative deviation impact of -0.26, ranking 7th on the table. The physical components ranking 6th on the table were air, water and animal with a negative deviation impact of -0.02.

However, the table also showed the findings obtained on landscape planning impacts on **socio-cultural components**. It was revealed by the table that the relative impact index of landscape planning on all the socio-cultural component variables in the study area was 5.0. From the 6 socio-cultural component variables,4 had positive deviation impact while the variables with negative deviation impact were 2. The socio-cultural component variable with the highest positive deviation impact of 0.09 was religion which was ranked 1st on the table. This was followed by cultural heritage, custom and social welfare improvement which had positive deviation impacts about the mean of 0.08, 0.07 and 0.02 respectively and ranking 2nd, 3rd and 4th on the table. In contrary, the socio-cultural component with the least negative deviation impact of -0.28 about the mean was societal value which was ranked 6th on the table while custom was ranked 5th with a negative deviation impact of -0.12.

Furthermore, the table revealed that $\overline{RII}$ for landscape planning impacts on **psychological component** variables in the study areawas5.4. However, the 7 psychological components,4 had a positive deviation impact about the mean while 3 have a negative deviation impact about the mean. The psychological component with the highest positive deviation impact of 0.43 was 'interaction' which was ranked 1st on the table. Followed by this was 'place identity', 'health' and 'education' which had positive deviation impact about the mean of 0.30, 0.18 and 0.09respectively and ranking 2nd, 3rd and 4th on the table. On the

contrary, the psychological component with the highest negative deviation impact about the mean of -0.14 was perception which was ranked 5th on the table while behavior was ranked 6th with a negative deviation impact about the mean of -0.56.

In addition, the table revealed that the Relative Impact Index of landscape planning denoted for all the **economic component** variables was 5.4. Also from the table, it was shown that out of the 4 economic component variables, 2 have positive deviation impact about the mean while the other 2 have negative deviation impact about the mean. The economic component with the highest positive deviation impact of 0.50 is economic status which was ranked 1st on the table and followed by property value with a positive deviation impact about the mean of 0.20, ranking 2nd on the table. On the contrary, the economic component variable with the least negative deviation impact about the mean of -0.40 and ranking 6th on the table was behavior. This was followed by perception which has a negative deviation impact of -0.30 and ranking 5th on the table.

Similar to the above, the table showed that Relative Impact Index of landscape planning for all **environmental component** variables was 5.2. It further revealed that out of the 7 environmental component variables, 3 had positive deviation impact about the mean while 4 had negative deviation impact about the mean. The environmental component with the highest positive deviation impact of 0.60 was air quality which was ranked 1st on the table, followed by environmental conservation and general environmental condition with positive deviation impact about the mean of 0.30 and 0.11 respectively, ranking 2nd and 3rd on the table. In contrary, the environmental component with the least negative deviation impact about the mean of -0.35 was improved concern for urban appearance which was ranked 7th on the table while depletion of earth's ozone layer, environmental hazards and risks and water quality were ranked 6th, 5th and 4thwith a negative deviation impact about the mean of -0.32, -0.24 and -0.03 respectively.

The analysis further revealed that the variance in the level of landscape impact on the physical and socio-cultural components were 0.090 and 0.020 respectively while the standard deviations were 0.300 and 0.140 and the coefficient of variation of the impact of landscape on them were 5.6% and 2.8% respectively. More so, the variances in the level of landscape impact on psychological, economic and environmental components were 0.108, 0.123 and 0.107 respectively while the standard deviations were 0.329, 0.350 and 0.327. The coefficients of variation of the impact of landscape on them were 6.1%, 6.5% and 6.3% respectively. It was deduced from the analysis that the impact of landscape planning on all the identified components of environment was considered to be high by the residents of the study area.

Table 6: Relative Impact Index of Landscape Planning on Environmental Quality of the Bodija

