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Research Article

ASSESSMENT OF PROVISION, ADEQUACY AND SPATIAL DISTRIBUTION OF GREEN INFRASTRUCTURE IN OSOGBO

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Abstract

Green infrastructure play significant roles in the totality of peoples' well being but its adequacy has become a source of concern especially in developing countries. This work examines the provision, adequacy and spatial distribution of available green infrastructure in Osogbo. Primary and secondary data were used, multistage sampling techniques was employed. (212) copies of questionnaire were retrieved and used. Descriptive and inferential statistics like mean, mode and standard deviation as well as ANOVA were used to analyze the data. It was discovered that government is the principal provider of the available green infrastructure in the study area, green infrastructure is not unevenly and equitably distributed and accessible, packs were also discovered to be the most common. The work recommended additional provision of green space through collaborative efforts, eco-friendly master plan, monitoring and maintenance of green infrastructure as well as environmental education for the residents.

Keywords: Green infrastructure, Adequacy, ANOVA, Osogbo.

INTRODUCTION

The need for maintaining and restoring nature within and near urban areas is stronger than ever before Urbes (2020). This is as a result of the shift of population from rural to urban especially in developing contraries (Byrne *et al*, 2015; Popoola *et al.,* 2016). Green infrastructure (GI) is a network of multi-functional green space and other green features in human settlements which can deliver quality of life and environmental benefits TCPA (2020). It is the network of all green spaces that contribute to biodiversity conservation and benefits people through the maintenance and enhancement of ecosystem. Green infrastructure increases aesthetic and leisure, they are also symbolic of the place where they are provided (Sandstrom, 2002; Baptiste *et al.,* 2015). (GI) also plays vital roles in the mitigation and adaptation to climate change (Berte and Panagopoulos, 2014). Mell (2008) opined that green infrastructure policy is a way by which green infrastructure needs are identified and planned for, and how the needs are actualized for the concerned stakeholders. On the other hand, green infrastructure delivery has been conceptualized by different authors as a process that involves planning, budgeting, provision, maintenance, monitoring and evaluation of green infrastructure (Wright, 2011; Calderon *et al.,* 2017; Calderón *et al.,* 2017). In the light of these definitions, green infrastructure delivery is conceptualized in this study as the provision and utilization of green infrastructure in different areas of our urban centre. In spite of the important roles which green infrastructure play in the survival of man, urban green space continues to face serious threats of loss and degradation owing to various human activities (Frazier 1996). Across the globe, urban green spaces are depleting at a faster rate. For example, in 25 European cities, between 7.3 and 41 percent of lands reserved for green spaces have been lost to different land uses such as residential, industrial and commercial (European Environment Agency [EEA], 2002; Schäffler and Swilling, 2013). Several towns in the Republic of South Africa have less than 10 percent of their total lands occupied by green spaces (Shackleton, *et al.,* 2017). Mensah (2014) reported that green spaces in Lagos now occupy less than 3 percent of the city's landmass.

