

# Causes and Effects of Tree Removal in University of Ibadan Campus

Sulaimon Olaniyan Agbaogun (✉ [hollarniyan@gmail.com](mailto:hollarniyan@gmail.com))

University of Ibadan <https://orcid.org/0000-0002-6698-0385>

Saka Oladunni Jimoh

University of Ibadan

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## Research

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# Abstract

Trees on the university of Ibadan campus environment are positioned in a remarkable and notable manner; however, they may also present potential hazards to the infrastructure and humans they coexist with. The numerous benefits of trees can be negated due to poor tree health and anthropogenic activities and as such they may become hazardous. The study aims at evaluating the causes and effects of tree removal on University of Ibadan Campus, Oyo State Nigeria. University of Ibadan was stratified into 4 locations which are: Residential areas, Administrative areas, Parks and Gardens and Academic Areas. 323 trees comprising of 38 species were identified and the locations where they were removed was identified also. Also, 200 respondents were sampled to assess the perceived effects of removal of campus trees and some members of campus biodiversity management committee were interviewed to ascertain the reasons behind tree removal on campus. With the aid of data form, oral interviews, site assessments, G.P.S and structured questionnaires, the trees removed in the last ten years, the reasons for their removal and perceived effects of tree removal on campus were ascertained.

The results revealed that the most trees removed on campus were *Delonix regia* 22.3% and *Albizia glaberima* 15.8% while the least removed were *Anarcadium occidentale*, *Bridelia micrantha*, *Cocos nucifera*, *Ficus mucoso*, *Morinda Lucinda*, *Pinus carribea*, *Tabebuia rosea* and *Terminalia superba* with 0.3% each.

Residential areas had the highest number of tree removal on campus while the parks and gardens and administrative areas had the least. Trees removed were because of so many reasons in which old age, threat to buildings, tree defects and wind throwing are more prominent.

In conclusion, the study revealed that the tree species removed had no specific relationship with the reasons for their removal but the reasons for removal of the trees had an association with the locations where they were removed. Also, it revealed that almost all the trees removed on campus was because they were or may later have some negative impacts on lives, environment and properties and mostly to forestall dangers. Since there will always be some common interactions between the environment, lives, properties and trees on campus, the study recommends effective management of campus trees and removal in cases where necessary and also replacement of removed trees especially because of root rots, insect infestation, dead trees and old age should be encouraged.

## 1. Introduction

The urban forest is defined to comprise all trees in the urban area, inclusive of individual street trees and clusters of park trees, and peri-urban forests extend to the outer metropolitan area. Within the urban forest, forest types include city parks and urban forests >0.5ha, pocket parks and gardens with trees, trees on streets or in public squares, and any other green spaces with trees, such as riparian corridors, rooftops, and nurseries(Endreny, 2018). The urban forests are an important and increasingly valuable component of our urban environment.

Urban forestry is generally defined as the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the physiological, sociological, economic, and aesthetic benefits trees provide society(konijnendijk et al., 2006).

Trees play a vital role in regulating our ecosystem on University of Ibadan campus. However, if they to be removed continuously, there may be multitude of largely irreversible consequences.

Trees add a canopy effect along the university's sidewalks, walkways etc. and provide cooling and shade. They also help with controlling the wind speeds and also help to retain water. Trees and shrubs provide nesting sites and food for birds and other animals on campus.

Trees improve the livability of our campus for countless reasons. However, for many years, tree canopy on the campus has been decreasing. Large mature trees which reach the end of their lives are not often replaced by smaller ones. Even when replanted, the trees struggle to establish and reach maturity due to the demands of hardscapes around them on the university premises.

The University of Ibadan started off as the University College, Ibadan (UCI) which was founded in 1948, occupying, at first, the old site at Eleyele. It later moved to the present site which covered over 910.52 ha of land. The site was generously leased by the chiefs and people of Ibadan for 999 years (History of UI, 2019). The site was predominantly a tropical rainforest with patches of farm lands with cash crops like palm tree, cocoa and kola nut.

Along the course of infrastructural developments and introductions of new programs which necessitated the need for massive constructions of lecture halls, administrative buildings, halls of residence and others, the forested areas started decreasing. The university, after realizing the dangers the deforestation activities was causing, e.g. wind throws, trees falling on vehicles e.t.c and also the dangers might pose in the near future e.g climate change, started tree planting exercise by introducing some exotic species e.g *Samanea saman* (monkey pod tree),*Delonix regia* e.t.c. The tree planting exercise yielded some positive results but in the last few years, due to various factors like massive infrastructural development, old age and others, the university has witnessed serious decline in urban forest cover.

