ASSESSMENT OF BUILT ENVIRONMENT QUALITY IN OGBOMOSO, OYO STATE, NIGERIA

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ABSTRACT: *The interactions between man and environment determine both the quality of environment and as well as the quality of life that man lives. The feedback mechanisms of the interactions between man and environment are directly proportional. The increase in the number of urban dwellers is no more novel as over 50% of the world population resides in urban centers. This continuous and accidental increase in the number of urban dwellers with respect to their actions in the environment has played significant roles in the depletion of the quality of the environment. Since human health or wellbeing depends on the quality of his immediate environment, the focus on environmental quality emerged as a key area for research in urban and regional planning. This paper appraises the quality of the built environment in a steadily urbanizing traditional settlement in Ogbomoso North Local Government, Nigeria using selected environmental quality indicators while necessary recommendations are put forward to rejuvenate sickening built environment.*

KEYWORDS: Human, Built, Environment, Health, Depletion, Quality, Urban, Nigeria

INTRODUCTION

An eloquent historian, Sir Winston Churchill, once affirmed that "we shape our buildings; thereafter they shape us". Human actions undoubtedly introduce changes in to the environment. Sometimes the substances of human actions are weighty, and we design and plan quality life experiences for ourselves and others but sometimes, human actions are shortsighted and underestimated, thereby creating uncomfortable situations that negatively impact the environment that surrounds us with which we are in constant interaction (Bartuska, 2007). The result of human inputs into the natural environment is what is typified as the built environment in the context of architecture and city design and in the simplest form refers to the buildings and spaces between them (Ahianba, 2008).

Owing to the acknowledged fact that a healthy, functional and aesthetically pleasing environment is essential to the health and well-being of its inhabitants, the built environment in our contemporary communities especially in urban centres has recently been an issue of increasing concern. A large percentage of humanity now lives in cities and other metropolitan areas as 50% of the world population lives in cities (UNFPA, 2007). Yet approximately 1 billion people out of a global population of close to 6 billion people are presently living in slum like conditions (UN-HABITAT, 2003).

In many developing countries particularly Nigeria, the urban/built environment is fast decaying. The factors responsible can be traced to rapid urbanization, rural-urban drift, steady economic downturn, decay of urban infrastructure, poor standard of constructions, lack of integrated planning, negligent urban housekeeping, preservation of historic value, disaster and war (World Bank, 2005; Ahianba et al, 2008 and Oyeleye, 2013). Often times, the pace of

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urbanization increase has been such that the maintenance of modest environmental standards inevitably had to lag behind and the result has been an increasing emergence of urban decay.

Since human health and wellbeing depends on the quality of his immediate environment, the focus on environmental quality emerged as a key area for research in urban and regional planning. However, at the centre of this is the need to access or measure the quality of the built environment or the extent of built environment deterioration in the societies. Having adequate information on the built environment quality and implementing urban improvement programmes based on such information will be an effective way of improving the quality and livability of the environment. It is in view of this that this paper appraises the quality of the built environment in a steadily urbanizing traditional settlement in Ogbomoso North Local Government, Nigeria using selected environmental quality indicators.

The Study Area

Ogbomosho North Local Government Area, Ogbomosho, Oyo state is located in the south western part of Nigeria. It is located on latitude of 8^0 07' N and longitude $4^0$14' E. Ogbomosho is the second largest town in Oyo State and is located on the high way connecting the North and South of Nigeria on the west flank. Ogbomosho North Local Government area is the most urbanized part of the Ogbomosho. It is the largest local government in the city being the city's major economic nerve with a population of 198,859 (NPC, 2006). A university, teaching hospital, private college of education and the Oba's palace are located within it. This implies that the local government contains both elements of advanced urban development as well as the relics of the historic past in the core areas.

Generally, three basic residential zones can be identified in traditional Nigerian cities. They are also called the ecological zones of urban settlements, (Afon, 2009) and each of these zones is often homogenous in terms of physical layout, ethnic composition, socioeconomic status and environmental amenities. The first of these residential zones is the core area that dates from the pre-colonial era. This area constitutes the oldest part of most cities and in most cases, consists of closely built houses that are connected by footpaths, and lacks access road. Physically, the core sectors are predominantly residential with aged building. In the study area, the localities or wards falling under the core area include Oja Igbo, Masifa, Isale Afon and Aaje.