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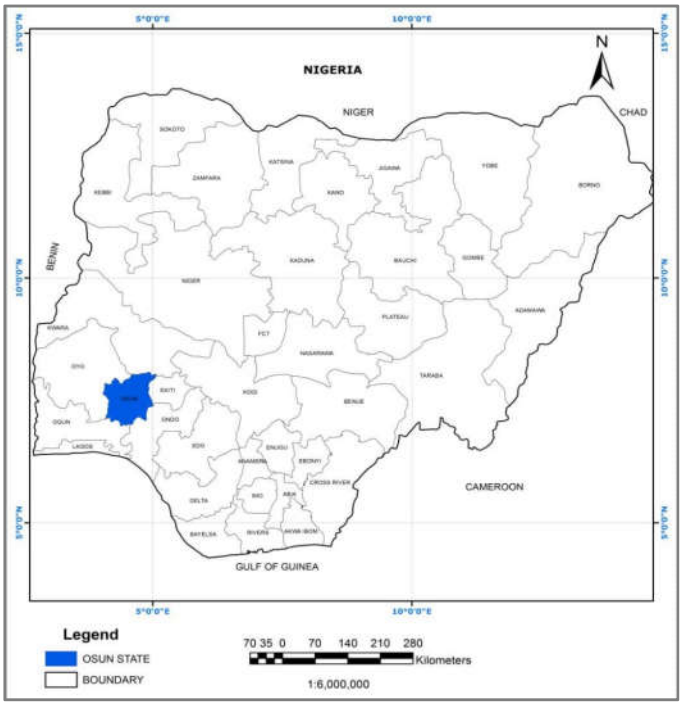
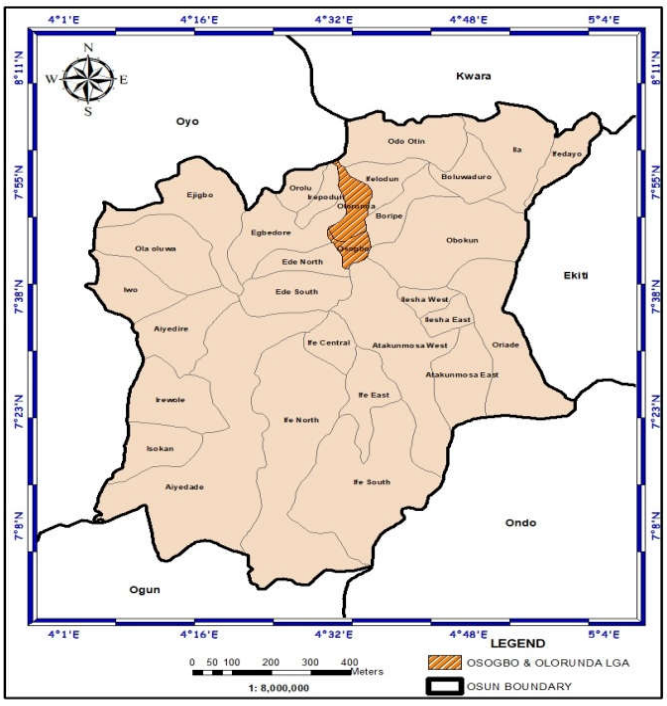
Statement of the Problem

Majority of the citizens in countries in sub-Saharan Africa (Nigeria inclusive) do not have access to green infrastructure and where available, they are neither not functioning or in a terrible state. This has contributed to deteriorating living condition in the regions and an affront to human dignity. Inadequate and poor state of green infrastructure has denied the residents enormous benefits provided by green infrastructure. These conditions come with attendant health and environmental implications such as increased flooding, higher wind speeds and more episodic rainfall especially in higher-density cities where green infrastructure are usually scarce (Coutts *et al,* 2014 and Brown, *et al*, 2015). In this study, the provision, adequacy and spatial distribution of the available green infrastructure is examined.

The Study Area

Osogbo is the Capital Cities of Osun State, Southwestern Nigeria. It is situated on Latitude 7º46'N and 7.767ºN and Longitude 4º34'E and 4.567ºE with an area of 47kmsq. Osogbo city is also the Headquarters of both Osogbo Local Government Area (Osogbo, South and Olorunda Local Government Area (Osogbo North). Based on the 2006 census Osogbo has a population of about 316,000 NPC (2006). She houses may public and private institutions and industries both local and contemporary. Osogbo is populated mainly by Yoruba ethnic group who are farmers, artisan and office workers.