## 2. Objective

The objectives of the study were to

- Identify species of trees removed, the numbers of trees removed and the locations where the trees were removed in the last 10 years on campus.
- Investigate the reason(s) behind the removal of trees on campus
- Assess the perception of the public on the effect of tree removal on the university environment

### 2.2 DESCRIPTION OF THE STUDY AREA

The study was conducted on the University of Ibadan Campus located in Ibadan, Oyo State of Nigeria. University of Ibadan is located within latitudes  $7^{\circ} 26' 58.2''$ N and  $7^{\circ} 26'.0'$  N and longitudes  $3^{\circ} 53' 48.56''$ E and  $3^{\circ} 53' 48''$ E at an average altitude of about 208m above the sea level(Akinyele, 2010). (Figure 3.1) The university's total land area is 910.52 ha of land. The climate is characterized by dry and rainy seasons. The dry season last from November to March each year; and it's always accompanied by dry cold wind of harmattan. The annual rainfall is about 13000mm, while the mean annual temperature ranges between  $34^{\circ}$ C and a minimum of  $22^{\circ}$ C (Akinyele, 2010).

The major river in University of Ibadan is River Awba. The drainage area is  $2.08\text{km}^2$ , its drainage density is  $1.93\text{km}^2$ . River Awba drains through a part of the academic area of the university especially the Faculties of science, Social Sciences, Department of Petroleum and Department of Agricultural Engineering, and empties its water into University dam/reservoir that is very close to the Zoological Garden of the University (Akin, 2003).

### **3. Methodology**

#### **3.2.1 SAMPLING DESIGN**

Stratified random design was adopted for this study. The University Campus was stratified into four namely; the academic areas, administrative areas, Parks and Gardens and residential areas.

#### **3.2.2 SAMPLING PROCEDURE**

Thirty percent of each of the strata listed above was visited. Trees removed along these sites were identified, counted and recorded according to the streets.

Fifty structured questionnaires each were administered in each of the strata. Oral interview was conducted with the members of the Biodiversity Management Committee. This was done to confirm the reasons behind removal of the trees and efforts being made on tree planting programs on campus.

Simple random sampling was employed, which involves visual identification, estimation and direct counting of trees removed on the field.

Also, GPS was used to take the coordinates of the areas

#### **3.2.3 DATA ANALYSIS**

The data generated was subjected to descriptive statistics including, frequency distributions, table, pie charts and histogram

Chi square at significance level 0.05 was employed to determine the relationship between the species felled and the reason(s) behind felling of the trees.

Also, chi square at significance level 0.05 was employed to determine the relationship between the location and the reason(s) behind felling of the trees.

### Hypothesis 1

$H_0$  species felled is independent of reasons for felling

$H_1$  species felled is dependent on reasons for felling

### Hypothesis 2

$H_0$  species felled is independent on the location of trees

$H_1$  species felled is dependent on the location of trees

The degrees of freedom

$$DF = (r - 1) * (c - 1)$$

Where, r= number of row; c= number of columns

$$\chi^2 = \frac{\sum (Observed - Expected)^2}{Expected}$$

## 4. Results

Table 1: Species of Trees Removed, Numbers and Locations of Trees Removed

Species of Tree	Local Name	Location	Frequency	N	(%)
<i>Acacia auriculiformis</i>	Casia	Amina Way	2	6	2.0
		Gogola Road	2		
		Zoological Garden	2		
<i>Albizia glaberima</i>	Ayunre	Amina Way	3	51	15.8
		Atiba Road	1		
		Botanical Garden	3		
		Ebrohime Road	4		
		Faculty of Agriculture	7		
		Faculty of Arts	1		
		Faculty of Science	2		
		Faculty of Veterinary Medicine	3		
		Gogola Road	2		
		Jaja Avenue	2		
		Kurumi Road	1		
		Maintenance	5		
		Mellanby Hall	1		
		Oduduwa Road	1		
		Sankore Avenue	1		
		Saunders Road	7		
		UI Bookshop	2		
<i>Alstonia boonei</i>	Ahun	University Mosque	2	2	0.6
		Upper Ijomo	1		
		Vice Chancellor's Lodge	2		
		Abadina Road	1		
		Atiba Road	1		