The second zone is the transitional zone. This is the segment of the settlements built due to the need to accommodate growing numbers of middle-income residents, most of them employed in the formal sector. This residential zone is basically the nexus between the urban core and the sub-urban zone. Housing is generally believed to be of higher quality in this zone and density is lower than the core. Oke Ado, Apake, and Alasa Layout, fall under this zone

The last zone is the sub-urban zone and they are characterized by well-planned layout of buildings. A high proportion of the residents here are the high income and well educated individuals. Generally, the intensity of land use decrease as one move from the traditional centre through the transitional zone to the suburban zone. The Ajilete Housing estate and the surrounding localities along Ogbomosho-Oshogbo road fall under this zone.

Each zone exhibits certain consistent features in terms of location, the types, structures and layouts of housing and land use activities and this enhances the analysis of the built environment in the study area.

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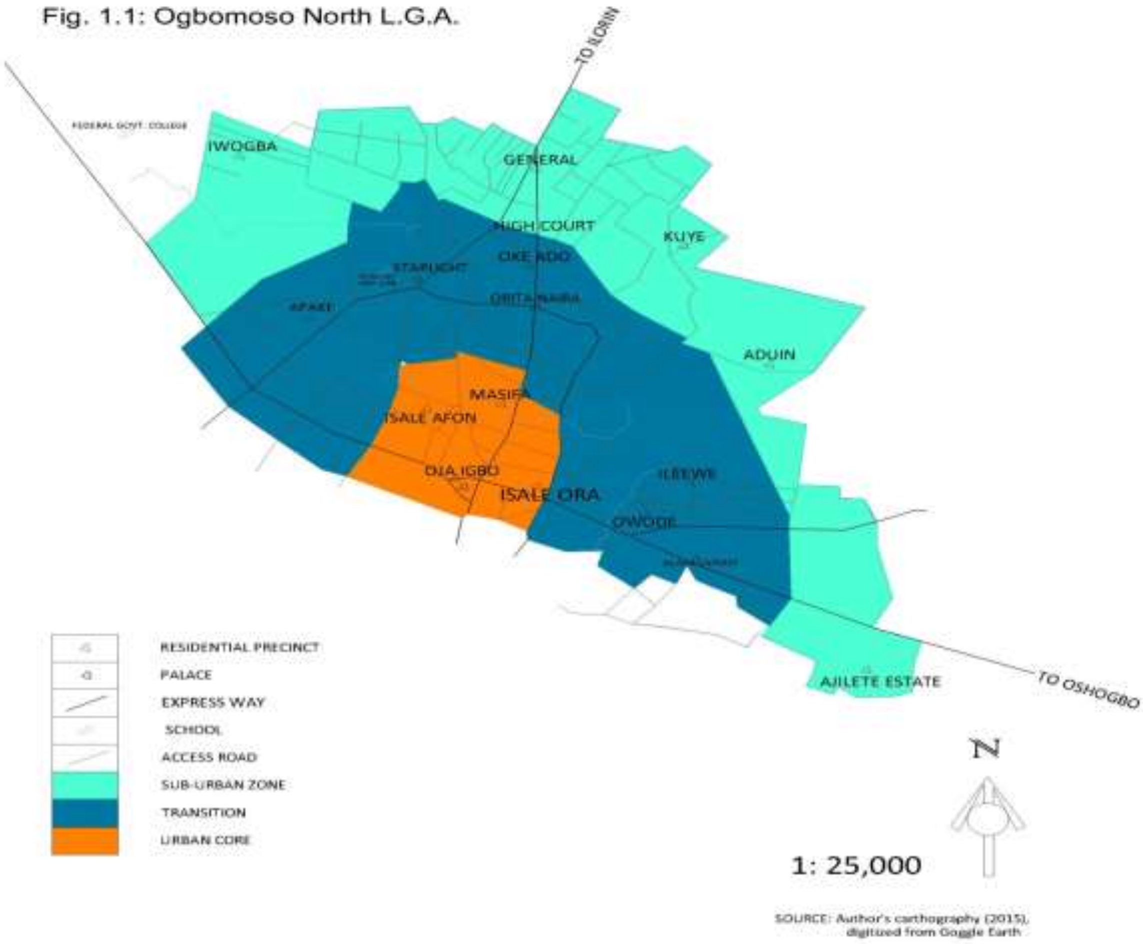
Fig. 1.1: Ogbomoso North L.G.A.