Source: Office of Survivor General, Nigeria

Fig 1. Map of Nigeria showing Osun State

Fig. 2. Map of Osun showing Osogbo

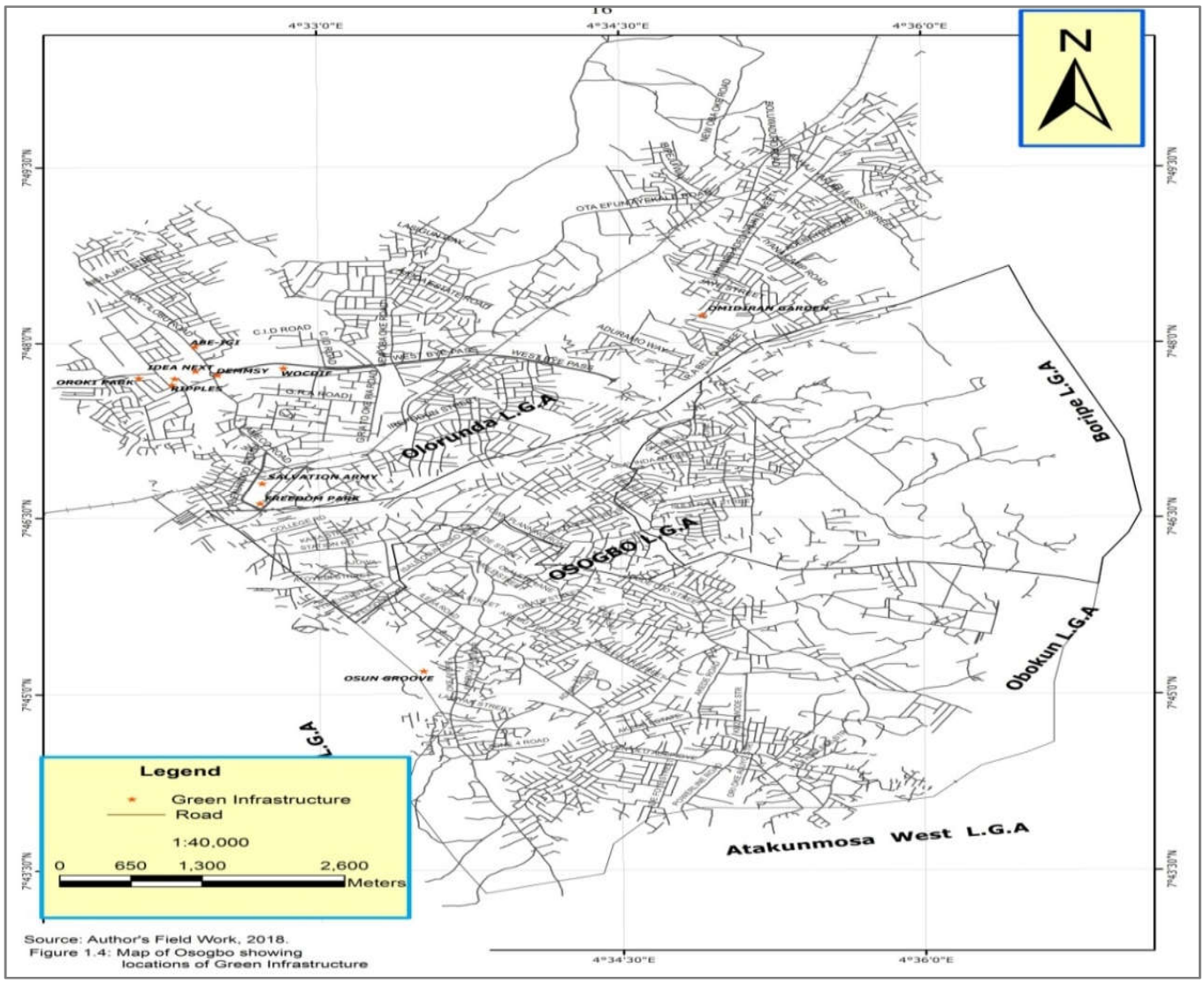


Fig. 3. Green Infrastructure distribution in Osogbo Source: Office of Survivuor general, Osogbo

Green infrastructure is situated in some areas in Osogbo. Among them is the Nelson Mandela Freedom Park. It is a long expanse of sprawling beauty, spanning a huge land mass from the Old Garage through Olaiya junction to Fakunle in Osogbo. This long stretch beautifully sculpted and designed, encapsulates the culture, history and essence of what Osun stands for in a modern and standardized mode. Other notable green infrastructure in the city is parks and garden situated at Lameco junction; Agunbelewo; Gbongan-Ibadan Road; Jaleoyemi-Asubiaro, Oba-Adenle Garden Ayetoro area and Abere in Osogbo among others. In general, the available green infrastructure in the city is observed not to be evenly distributed among the different residential areas in Osogbo (see Figure 3). Consequently, there is bound to be attendant implications for the inequality in the available infrastructure. Hence, this study examined provition, adequacy and spaatial distribution of green infrastructue in Osogbo