<i>Anarcadiumoccidentale</i>	Cashew	Zik Hostel	1	1	0.3
<i>Anogeissusleiocarpus</i>	Ayin	Faculty of Education	2	2	0.6
<i>Antiarisaficana</i>	Oro	Bini Road	1	14	4.3
		Fountain Park	4		
		Kurumi Road	3		
		Liard Road	1		
		Parry Road	1		
		Vice Chancellor's Lodge	3		
		Zoological Garden	1		
<i>Araucaria columnaris</i>	Christmas Tree	Faculty of Social Science	2	2	0.6
<i>Azadirataindica</i>	Dongoyaro	Botanical Garden	2	11	3.4
		Elliot Road	1		
		Equipment and Maintenance	4		
		Faculty of Science	1		
		Fountain Park	3		
<i>Blighia sapida</i>	Ishin	Upper Ijomo	1	2	0.6
		Zoological Garden	1		
<i>Bridelia micrantha</i>	Asasha	Amina Way	1	1	0.3
<i>Casuarina equisetifolia</i>	Casuarina	Amina Way	1	28	8.7
		Balewa Hostel	15		
		Estab	3		
		Faculty of Education	1		
		Love Garden	3		

		Parry Road	1		
		Zik Hostel	4		
<i>Ceiba pentandra</i>	Araba	Faculty of Science	1	3	1.0
		Zoological Garden	2		
<i>Cocos nucifera</i>	Coconut	Zik Hostel	1	1	0.4
<i>Cola nitida</i>	Obi	Amina Way	3	4	1.2
		Ebrohime Road/Residential	1		
<i>Delonix regia</i>	Panseke	Amina Way	17	72	22.3
		Bini Road	1		
		Botanical Garden	3		
		Danfodio Road	1		
		Ebrohime Road	6		
		Faculty of Agriculture	5		
		Faculty of Arts	1		
		Faculty of Science	1		
		Faculty of Veterinary Medicine	2		
		Gogola Road	2		
		Jaja Avenue	1		
		Lishabi Crescent	1		
		Niger Road	5		
		Obong Road	4		
		Oduduwa Road	1		
		Parry Road	6		
		Sankore Avenue	6		

		Saunders Road	6		
		University Mosque	3		
<i>Elaeis guinensis</i>	Palm Tree	Faculty of Social Science	2	5	1.5
		Zik Hostel	3		
<i>Ficus thonningii</i>	Odan	Amina Way	3	10	3.1
		Faculty of Agriculture	4		
		Faculty of Arts	1		
		Jaja Avenue	2		
<i>Ficus mucoso</i>	Obobo	Faculty of Education	1	1	0.3
<i>Funtumia africana</i>	Ire	Vice Chancellor's Lodge	2	2	0.6
<i>Gliricidia sepium</i>	Agunmoniye	Amina Way	2	18	5.6
		Barth Road	3		
		Faculty of Veterinary Medicine	4		
		Jaja Avenue	1		
		Oduduwa Road	2		
		Queen Elizabeth Hall	1		
		Vice Chancellor's Lodge	3		
		Zoological Garden	2		
<i>Gmelina arborea</i>	Gmelina	Faculty of Science	2	4	1.2
		Zoological Garden	2		
<i>Khaya senegalensis</i>	Mahogany	Faculty of Education	2	2	0.6

<i>Lamea welwitschii</i>	Oopon	Faculty of Social Science	6	8	2.5
		Student Union Building	2		
<i>Magnifera indica</i>	Mango	Amina Way	5	11	3.4
		Ebrohime Road	2		
		UI Second Gate	1		
		Vice Chancellor's Lodge	3		
<i>Milicia excelsa</i>	Iroko	Botanical Garden	1	2	0.6
		Vice Chancellor's Lodge	1		
<i>Millettia thonningii</i>	Ito	Oduduwa Road	2	7	2.2
		Saunders Road	2		
		Student Union Building	1		
		Zoological Garden	2		
<i>Morinda Lucinda</i>	Oruwo	Vice Chancellor's Lodge	1	1	0.3
<i>Nesogordonia papaverifera</i>	Orodu	Fountain Park	4	4	1.2
<i>Newbouldea leavis</i>	Akoko	Gogola Road	2	3	1.0
		Vice Chancellor's Lodge	1		
<i>Persia americana</i>	Pear	Amina Way	1	2	0.6
		Sankore Avenue	1		
<i>Pinus carribea</i>	Pine	Faculty of Science	1	1	0.3
<i>Pycnanthus angolensis</i>	Akomu	Vice Chancellor's Lodge	2	2	0.6

<i>Roystonia regea</i>	Royal Palm	Faculty of Social Science	1	4	1.2
		Zik Hostel	3		
<i>Spathodea campanulata</i>	Oruru	Ebrohime Road	1	2	0.6
		UI Bookshop	1		
<i>Tarebuea rosea</i>	Tepubear	Faculty of Agriculture	1	1	0.3
<i>Terminalia catapa</i>	Fruit	Equipment and Maintenance	2	27	8.4
		Faculty of Agriculture	1		
		Faculty of Education	4		
		Faculty of Social Sciences	1		
		Faculty of Veterinary Medicine	5		
		UI Second Gate	1		
		Vice Chancellor's Lodge	4		
		Zik Hostel	8		
		Zoological Garden	1		
<i>Terminalia superba</i>	Afara	Saunders Road	1	1	0.3
<i>Triplochiton scleroxylon</i>	Arere	Botanical Garden	2	5	1.5
		Oduduwa Road	2		
		Zoological Garden	1		