Environmental Components	Impact Rating and Weighted Value									Mean Deviation		
	EH (7)	VH (6)	MH (5)	L (4)	ML (3)	VL (2)	NI (1)	SWV	RII	(RII-$\overline{RII}$)	(RII-$\overline{RII}$)^2	Rank
PHYSICAL												
Parking facilities	79	38	80					951	5.80	**0.39**	0.1544	1ST
Man	70	48	27	4	15	-	-	944	5.76	**0.35**	0.1246	2ND
Soil	33	50	57	24	-	-	-	912	5.56	**0.16**	0.0256	3RD
Housing	567	528	30	4	8	16	3	901	5.49	**0.08**	0.0069	4TH
Transportation network	58	45	30	-	-	-	-	888	5.41	**0.00**	0.0000	5TH
Air	10	102	48	4	-	-	-	938	5.72	**-0.02**	0.0003	6TH
Water	44	47	37	15	14	7	-	884	5.39	**-0.02**	0.0003	6TH
Sanitation and engineering services	21	41	70	16	8	5	3	844	5.15	**-0.26**	0.0660	7TH
Street furniture and utilities	24	49	53	5	1	23	9	805	4.91	**-0.50**	0.2470	8TH
Animal	42	20	85	3	9	5	-	800	4.88	**-0.53**	0.2777	6TH
Total									**54.07**		**0.9007**	
SOCIO-CULTURAL												
Religion	28	30	62	35	-	-	9	774	5.09	**0.09**	0.0088	1ST
Cultural heritage	21	26	85	16	11	3	2	823	5.08	**0.08**	0.0071	2ND
Custom	10	50	65	29	5	1	4	832	5.07	**0.07**	0.0055	3RD
Social welfare improvement	25	16	84	27	4	4	4	832	5.02	**0.02**	0.0006	4TH
Societal value	23	30	64	24	3	16	4	795	4.88	**-0.12**	0.0055	5TH
Inter-tribal relation	-	27	89	35	7	-	6	833	4.72	**-0.28**	0.0762	6TH
Total									**29.86**		**0.0981**	
PSYCHOLOGICAL												
Interaction	33	43	50	24	10	7	-	869	5.87	**0.43**	0.1886	1ST
Place Identity	47	57	51	9	-	-	-	962	5.74	**0.30**	0.0926	2ND
Health	61	31	37	26	4	-	5	889	5.62	**0.18**	0.0340	3RD
Education	54	42	46	6	11	-	5	922	5.53	**0.09**	0.0089	4TH
Perception	17	81	49	6	11	-	-	907	5.30	**-0.14**	0.0184	5TH
Experience	31	63	66	4	-	-	-	941	5.11	**-0.33**	0.1061	6TH
Behaviour	14	65	50	12	10	9	4	838	4.88	**-0.56**	0.3088	7TH
Total									**38.05**		**0.7574**	
ECONOMIC												
Property value	12	63	52	11	4	-	22	964	5.88	**0.50**	0.2186	1ST
Economic status	53	41	50	2	11	-7	-	922	5.62	**0.20**	0.0431	2ND
Employment	15	66	46	2	18	15	2	825	5.03	**-0.40**	0.1463	4TH
Revenue	43	63	20	15	18	-	5	839	5.12	**-0.30**	0.0856	3RD
Total									**21.65**		**0.4935**	
ENVIRONMENTAL												
Air quality	37	97	13	1	11	-	5	948	5.78	**0.60**	0.3600	1ST
Environmental conservation	30	41	44	18	15	4	12	898	5.48	**0.30**	0.0900	2ND
General environmental condition	31	68	34	10	15	-	6	871	5.31	**0.11**	0.0121	3RD
Water quality	17	92	22	-	11	22	-	858	5.23	**-0.03**	0.0009	4TH
Environmental hazards and risks	30	41	44	18	15	4	12	813	4.96	**-0.24**	0.0576	5TH
Depletion of ozone layer	17	51	60	12	4	-	20	801	4.88	**-0.32**	0.1024	6TH
Improved concern for urban appearance	12	63	52	11	4	-	22	796	4.85	**-0.35**	0.1225	7TH
Total									**36.49**		0.7455	

Source: Author's field survey, 2016

CONCLUSION AND RECOMMENDATION

This study assessed the impact of landscape planning on the environmental quality of Bodija, Ibadan. The impact of landscape planning on 34 identified environmental components categorized into 5 (physical, socio-cultural, psychological, economic and environmental) were measured by rating the impact on each, to be either positive or negative. Result of the frequency analysis from the study established that the psychological component variables had the highest positive rating with mean percentage of 98.89% and least negative rating of 1.11% (mean percentage). Economic component variables had the next highest positive rating after psychological components with an average positive percentage of 97.58% and average negative percentage of 2.42%. Physical component variables however had the least positive rating of 93.56% (average percentage) and the highest negative rating of 6.46% (average percentage).

The impact index of each environmental component as categorized into 5 was further measured using Relative landscape planning Impact Index (RII) with a seven point Likert scale rating. The result of the analysis established that, for the physical component variables, 'parking facilities' had the highest impact deviation of 0.39 about the mean while street furniture and utilities had the least negative impact deviation of -0.50 about the mean. For the socio-cultural components, 'religion' had the highest impact deviation of 0.09 about the mean while 'inter-tribal relation' had the least negative impact deviation of -0.28 about mean. Similarly, for psychological component variables, 'interaction' had the highest impact deviation of 0.43 about the mean while behavior had the least negative impact deviation of -0.56 about the mean. Economic and environmental components however had 'property value' and 'air quality' as the variables with the highest impact deviation of 0.50 and 0.60 respectively about the mean while they had employment and improved concern for urban appearance as the variables with the least negative impact deviation of -0.40 and -0.35 respectively about the mean.