Literature review

Quite a number of studies have investigated the state of green infrastructure in the developed and developing nations (Gill, *et al.,* 2007; Oh & Jeong, 2007; Ma & Haarhoff, 2015; Popoola *et al.* 2016). For instance, Ma & Haarhoff (2015) using the network analysis method of GIS, examined accessibility levels of green infrastructure in walking distance in Auckland, New Zealand. The studies concluded that residents/households in low income areas do not have access to green infrastructure such as parks and public gardens, green corridors, local natural reserves, and beaches, with amenities such as playground, exercise equipment and social gathering sites. In a similar vein, Popoola *et al.* (2016) argued that accessibility to green infrastructure is subjective to the financial power of the users. The study further stressed that the state of green infrastructure in Nigeria is attributed to incessant economic and political crises, rapid urbanization, inefficient infrastructural delivery systems, low investment in green infrastructure and bad governance. On the other hand, Molla *et al.,* (2017) stated that the deplorable condition of some green infrastructure in Nigeria is attributed to the fact that some of them belong to governments.

The study concluded that the three tiers of government need to engage in public private partnership to enhance and bring about adequate green infrastructure maintenance. The expanding rate of urbanization and city extension has brought about the loss of green spaces in across the globe (Mensah, 2014). Insights demonstrate that urban green spaces are draining at a quicker rate in urban territories over the world. As far back as 2002, (European Environmental Agency EEA) reported that in 25 European urban areas 7.3 and 41 percent of grounds saved for green spaces been lost to various land uses. Similarly, USA, 274 metropolitan territories recorded lost of around 1.4 million hectares of green spaces to various land advancements (McDonald *et al.,* 2010). In African, there is an exceptional pressure on green spaces for various human exercises bringing about persevering disintegration of these green spaces particularly in urban area where the weight is more significant (Kestermont, *et al.,* 2011). By and by, the fast consumption of green spaces in Africa has brought about green spaces involving little per penny of the aggregate land space of numerous urban regions (Shackleton, *et al.,* 2017). For example, it was discovered that few towns in South Africa have fewer than 10 percent of their aggregate terrains possessed by green spaces (Ward & Shackleton, 2016). Additionally, in Kumasi city (Ghana) once the Garden city of West Africa, measurements demonstrates that few of the green paces in the city have been drained staying just a little division which together with other open spaces constitute around 10.7 percent of the aggregate land zone of Kumasi (Amoako and Korboe, 2011). On account of Nigeria, the expanding urbanization and human populace development amid ongoing urban decay have brought about critical loss of green infrastructure in Nigerian urban communities. Fast populace development has not likewise been joined by a comparing increment in the conveyance of basic urban green infrastructure, for example, parks, sit-outs, indoor and open air unwinding. In Lagos, it was accounted for that green spaces presently possess less than 3 percent of the city's landmass (Mensah, 2014); the investigation of Ezema *et al*. (2015) unhindered decreasing of accessibility to green infrastructure. Popoola *et al.,* (2016) concluded that revealed that rapid urbanization has seriously reduced green space in Ibadan. In a nutshell, exorbitant obliteration of green infrastructure in Sub Saharan Africa has been caused by rapid urbanization, poor administration, poverty, illiteracy, corruption, outdated and poorly enforced master plan. These same reasons among others have also accounted for inadequate provision and equitable distribution of green infrastructure in Nigerian cities

MATERIALS AND METHODS

Primary and secondary data obtained were analyzed using frequency and percentage distributions. Multistage sampling technique was employed: (i) stratification of residential area into three zones; (the core, intermediate and suburban), (ii) identification and selection of six political wards across the stratified residential zones. (iii) See table 1

The fourth stage is the purposeful selection of streets within the selected political wards (sees Tables 3). Structured questionnaire were administered on house heads in the 10th, 10% of number of houses (see table 4)

Five point Likert scale was used in rating the level of adequacies attached to the green infrastructure in the study area. The respondents were requested to rate the level of adequacy attached to the green infrastructure on a 5-point Likert scale (1 = not adequate at all, 2 = not adequate, 3 = neutral, 4 = adequate and 5 = very adequate).