N = Number of species removed per location

Total number of all trees removed on campus = 323

**Table 2: Reasons for Tree Removal as Documented by Biodiversity Committee**

Reasons for Tree Removal	Species of Tree	Frequency	Percentage (%)
Old Age	<i>Acacia auriculiformis</i>	18	47.37
	<i>Albizia glaberima</i>		
	<i>Anarcadium occidentale</i>		
	<i>Azadirat aindica</i>		
	<i>Bridelia micrantha</i>		
	<i>Casuarina equisetifolia</i>		
	<i>Cocos nucifera</i>		
	<i>Cola nitida</i>		
	<i>Delonix regia</i>		
	<i>Elaesis guinensis</i>		
	<i>Ficus thoningii</i>		
	<i>Gliricidia sepium</i>		
	<i>Magnifera indica</i>		
	<i>Milicia excelsa</i>		
	<i>Roystonia regea</i>		
	<i>Terminalia catapa</i>		
	<i>Terminalia superba</i>		
	<i>Triplochiton scleroxylon</i>		
Threat to building	<i>Albizia glaberima</i>	15	39.47
	<i>Alstonia boonei</i>		
	<i>Antiaris africana</i>		
	<i>Blighia sapida</i>		
	<i>Casuarina equisetifolia</i>		
	<i>Delonix regia</i>		
	<i>Ficus thoningii</i>		
	<i>Gliricidia sepium</i>		
	<i>Gmelina arborea</i>		

	<i>Magnifera indica</i>		
	<i>Millettia thonningii</i>		
	<i>Persia americana</i>		
	<i>Roystonia regea</i>		
	<i>Tarebuea rosea</i>		
	<i>Terminalia catapa</i>		
<b>Wind Throwing</b>	<i>Albizia glaberima</i>	14	36.84
	<i>Antiaris africana</i>		
	<i>Azadirata indica</i>		
	<i>Blighia sapida</i>		
	<i>Casuarina equisetifolia</i>		

	<i>Ceiba petandra</i>		
	<i>Delonix regia</i>		
	<i>Ficus thonningii</i>		
	<i>Gliricidia sepium</i>		
	<i>Gmelina arborea</i>		
	<i>Nesogordonia papaverifera</i>		
	<i>Pinus carribea</i>		
	<i>Spathodea campanulata</i>		
	<i>Terminalia catapa</i>		
<b>Infrastructural Development</b>	<i>Acacia auriculiformis</i>	9	23.68
	<i>Albizia glaberima</i>		
	<i>Anogeissus leiocarpus</i>		
	<i>Casuarina equisetifolia</i>		
	<i>Delonix regia</i>		
	<i>Ficus mucoso</i>		
	<i>Khaya senegalensis</i>		
	<i>Newbouldea leavis</i>		
	<i>Terminalia catapa</i>		
<b>Damage Roof</b>	<i>Albizia glaberima</i>	8	21.05
	<i>Alstonia boonei</i>		
	<i>Antiaris africana</i>		
	<i>Azadirata indica</i>		
	<i>Delonix regia</i>		
	<i>Gmelina arborea</i>		
	<i>Magnifera indica</i>		
	<i>Terminalia catapa</i>		

<b>Potential Hazards</b>	<i>Casuarina equisetifolia</i>	7	18.42
	<i>Funtumia africana</i>		
	<i>Lamea welwitschii</i>		
	<i>Milicia excelsa</i>		
	<i>Millettia thonningii</i>		
	<i>Pycnanthus angolensis</i>		
<b>Tree Hole</b>	<i>Triplochiton scleroxylon</i>	6	15.79
	<i>Albizia glaberima</i>		
	<i>Antiaris africana</i>		
	<i>Magnifera Indica</i>		
	<i>Millettia thonningii</i>		
	<i>Morinda Lucinda</i>		
	<i>Newbouldea leavis</i>		
<b>Root Rots</b>	<i>Albizia glaberima</i>	5	13.16
	<i>Azadirata indica</i>		
	<i>Delonix regia</i>		
	<i>Persia americana</i>		
	<i>Terminalia catapa</i>		
<b>Threat to Lives</b>	<i>Albizia glaberima</i>	3	7.89
	<i>Gliricidia sepium</i>		
	<i>Millettia thonningii</i>		
<b>Insect Infestation</b>	<i>Auraucaria columnaris</i>	3	7.89
	<i>Ceiba pentandra</i>		
	<i>Lamea welwitschii</i>		
<b>Rest on Building</b>	<i>Delonix regia</i>	2	5.26
	<i>Magnifera indica</i>		