METHODOLOGY

The research adopted the survey method and utilized the two most popular data collection methods i.e. field observation and the use of questionnaire. The primary data were generated with the use of structured questionnaires designed to accommodate necessary variables that will constitute the Environmental Quality Indicators (EQIs). The survey covered neighborhoods and households in Ogbomosho North Local Government. The sample frame was delineated based on the observed residential zones. Four localities were selected within each of the three residential zones, hence, twelve residential localities were selected within the study area for questionnaire administration. Next, the buildings within each selected locality were enumerated with the Google Earth software, taking the roads surrounding individual locality as subjective boundaries and taking 15% of the buildings as the sample size. Questionnaire administration was done on the basis of buildings picking one respondent form a building. The random systematic sampling technique was used for questionnaire administration using an interval of six and a maximum of three buildings per street. On the whole, 235 copies of the questionnaires were administered in the study area.

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The environmental quality indicators (EQIs) used were the aggregate of selected variables relevant for evaluating the built environment. These variables fall under five basic categories, the total of which is called Built Environmental Quality Index (BEQI). The 5 EQIs are; sanitary sewerage system, accessibility, waste management, electricity supply and building quality.

The variables selected under each EQI were collected by simple observation and recording. Each of the five EQIs is made of variables already structured with the options arranged in the order of desirability from the least desirable to the best. These options were coded appropriately as ratings to the variables under each Environmental Quality Indicator (see Table 1). Empirical computations for calculating built environment quality will follow the procedure below.

Table 1: Rated Options of EQI Variables

Environmental Quality Indicator (EQI)	Ratings (Weighted Values)				
	1	2	3	4	5
Sanitary Sewerage					
1. Drainage type	No channels	Open channels	Closed channels		
2. Drainage Condition	Blocked	fairly blocked	very clear		
Accessibility					
3. Building accessibility	No defined accessibility	Foot path	Access road		
4. General Accessibility	No clear path	By un-tarred road	By tarred road		
5. Condition of access road	Un-tarred	Tarred but in bad condition	Tarred		
Waste Management infrastructure					
6. Domestic waste utilities	None	Refuse bins	Garbage collection trucks	Incinerator	
7. Toilet Facility	No Toilet	Pit Latrine	Water closet		
8. Minimal number of refuse dumps	Four dumps	Three dumps	Two dumps	One dump	No dump
Power Infrastructure					
9. Source of electricity	No electricity	Generator alone	Both Generator and PHCN	PHCN alone	
10. Stability	Poor	Fair	Good	Very good	
Building Quality					
11. Building Type	Traditional courtyard	Brazilian type	Flat	Duplex	
12. Wall Structure	Mud	Cement blocks	Mud bricks		
13. Wall Condition	Not plastered	Plastered outside alone	Plastered inside alone	Plastered both in and out	Plastered and painted
14. Window Material	Wood	Metal	Glass		
15. Roof Condition	Leaking	Sagging	No defect		
16. Ceiling Type	None	Unpainted asbestos	Painted asbestos	Plank/Tiles	

Source: Authors' Computation, 2015.

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Total Weighted Value (TWV): The percentage score of each rating of a variable under an environmental quality indicator is multiplied by its respective weighted value and added together

Environmental Quality Index (EQI): The TWV for the variables under an environmental Quality Indicator are added to get the Environmental Quality Index (EQI)

Built Environment Quality Index (BEQI): The Environmental Quality Index (EQI) are summed up and converted back to whole figures the mean is calculated for each locality.

DISCUSSION OF FINDINGS

Infrastructural amenities are important components of the built environment, and as such sewerage will be examined. Sewerage is the term used to describe the removal of liquid waste or sewage by means of drains or sewers. In other words it encompasses the general management of liquid waste. Sewerage in the study area is inadequate. 37.9% of the buildings have no defined drainage channel for conveying wastes - a clear indication of the insanitary state of the built environment. Only 12.7% of the sampled population has proper drainage channels around their buildings. 49.4% of the population has open drains. Moreover, table 2 shows that sanitary infrastructures are grossly inadequate in the study area. 75.7% of the sampled population has no access to any form of waste disposal utilities within their environment, 8.9% have no toilet at all with 28.5% using pit latrines. All these are indicators of poor housing quality culminating in decay of built environment.