Analysis of these variables was carried out using descriptive statistics whereby measure of central tendency such as the average mean were used to compute relative effectiveness indexes. Standard deviations for each of the mean relative adequacy indexes as well as the overall standard deviation for each residential area and Coefficient of Variations (CVs) were computed. Variables with the actual value of the mean relative adequacy index indicated moderate level of adequacy; those with high standard deviations had high level of adequacy while those with low standard deviations indicated low level of adequacy.

Providers of Green Infrastructure in the Study Area

Information on the providers of available green infrastructure in the three residential areas of Osogbo was also determined from residents. From the summary presented in Table 4,

Table 1. Electoral Wards across the Residential Zones of Osogbo

Residential zone	Local Government Areas and Political Wards	
	Olorunda	Osogbo
Core	Akogun, Atelewo, Owoope, Owode I,	Ataoja A, Ataoja B, Otun-Jagun A, Otun jagun B, Alaagba, Jagun A, Jagun B, Eketa, Ekerin,
Transition	Owode II, Balogun	Ataoja C, Are Ago, Ataoja D, Otun-Balogun
Suburban	Agowande, Ayetoro	Ataoja E, Babakekere
Total No of Wards	9	15

Source: Google Earth (2020)

Table 2. Selected Streets within Residential zones of the Study Area

Residential zone	Olorunda LGA		Osogbo LGA		Total No. of Sampled Streets	Total No. of selected Streets
	No of Streets	No of selected streets	No of Streets	No of selected streets		
Core	83	8	112	11	195	19
Transition	79	8	102	10	181	18
Suburban	62	6	46	5	108	10
Total	224	22	260	26	484	48

Source: Google Earth and Author's Field Survey, (2020)

Table 3. Number of Buildings in Selected Streets

Residential zone	No of Buildings	Sample Size (10%)
Core	846	85
Transition	715	72
Suburban	563	56
Total	2124	212

Source: Google Earth and Author's Field Survey, (2020)

Table 4. Providers of Green Infrastructure

Provider	Core		Transition		Suburban		Total	
	Freq.	%	Freq	%	Freq	%	Freq	%
Government	45	54.2	35	48.6	41	74.5	121	57.6
Community Groups	13	15.7	10	13.9	6	10.9	29	13.8
Private Organisations	12	14.5	16	22.2	5	9.1	33	15.7
Individuals	13	15.7	11	15.3	3	5.5	27	12.9
Total	83	100	72	100	55	100	212	100

Source: Author's Field Survey (2020)

it was evident that government is the largest provider of green infrastructure in the study area. This accounted for 57.6% of the total response. Other providers of green infrastructure in the study area were private organisations, community groups and individuals. These respectively accounted for 15.7%, 13.8% and 12.9%. It can be concluded from the foregoing analysis that government is the primary providers of green infrastructure in the study area. This is confirmed in similar study (Molla *et al,* 2017).

Available Green Infrastructure in the Study Area

Availability of green infrastructure promotes public health, enhance air quality and provide valuable ecosystem services to urban dwellers (McPherson *et al,* 1994; Nowak *et al,* 1996). A number of green infrastructures that could enhance environmental quality were identified through literature search. Residents were asked to indicate whether the infrastructure were available or otherwise in the core, transition and suburban residential zones of the study area. Findings were as presented in Table 5. The most available green infrastructure in study area was parks as shown in Table 5. The study established that 18.4% of respondents in the core area were aware of the availability of parks. In the transition and sub-urban areas, 18.6% and 20.7% claimed that this was available. It was evident that 19% of the respondents were aware of parks availability in the study area. From the above, it was conclusive that parks were common in the study area. The *Abe Igi Anu Park at Ilobu* road, Freedom Park at Old Garage roundabout, *Osogbo* Stadium and Oba *Adenle* garden stand out in this regard. The table further revealed that public green space ranked second most important green infrastructure that is available in the study area. In the core and suburban areas, it ranked second and 14.3% and 15.5% respectively were aware of the availability of the public green space in their area. In the transition area, 11.37% were aware of the availability of public green space (see Table 5). It can therefore be deduced that, availability of public green space in the study area will enhance environmental quality. Availability of home garden was the next most available green infrastructure in the study area ranking third. In the core and transition area, 6.98% and 6.22% of its respondents respectively were aware of its availability. Its availability was higher in the suburban area with 9.84% (see Table 5) response to its availability. Increase in the availability of home garden in the suburban area could be attributed to the difference in level of income across the three residential areas. The fourth ranked most available green infrastructure in the study area was street trees. From Table 4.12, it is evident that 7.45% of the respondents were aware of its availability in the study area. This infrastructure ranked fifth in the core and transition area. Similarly, 7.3% and 6.21% respectively claimed that they were aware of its availability. In the transition area, 8.45% of the respondents were aware of the availability of this infrastructure. In the study area, there were street trees in area such as Olorunsogo/Ring road, Ola-iya/Fakunle axis and Landero roundabout in Osogbo. Squares and plazas have been identified as major green infrastructure that can enhance residents' quality of life (Holbrook, 2009; Oxigen, 2011; European Commission, 2012).