<b>Tree Snapping</b>	<i>Terminalia catapa</i>	1	2.63
<b>Damage Building</b>	<i>Albizia glaberima</i>	1	2.63

Total number of species reported = 38 species of tree

**Table 3: Reasons for Tree Removal as Reported by Respondents**

Variables	Responses	Frequency	Percentage (%)
Have you noticed trees being removed within the university?	Yes	173	86.5
	No	27	13.5
Reasons for tree removal	Old age	95	56.2
	Construction	71	42.0
	Wind throwing	60	35.5
	Destruction of roads and buildings	59	34.9
	Conflict with other campus amenities	41	24.3
	Insect infestation	2	1.2

**Table 4: Species of Trees Removed due to Specific Reason**

Species of Trees	Reason for Removal
<i>Anarcadium occidentale</i>	Old Age
<i>Anogeissu sleiocarpus</i>	Infrastructural Development
<i>Auraucaria columnaris</i>	Insect Infestation
<i>Bridelia micrantha</i>	Old Age
<i>Cocos nucifera</i>	Old Age
<i>Cola nitida</i>	Old Age
<i>Elaesis guinensis</i>	Old Age
<i>Ficus mucoso</i>	Infrastructural Development
<i>Funtumia africana</i>	Potential Hazards
<i>Khaya senegalensis</i>	Infrastructural Development
<i>Morinda Lucinda</i>	Tree Hole
<i>Nesogordonia papaverifera</i>	Wind Throwing
<i>Pinus carribea</i>	Wind Throwing
<i>Pycnanthus angolensis</i>	Potential Hazards

<i>Spathodea campanulata</i>	Wind Throwing
<i>Tarebuea rosea</i>	Threat to building
<i>Terminalia superb</i>	Old Age

**Table 5: Uses of Trees and Maintenance of Trees**

Variables	Responses	Frequency	Percentage (%)
Do you have trees in your compound/faculty/office/hostel	Yes	162	98.8
	No	2	1.1
Can you give the estimated number of trees in your compound/faculty/office/hostel?	Yes	61	37.7
	No	101	62.3
Uses of trees	Relaxation e.g. sitting under shade	141	87.0
	Environmental protection against wind	117	72.2
	Education and research purposes	108	66.7
	Collection of fruits and leaves	53	32.7
	For beautification	2	1.2
	Reduction of noise pollution at the university sawmill	2	1.2
How do you/university maintain these trees?	University cleaning agents	121	74.7
	Campus biodiversity committee	115	71.0
	Doing it yourself	23	14.2
	Employing labor	20	12.3

Total number of trees reported = 929

Mean =  $15.2 \pm 20.6$

**Table 6: Perception of Respondents on Tree Removal Activities**

Variables	Responses	Frequency	Percentage (%)
Do you love to live/work in an environment with planted/natural trees?	Yes	177	88.5
	No	23	11.5
Do you love to live in a green environment?	Yes	173	86.5
	No	27	13.5
What is your perception about tree removal activities on campus?	Undesirable	131	65.5
	Desirable	69	34.5
Why do you think tree removal activities on campus is undesirable?	Gives beautiful scenery	95	72.5
	Erosion control	79	60.3
	Reduction of heat	72	55.0
	Purification of atmosphere	64	48.9
	Production of fruit	53	40.5
Why do you think tree removal activities on campus is desirable?	Potential hazards	50	72.5
	Litters may dirty the environment	42	60.9
	Destruction of electric cables	31	44.9
Support for continuation of tree removal on campus	Yes	75	37.5
	No	125	62.5

**Table 7: Chi-square showing relationship between reasons for removal and location of tree species**

<u>Chi-square</u>	<u>Value</u>	<u>df</u>	<u>P value</u>
Pearson Chi-Square	58.199 <sup>a</sup>	36	0.011

**Table 8: Result of chi-square showing the between tree species removed and reasons for removal**

<u>Chi-square</u>	<u>Value</u>	<u>df</u>	<u>P value</u>
Pearson Chi-Square	440.584 <sup>a</sup>	444	.537

## Discussion

From the result presented in chapter four, inferences were drawn from various variables in order to assess the causes and effects of tree removal on the University of Ibadan Campus.

**Species of trees removed, numbers and locations of trees removed:** Thirty-eight tree species removed from twenty (20) families were identified from different locations. Prominent trees that were removed in these areas in an order of reducing frequency were *Delonix regia*, *Albizia glaberima*, *Terminalia catapa*, *Gliricidia sepium* and *Antiaris africana* among others.