Roof condition is also an indicator of building quality. 20.4% of selected buildings in the study area are either leaking or sagging. A building with leaking roof allows water in to the building and increases ambient moisture content of building materials. This increases the presence of interior biological contaminant as biological contaminants require moisture and warmth (Tang G. Lee, 1996). Sagging roof on the other hand have awkward shapes inherent in age of the building and quality of construction and reduce the aesthetic quality of the environment.

Furthermore, the dirty state of the environment is linked with the prevalence open dump located haphazardly within buildings. 33.2% of the respondents identified 2 open dumps in their environment and 25.5% at least one open dump. Only 20% of the sampled buildings were not situated around dumps. Open dumps have been known to constitute serious health hazards to residents. According to Marshal (1995), open dumpsites are a major problem to the environment, especially on the air that the people inhale as they emit obnoxious odour and smoke that cause illness to people living in, around, or closer to them.

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Table 2: Selected Built Environment Quality Variables

Variable	Frequency	Percentage
Drainage Type		
No Channels at all	89	37.9
Open Channels	116	49.4
Closed channels	30	12.7
Total	*235*	*100.0*
Roof Material		
Leaking	13	5.5
Sagging	35	14.9
No Defect	187	79.6
Total	*235*	*100.0*
Toilet Facilities		
No Toilet at all	21	8.9
Pit Latrine	67	28.5
Water Closet	147	62.6
Total	*235*	*100.0*
Refuse Dumps		
4 Refuse dumps	6	2.6
3 Refuse dumps	44	18.7
2 Refuse dumps	78	33.2
1 Refuse dumps	60	25.5
None	47	20.0
Total	*235*	*100.0*
Condition of Access Roads		
Un-tarred	73	31.06
Tarred but in bad condition	75	31.9
Tarred	25	10.6
Total	*173*	*73.56*
Missing	62	26.4
Total	*235*	*100.0*

Source: Authors' Computation, 2015.

On accessibility, 26.4% of the sampled buildings in the study area have no proper accessibility, 73.6% of these buildings are accessible by access streets. However, a further perusal of the Table 2 will show that even though 73.6% are accessible, 31.06% of buildings in the study area are accessible by un-tarred roads; 31.9% tarred but in bad condition while only 14.5% are properly tarred. This is an indication that the quality of accessibility in the study area requires attention of the necessary stakeholders. Proper accessibility gives shape to urban form, improves aesthetics and safety which obviously isn't the case. Besides, un-tarred roads increase the concentration of ambient particulate matters in the environment.

Variation in Built Environment Quality

The Environmental Quality Index (EQI) of selected localities is presented in appendix 1. Analysis of Variance (ANOVA) was used to ascertain if the calculated Built Environment Quality Indices (BEQI) varies across the residential zones in Ogbomosho North Local Government. The result shows that BEQI decreases from the suburban zone to the core area.

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The suburban zone has the highest BEQI with a score of 253 while the core area has the least (223.59). Further analysis however reveals that there is no difference in the calculated Built Environment Quality Indices (BEQI) of the twelve residential localities in Ogbomosho North Local Government. This implies that even though it appears that some localities have higher Built Environment Quality Index (BEQI) higher than others, the difference is not significant and built environment quality in the selected residential localities is essentially the same.

Table 3: Environmental Quality Index across Residential Zones (Descriptive)

Residential Zones	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Core	64	223.59	69.871	8.734	206.14	241.05	116	400
Transition	64	244.91	70.909	8.864	227.19	262.62	111	424
Suburban	64	253.20	74.409	9.301	234.62	271.79	120	470
Total	192	240.57	72.466	5.230	230.25	250.88	111	470

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	29861.885	2	14930.943	2.900	.057
Within Groups	973141.234	189	5148.895		
Total	1003003.120	191			

Source: Authors' Computation, 2015.

CONCLUSION

The impact of the quality of built environment in which human lives greatly determines the quality of human life. The continuous depletion of the quality of built environment continues to increase both the human morbidity and mortality. The great threat to human existence as a result of sickening environment which is not unrelated to human activities and actions in the environment can never be overstressed. There is no doubt; a call for emergency from all the necessary stakeholders in revitalizing human environment has become more than necessary at this point. Thus, this study concludes by putting forward a few recommendations to achieve revitalization of the built environment in the study area and even beyond.