Table 5. The Level of Green Infrastructure Availability in the Study Area

Facility	Core.	%	Rank	Tran	%	Rank	S/Frq.	%	Rank	Study Area Total	%
Parks	58	18.4	1	53	18.66	1	40	20.73	1	151	19.06
Public green space	45	14.3	2	32	11.27	3	30	15.54	2	107	13.51
Allotments	18	5.71	8	15	5.28	9	6	3.10	8	39	4.92
Green corridors	24	7.62	4	18	6.39	6	10	5.18	6	52	6.56
Street trees	23	7.30	5	24	8.45	4	12	6.21	5	59	7.45
Urban forests	16	5.08	9	13	4.58	10	13	6.74	4	42	5.30
Green roof	7	2.22	11	9	3.17	12	6	3.12	8	22	2.78
Vertical greening	4	1.27	12	9	3.17	12	6	3.12	8	19	2.39
Blue roof	7	2.22	11	11	3.87	11	6	3.12	8	24	3.03
Rain gardens	12	3.81	10	13	4.58	10	8	4.15	7	33	4.17
Outdoor sport fields	29	9.21	3	33	11.62	2	19	9.84	3	81	1.02
City square and plazas	22	6.98	6	17	5.99	7	12	6.22	5	51	6.43
Home garden	29	9.21	3	21	7.39	5	12	6.22	5	62	7.82
Cemetery& religion yards	21	6.67	7	16	5.63	8	13	6.74	4	50	6.31

** The figure exceeded the total questionnaire administered due to multiple response permitted
Source: Computer Print Out (2020)

Table 6. Green Infrastructure Adequacy in the study area

	Core		Transition		Suburban		Study Area	
Facility	GIAI	MD	GIAI	MD	GIAI	MD	GIAI	MD
Parks	1.77	0.57	1.82	0.51	1.87	0.64	1.82	0.54
Public green space	1.77	0.57	1.94	0.61	1.47	0.24	1.80	0.52
Allotments	1.20	0.00	1.39	0.06	1.00	-0.23	1.20	-0.08
Green corridors	1.18	-0.08	1.01	-0.32	1.11	-0.12	1.10	-0.18
Street trees	1.16	-0.04	1.38	0.05	1.39	0.16	1.30	0.02
Urban forests	1.10	-0.10	1.26	-0.07	1.43	0.20	1.25	-0.03
Green roof	1.03	-0.17	1.39	0.06	1.47	0.24	1.28	0.00
Vertical greening	1.03	-0.17	1.04	-0.29	1.03	-0.20	1.03	-0.25
Blue roof	1.01	-0.19	1.01	-0.32	1.00	-0.23	1.00	-0.28
Rain gardens	1.01	-0.19	1.00	-0.33	1.00	-0.23	1.00	-0.28
Outdoor sport fields	1.00	-0.20	1.40	0.07	1.38	0.15	1.25	-0.03
City square and plazas	1.18	-0.08	1.36	0.04	1.03	-0.20	1.08	-0.20
Home garden	1.19	-0.09	1.01	-0.32	1.02	-0.21	1.17	-0.11
Cemetery& religion yards	1.02	-0.18	1.02	-0.32	1.00	-0.23	1.00	-0.28
Mean Aggregate	$GIAI_C$= 1.19		$GIAI_T$= 1.29		$GIAI_S$= 1.23		$GIAI_S$= 1.28	