## Tree Species removed, numbers and location on Campus

**Residential Areas:** *Delonix regia* had the highest number of removal in the stratum (56) followed by *Albizia glaberima* (24) were removed. Also, Twenty-one *Casuarina equisetifolia*, *Terminalia catapa* (12), *Gliricidia sepium* (11) ,*Antiaris Africana* (9), were some of the prominent species removed during the course of the last 10 years. The presence of more trees removed in the residential can be explained by the fact that there are more trees in the residential areas more than other areas on campus

**Administrative Areas:** More of *Albizia glaberima* were removed in this stratum as against *Delonix regia* that were removed in S1. Out of the trees species that were removed, *Albizia glaberima*, *Azadirata indica* and *Delonix regia* were more prominent. *Magnifera indica*, *Millettia thonningii*, *Gliricidia Sepium* and *Spathodea campanulata* had one removed each. There is a reduction in species richness and diversity from S1 to S2 which may be due to hard impervious surfaces around the administrative areas. This agrees with Ajewole (2005) which states that the urban environment is generally characterized by impervious surfaces, highly reflective and radiating materials like concrete, and metals.. This agrees with the findings of Omole et al., (2009)that *Samena sena* pose a highest level of hazard as they are most likely to fall , this may be attributed to the fact that most municipal trees within the university community survive on construction-altered soils that may be compacted, poorly drained, littered with construction

debris and landscape maintenance. All these cumulative stresses are expected to take a toll on tree vitality and structural integrity, increasing the risk of failure.

**Residential Areas:** There were seventeen species of trees removed in S3. Also, *Albizia glaberima*, *Terminalia catappa* and *Delonix regia* are the most prominent with 13, 11 and 9 respectively. Other Species like *Ficus mucoso*, *Lamea welwitschii* and *Gliricidia sepium*.

**Parks and Gardens :** Thirteen (13) species were removed with their total number of trees observed to have been removed being 36 .*Antiaris Africana* and *azadirata indica* have the highest number of their species removed while *Albizia glaberima*, *Casuarina equisetifolia*, *Delonix regia* and *Triplochiton scleroxylon* had 3 removed each. *Ceiba petandra*, *Milicia excels* and *Blighia sepium* had one removed each. . This also agrees with findings of Omole et al., (2009) that there are large trees which present a great hazard on campus, hence the need for their removal.

**Reasons for Tree Removal as perceived by respondents:** Table 3 shows that 86.5% of the respondents noticed tree removal on campus. 56.2% perceived that the reasons for tree removal are due to old age, 42% believed that the trees removed especially at the Faculty of Education area due to constructions going on there. Also, 34.9% believed that the trees were removed due to destruction of roads and buildings. 35% believed the trees were removed due to wind throwing, this agrees with the findings of Omole et al.,(2009) that most of the trees on University of Ibadan Campus are as old as the University itself

**Reasons for Tree Removal on Campus as documented by Campus Biodiversity Committee:** From Table 4, we can deduce that of all various reasons as documented by biodiversity committee, Old Age was the most prevalent. This agrees with the findings of Omole et al.,(2009)who reported that most of the trees are as old the University and that many changes in the University campus over the last fifty (50) years have greatly stressed many of the trees resulting in decline tree canopy that is grossly undermanaged. Omole et al., (2009) reported that trees having multiple defects are hazardous within the University of Ibadan community. Also, as reported by the biodiversity committee *Samena sena* have rooting abilities that grows into underground facilities, road and building foundations. This also agrees with the findings of Omole et al., (2009)who reported that the potential for damage is extremely high and high for *Delonix regia* and *Samena sena* respectively but *Samena sena* has a potential to cause more infrastructure damage. Also, there were cases of trees removed due to infrastructural developments on campus especially Faculty of Technology, Human Nutrition, Faculty of Education amongst all.

Some other species like *Samena sena*, *Khaya ivorensis*, *Terminalia catappa* and *Terminalia ivorensis* were removed because they possess heavy crowns and their canopies grows into roofs and damage buildings.

**Uses of Trees and Maintenance of Trees on Campus:** From Table 6, 98.8% of the respondents had trees in their compound, faculty, office or hostel and 37.7% could give the estimated number of trees. 929 trees were reported to be present in respondents offices/hostels/compounds or faculties, this agrees with

Eguakun and Nkwor (2019) which states that the University environment is rich with diverse avenue tree species because of the benefits of trees in the environment.

The respondents uses the trees for wide range of benefits which includes research and education, collection of fruits and leaves, relaxation such as sitting under shades, beautification, protection from winds and reduction of noise in the factories like sawmill. This agrees with the findings of Afolayan (2009).