The study pointed out that the positive impacts of landscape planning on the environment outweigh the negative impacts thereby creating a pleasing environment free for living and working. The implication of the findings is that landscape planning from physical point of view apart from its aesthetics values; it has direct or indirect impact on pedestrian circulation, parking alignment, household boundaries, prevention of erosion, and control transportation network. Landscape planning from socio-cultural point of view enhances cultural heritage, improves social welfare, foster customs and tradition. Physiological perspective of landscape planning creates interaction forum, places of identity, boost health of the people, and enhances education. Whereas, from economic perspective, landscape planning enhances property value, and improve economic status of the people. Therefore, in order to achieve a quality environment where the quality of life could be enhanced, the following recommendations are proposed:

1. Proper public enlightenment on the importance and reasons for the need to protect landscape element in the environment. This will change the orientation of people towards the various landscape elements in the environment.
2. Government should inculcate landscape planning as part of the required document before a building approval is granted. They should also mandate the owners of existing buildings to embark on landscaping of their environment. This will enhance the quality of living areas to meet people's preferences.
3. In addition to the above, policy makers need to come up with a policy that will address the issue of landscaping the environment. This is in a bid to create an attractive and conducive environment where physical, psychological, spiritual health and mental well-being; leading to increased life-span could be improved.

References

AbdulGhani S. and Nurwati B., (2012): Quality of Life of Residents in Urban Neighbourhoods of Pulau Pinang, Malaysia. *Journal of Construction in Developing Countries*. Vol. 17, No. 2, pp. 117–123.

Alex X. Niemiera (2015): Selecting Plants for Virginia Landscapes: Showy Flowering Shrubs, Virginia Cooperative Extension, Vigaina State University, HORT-84P

Ayeni D.A., (2012a): Enhancing the Nigerian Tourist Attractions through Landscaping for Sustainable Tourism Development. *American Journal of Tourism Research*. Vol. 1, No. 2, Pages 59-66.

Ayeni, D.A. (2012b): Emphasizing Landscape Element as Important Components of a Sustainable Built Environment. Developing Country Studies, vol. 2(8), pp. 33-43.

Cellmer, R., Senetra, A., & Szczepańska, A. (2012). Land Value Maps of Naturally Valuable Areas• Geomatics and. *Environmental Engineering*, *6*(3).

Ibimula F.A. (2014): Key Issues on Landscape Planning in the Context of Environmental Sustainability. European Scientific Journal January edition, vol.10, No.2, pp. 143-156.

Kingsley, E. and Christopher, A., (2014.): Urban Environmental Landscaping: A Strategy for Improving the Environmental Quality of Nigerian Cities. *Journal of Environment and Earth Science*, Volume 4, No.2, pp. 12-14.

Marty Rosen, (2007): *Creating Sustainable Communities: A Guide for Developers and Communities*. New Jersey Department of Environmental Protection, office of planning and sustainable communities.

Morris, N. (2003): Health, well-being and open space: Literature review, Edinburgh College of Herriot Watt University, Edinburgh. Edinburgh.

National Population Commission (NPC) (2008). Federal Republic of Nigeria. Final 2006 census results. Retrieved from: http://www.population.gov.ng/index.php. Accessed on December 14, 2014.

Southeast England Development Agency (SEDA) (2005): Well-being Tourism, Diversification Opportunities for Form and Rural Businesses. Southeast England Development Agency, Retrieved September 12 2015 from: *http://www.industry.visitsoutheastengland.com/dbings.*

Shahli, F. M., Hussain, M. R. M., Tukiman, I., & Zaidin, N. (2014). The Importance Aspects of Landscape Design on Housing Development in Urban Areas. *APCBEE Procedia*, *10*, 311-315.

Sirgy, M.J. and Cornwell, T. (2002). How neighbourhood features affect quality of life. *Social Indicators Research.* Vol. 59: Pp. 79–114.

Terwase S., Theresa S.U., (2013): Residents' Perception of Environmental Quality in Judges Quarters of Makurdi Town. *Nigeria. Journal of Human and Social Science Research*. Vol. 1, No. 1, pg. 39 – 49.

Thompson, C. W., Sugiyama, T., Bell, S., Milligton, C.,Southwell, K., and Roe, J., (2007): Landscape quality and quality of life. In: Ayeni D.A. (Ed.): *Enhancing the Nigerian Tourist Attractions through Landscaping for Sustainable Tourism Development. American Journal of Tourism Research*. Vol. 1, No. 2, 2012, Pp. 59-66.

Williams, J.D. and Tilt. K. (2006): Residential Landscape Design. Alabama Cooperative Extension System. London, UK

Wylie, J. (2007): Impacts of Landscape on the Environment. Routledge, Abingdon. Pg.264.