Authors' Compilation 2020
NOTE: GIAI= Green Infrastructure Adequacy Index;**DM**- Deviation from the Mean (of Core, Transition, Suburban and the study area), **$GIAI_C$** = Green Infrastructure Adequacy Index Core, **$GIAI_S$** = Green Infrastructure Adequacy Index Suburban, **$GIAI_T$** = Green Infrastructure Adequacy Index Transition

Squares and plazas ranked fifth most available green infrastructure. In the core and suburban area, it ranked third and fifth most available green infrastructure with 9.21% and 6.22% of its respondents respectively affirmed its availability, in the transition area, 5.99% of its respondents claimed that Squares and plazas was available and ranked seventh. Among the least available green infrastructure was the rain garden. Rain garden is important in filtering rainwater runoff before it reaches local waterways and protect communities from flooding and drainage problems (Pathak 2011). In the transition and suburban area, 4.58% and 4.15% respectively responded that they had rain garden, in core area the situation was critical as only 3.81% perceived that there was rain garden. It was therefore evident that Osogbo might be vulnerable to flood occurrence in some of its area during raining season due to lack of rain garden in the area. Green roof is another most inevitable green infrastructure that reduces runoff water, noise and air pollution in urban areas. Green roof in the core transition and suburban areas is at a low level of availability as 2.2%, 3.17% and 3.12% of respondents respectively were aware of its availability. Consequently, low level of availability of green roof has enormous implications by increasing residents' level of vulnerability to various types of hazards in the study area. However, it is unlikely that the available green infrastructure highlighted may not be adequate to meet the needs of the residents of the study area. This uncertainty would be the focus of the next section.

Green Infrastructure Adequacy

Many at times infrastructure may be available, but their adequacies are not investigated. It is not actually the available infrastructure that enhances the quality of the environment, but how adequate the infrastructures are and residents' perception of their adequacies. In order to determine the level of adequacies attached to the green infrastructure in the study area, respondents rated each of the infrastructure identified in the questionnaire using one of the 5 Likert Scales of 'Very Adequate' (VA), 'Adequate' (A), 'Just Adequate' (JA), 'Not Adequate' (NA), 'Not adequate at all' (NAA). For ease of analysis, an index known as Green Infrastructure Adequacy Index (GIAI) was arrived at. If the green infrastructure are rated above or the same with mean value, this depicts that the green infrastructure is adequate and inadequate infrastructure represents lower than mean value The findings were as presented in Table 5. From Table 4, the infrastructure with GIAI above the mean for the study area (GIAI =2.81) included parks, public green space, street trees and green roof. On the other hand, infrastructure, with lower GIAI lower than the mean for the study area were; allotments, green corridors, urban forests, vertical greening, blue roof, rain gardens, outdoor sport fields, city square and plazas, home garden and cemetery& religion yards. As shown in Table 5, parks was the most adequate green infrastructure in the study area, it has a GIAI of 1.82 higher than the GIAI, which is 1.28. In the core

area, it was the most adequate green infrastructure and also ranked first in availability too. The situation was the same in the suburban area, while in transition area, the infrastructure (parks) ranked second as the most adequate with GIAI 1.82, higher than the $GIAI_T$ and its availability is also high. Public green spaces were the next most adequate infrastructure in the study area. Its GIAI was 1.80, which was higher than the average GIAI for the study area. The adequacy of public green space was ranked as first most adequate by respondents in the transition area; it had 1.94 as its GIAI which is higher than the average GIAI of 1.29 for transition area. It was ranked as first most adequate infrastructure in the core area as well; it had GIAI of 1.77, which is higher than the average GIAI for core area which is 1.19. In suburban area, it ranked the second most adequate infrastructure with GIAI of 1.47, also higher than the average GIAI for suburban which is 1.23. Adequacy of public green space in these residential areas is not unconnected with the fact that residential areas in Nigeria are still experiencing pervasive flooding of wide dimensions. The third most adequate green infrastructure in the study area was street trees. The GIAI for this infrastructure was 1.30. In suburban area, it had GIAI of 1.39, it ranked fifth most adequate infrastructure, and also ranked fifth in its availability. In transition area, it had GIAI of 1.38, it ranked sixth most adequate infrastructure. While in the core area, the GIAI for street trees was 1.16, it ranked the seventh most adequate facility, and respondents ranked its availability as seventh most available infrastructure. Green roof was the fourth most adequate infrastructure in the study area. It was ranked by respondents as the fifth most available in the study area; it had a GIAI of 1.28. In the core area, the GIAI for the infrastructure was 1.03, it ranked ninth most adequate green infrastructure, while it was ranked fifth most available infrastructure by respondents. In the transition area, it was ranked fourth most adequate green infrastructure with GIAI of 1.39, it also ranked fourth most available green infrastructure. In the suburban area, this infrastructure ranked second most adequate green infrastructure, with GIAI of 1.47, it also ranked fourth most available infrastructure by its respondents.