Also, from the result obtained, 71% reported that the campus biodiversity committee was involved in tree maintenance which agrees with the findings of Omole et al., (2009) that University of Ibadan campus tree biodiversity committee are responsible for removing or otherwise treating hazardous tree growing on campus property, they are also responsible for maintaining urban tree canopies, thereby minimizing unjustified removals.

**Perceived Effects of Tree Removal on Campus:** Analysis from Table 7 shows that 88.5% of the respondents love to live or work in an environment with natural or planted trees. This agrees with the findings of Afolayan(2009) which states that lots of people love to live in an environment with natural or planted trees.

65.5% of the respondents reported tree removal on campus as being undesirable because of the numerous benefits they derive from the presence of trees around them which includes purification of atmosphere, heat reduction and fruits and leaves productions among others.

Also, 34.5% reported tree removal on campus as being desirable because of potential hazards, littering of their environment such as hostel/offices/houses and walkways and also destruction of campus infrastructures such as buildings, roads, electric cables, underground facilities and others.

62.5% would not support the continuation of tree removal as against 37.5% that would support it. This implicates that trees on campus would enjoy active participation of public on campus trees, tending and maintenance and also maybe participation in tree planting programs on campus.

Also, it shows from Table 8 that the respondents have ample knowledge about environmental hazards like erosion, flooding e.t.c. and television and social medias are the major sources of disseminating information. This implies that lots of people watch television and are very active on social medias.

High temperature on campus was reported by the majority as the effect of tree removal experienced on campus, while 62.9% had experienced storm and 27.9% had experienced flooding.

Also, 80% of the respondents knew tree removal on campus is the major factor responsible for the hazards and 93% believed that reforestation and replacement of trees removed can help to mitigate the effects. The implication of these is that University of Ibadan being an academic environment, many people has knowledge about urban tree reduction and deforestation.

**Relationship between location and reasons for tree removal:** The P-Value of the chi-square from table 9 which is 0.011 shows that there is significant association between tree species locations and reasons for tree removal. Therefore we do not accept the null hypothesis. This implies that the locations of trees have their impact on the reasons for tree removal. Areas like residential areas are more prone to tree removal. There are lots of trees that are old on campus especially the residential areas. This agrees with the findings of Omole et al.,(2009) who reported that 94 trees along Oduduwa Road of the campus were hazardous. This also agrees with the findings of who reported that most of the trees are as old the University and that many changes in the University campus over the last fifty (50) years have greatly stressed many of the trees resulting in decline tree canopy that is grossly undermanaged. Due to threat to lives, buildings and properties around the residential areas, there is need to remove these trees.

**Relationship between Tree Species Removed and reasons for removal.:** The P-Value from table 10 which is of 0.54 shows that there is no significant association between species of tree removed and reasons for tree removal. Therefore we do not reject the null hypothesis. This implies that the trees removed does not have any impact on the reasons for removal. This also agrees with the findings of Omole et al., (2009) which states that the defects observed in the municipal trees within the campus are common to all the tree species.

## Conclusion

Despite the unquantifiable benefits and impacts of urban trees to the University of Ibadan environment, they tend to cause hazard to lives, properties and its surrounding, when they are unattended to. Some tree defects on campus includes termites and pests infestation, fungi, leaning tree as a result of wind throw, cracking of the roots and stem barks, decay/rotting of the roots and stem, severe debarking of stems, etc.

Trees on University of Ibadan Campus were removed for various reasons which range from constructions of new buildings, wind throwing, threat to existing buildings, old age, threat to lives and properties among others. Most prominent of these reasons are old age and threat to buildings. The location of the trees species had impact on the reasons for removal and the species removed had no relationship with the reasons for removal. Also, very high temperature was recorded by respondents has been the most witnessed disadvantage of tree removal on campus. The study concludes that trees on campus mostly especially around residential areas should be periodically and properly managed to reduce hazards to lives and properties. Also, records of trees removed on campus should be kept so as to assess the rate of removal.

## RECOMMENDATIONS

The following recommendations are made based on the findings of this study:

Trees like species like *Samena sena*, *Khaya ivorensis*, *Terminalia catappa* and *Terminalia ivorensis* should be avoided in future planting programs because they possess heavy crowns and their canopies grows into roofs and damage buildings especially the residential areas and administrative areas.

Management practices like pruning should be periodically done to reduce the rate of hazards posed by species *like Khaya ivorensis* and *Terminalia catappa* because of their heavy crowns.

Trees around residential areas must be periodically managed by the biodiversity committee before they constitute hazards to life and properties.

There should be involvement of soil scientists to study planting sites before future planting is done to reduce cases of loose soil.