RECOMMENDATIONS

This study has depicted the state of the built environment, which has been found to be greatly depleted. However, expounding on the problems is not enough, suggesting ways of improving the situation is just important. In an attempt to improve the quality of the built environment and human health within the study area and beyond, this study provides the following suggestions;

First, an important feature of the built environment is that it increases at the expense of the natural environment. This cannot be helped but can be managed. Components of the natural environment like vegetation should be preserved and conserved to the maximum. Tree planting

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campaigns should be embarked upon. Those with trees in their surroundings should be encouraged to preserve them and plant more because they improve the quality of the ambient air in the environment.

Moreover, the drainage condition in the study area should also be improved. The local government should embark on providing a proper sanitary sewerage system. Covered drains adjoining access roads should be provided so that drains from individual buildings can be collected and efficiently discharged. This apart from reducing health problems associated with poor drainage systems will improved the physical condition and neatness of the built environment.

Environmental utilities and other necessary infrastructures should also be provided. Specifically, waste management infrastructures like incinerators, refuse bins and garbage collection trucks should be made available within the study area, public toilets should be provided, electricity and water supply should be improved so as to make the built environment much more habitable and reduce health problems associated with it.

Furthermore, rehabilitation programmes should be put in place to rescue the part with the worst built environment quality in the study area which is the core area. Rehabilitation also known as renovation is an activity designed to extend the life of properties which are not structurally sound but only need improvement or conversion. Okeke (2002) describes it as a process of neighborhood revitalization. It seeks to revitalize the areas by upgrading the environment with minimum disturbance to the inhabitants. It however requires financial input from the local and state government. The Built Environment Quality Indices BEQI computed in appendix 1 could guide the selection of areas in need of rehabilitation.

Finally, provisions should be made to ensure that standards for housing, which prescribes minimum conditions under which a building, or part of it, may be lawfully occupied as a dwelling are adhered to. The Control Department should monitor the development of new buildings within the study area and ensure that they comply with planning tenets involving set back, air space, sewerage layout, toilet facilities and others to improve the quality of the built environment.

The built environment has great impacts on the livability of individuals and its various components have been examined. It is hoped that if the suggestions made are adopted, a cleaner and healthier built environment for residents' living will be promoted.

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Appendix 1: Computations for the Environmental Quality of Residential Localities

EQI	Isaleora	Masifa	Ojaagbo	Isaleafon	Alasa	Apake	Okeado	Ileewe	Estate	Kuye	Iwogba	Aduin
	Core Residential Area				**Transition Zone**				**Sub-urban Zone**			
Sewerage												
Drainage quality	180	165	190	173	156	145	165	200	210	191	176	162
Drainage condition	145	155	205	127	221	182	194	251	220	205	205	205
TWV	*325*	*320*	*395*	*300*	*377*	*327*	*359*	*451*	*430*	*396*	*381*	*367*
Accessibility												
Building Accessibility	205	270	237	209	247	286	247	244	300	272	290	281
General accessibility	220	255	184	218	190	241	229	200	120	229	219	214
Road Condition	180	177	267	173	210	173	210	111	160	182	135	144
TWV	*605*	*702*	*688*	*600*	*647*	*700*	*686*	*555*	*580*	*683*	*644*	*639*
Waste Management												
Waste Mgt. utility	150	140	116	173	121	136	130	117	160	138	143	124
Toilet Facilities	220	255	258	250	232	255	265	231	300	262	291	262
Minimal refuse dumps	315	340	284	318	311	400	230	370	370	338	386	307
TWV	*685*	*735*	*658*	*741*	*664*	*791*	*625*	*718*	*830*	*738*	*820*	*693*
Electricity												
Power Source	310	285	321	327	326	336	388	283	200	290	281	248
Stability of supply	230	215	253	259	295	232	206	204	320	195	262	238
TWV	*540*	*500*	*574*	*586*	*621*	*558*	*594*	*487*	*520*	*486*	*543*	*486*
Building Quality												
Building Structure	145	205	163	170	253	218	218	287	320	234	281	286
Wall Structure	135	175	174	159	195	291	194	200	200	200	200	200
Wall Condition	340	385	400	391	315	409	424	382	470	405	405	396
Window material	145	150	184	173	258	232	218	239	300	238	291	257
Roof Condition	225	265	247	250	290	263	288	283	300	300	290	291
Ceiling quality	220	240	331	214	221	264	294	274	310	272	267	257
TWV	*1,210*	*1,420*	*1,499*	*1,375*	*1,532*	*1,677*	*1,636*	*1,665*	*1,900*	*1,649*	*1,734*	*1,687*

Source: Authors' Computation, 2015.

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