The least adequate green infrastructure in the study area were green corridors, allotments, urban forest, vertical greening, blue roof, rain gardens, city square and plazas, cemetery and religion yards. All these had negative deviation about the mean. Their GIAI in the study were 1.10, 1.20, 1.25, 1.03, 1.00. 1.00, 1.08, 1.00 and 1.00 respectively, their values were lower than the average GIAI of the study area of 1.28. As shown in Table 6, this entire infrastructure had negative deviation about the mean in the three residential areas. From the foregoing, it was evident that some basic green infrastructure that are important for promoting public health and providing valuable ecosystem services to urban dwellers were missing in the study area. Also, the adequacy of the available green infrastructure in the different residential areas varies from one city to another. The result of the One Way Analysis of Variance suggested that this variation was not statistically significant *(*F=0.777 and p=0.466).

Summery, Conclusion and Policy Implication

It could be summarized that government is the principal provider of the available infrastructure in the study area; the available green infrastructure is not uneven distribution and accessible, packs were also discovered to be the most common. The study revealed that government constituted the major provider of green infrastructure in the three residential densities of the study area. It was also discovered that parks was the most available green infrastructure to respondents (19.1%) in the three residential areas. Other green infrastructure with high level of availability were public green space, home garden, street trees, green corridors, city square/plaza and religion yards among others. The level of adequacies attached to the available green infrastructure determined through Green Infrastructure Adequacy Index (GIAI) measured on a five-point Likert Scale showed that green infrastructure were below just adequate as the mean index for the study areas was 1.28. Green infrastructure considered adequate more than the average adequacy expressed in all infrastructure in the area included: parks, public green space, street trees, and green roof respectively with indices of 1.82, 31.80, 1.30 and 1.28. It was discovered that the most important green infrastructure in the three residential areas was home garden with an index of 4.46. This was above the average index (3.84) computed for the three settlements. Other important green infrastructure were parks (4.44), street trees (4.4), allotments, (4.09) outdoor sport fields (3.93), urban forests (3.99) and green corridors (3.96). However, the green infrastructure perceived to be least in importance were green corridors, public green space, rain garden and cemetery. Measuring the satisfaction residents derived from green infrastructure through the Resident Satisfaction Index (RSI), it was established that the green infrastructure respondents' derived the highest level of satisfaction were parks (3.55), outdoor sport fields (3.37), street trees (3.29), allotments (3.10), and green roof (3.09) each of which is higher than the study area index (RSI_s= 3.08). It's evident that the existing green spaces were insufficient in number and their distribution was unsatisfactory for over half of the study population. In light of the increasing urban development pressure, this study recommends the need for additional green spaces and protection of the existing green infrastructure network to create a climate-resilient development in the study area. Government must also be willing to put in place planning framework that is eco-friendly, and master plan that provides for green infrastructure. Such that both public and private development plans include green spaces in their designs which must be rigidly adhered to and those that lack green infrastructure are provided with. This will help complement the already available ones. The three tiers of government need to engage in public-private partnership to enhance and bring about adequate green infrastructure delivery in Nigeria communities. For this to be well incorporated there is need for government to involve private organizations and interested individuals in planning, budgeting, provision, maintenance, monitoring and evaluation of green infrastructure. This will bring about development of various spheres of life such as recreation, agricultural, educational, health and nutrition in the country.

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