Trees like *Samena sena* and *Delonix regia* should be discouraged from future planting especially near administrative areas, residential areas and academic areas because of their records of destroying underground facilities and building foundations.

Evaluation of the campus trees should be carried out every 1-2 years to replace dead trees and remove old trees that may pose threat to lives, properties and buildings.

Steps should be taken to enact and enforce stricter laws binding people from destroying or removing trees in their quarters because they want to use the land for farm.

Steps should be taken to enforce stricter laws binding all construction contractors on campus to always seek for permission from the biodiversity management committee before removing any tree on site.

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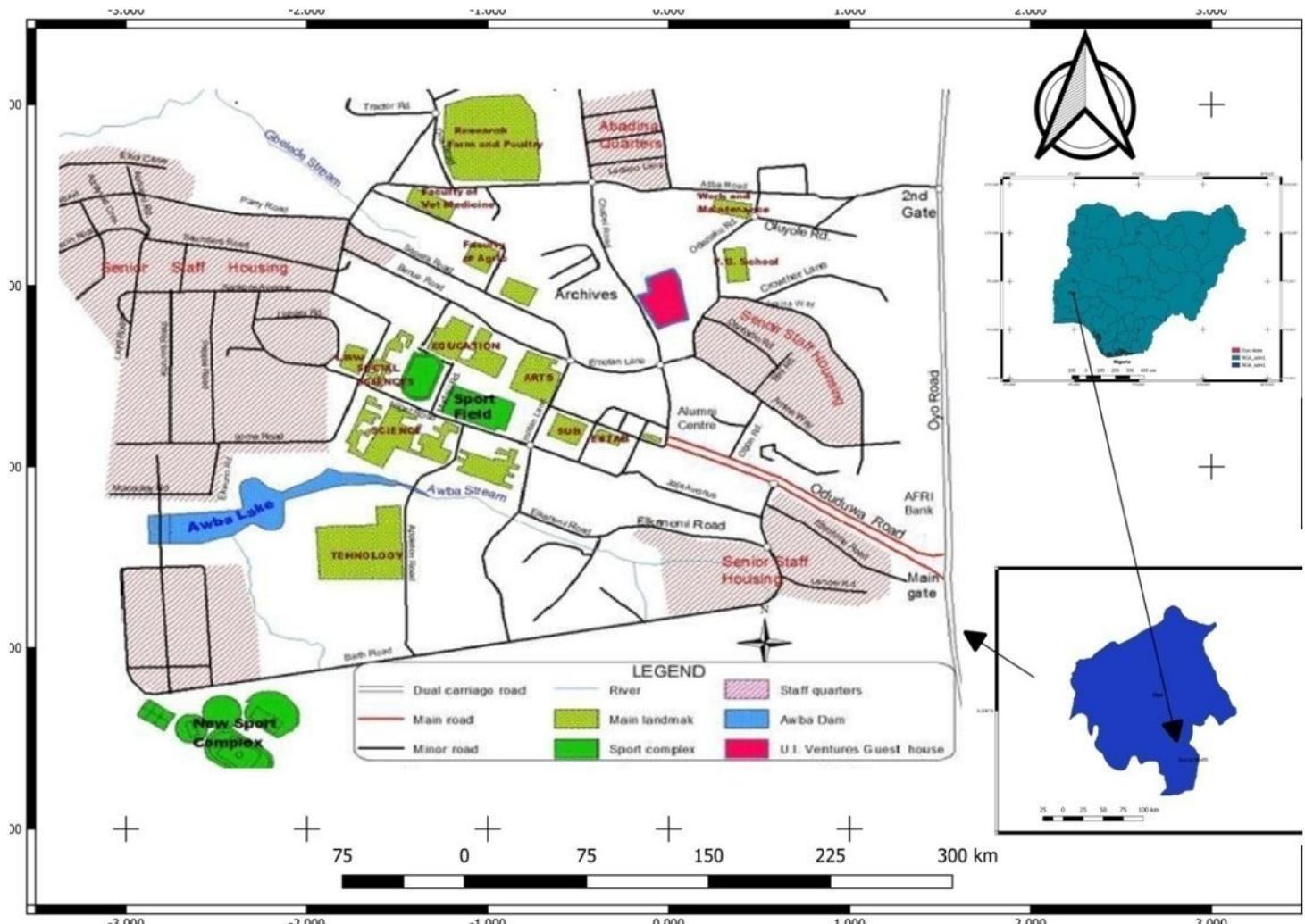
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## Figures



**Figure 1**

Map of University of Ibadan. Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.



**Figure 2**

A picture of *Ficus thonningii* removed along Jaja Avenue due to threat to building



**Figure 3**

Milicia excelsa removed at botanical garden due to old age