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## TREE SPECIES COMPOSITION WITHIN KANO STATE UNIVERSITY OF SCIENCE AND TECHNOLOGY WUDIL, KANO STATE, NIGERIA

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### ABSTRACT

*The study accessed the tree species composition within the Kano State University of Science and Technology Wudil, Kano State, Nigeria with the view of providing information that will help in the management and conservation of tree species within the campus. The study area was stratified into four (4) sections from which total enumeration of tree species was carried out. Results from the study shows that, there are 8267 tree stands, representing 43 tree species cutting across 21 family and 37 genera. Azadirachta indica recorded the highest frequency and percentage frequency of 3959 and 47.89% respectively while Borassus aethiopum, Celtis integrifolia and Sclerocarya birrea recorded the lowest frequency and percentage frequency of 1 and 0.01% respectively. The family Fabaceae recorded the highest frequency and percentage frequency of 11 and 52.38% respectively while Anonaceae, Apocynaceae, Arecoideae, Balanitaceae, Bignoiaceae, Ebenaceae, Lamiaceae, Rhamnaceae, Sapotaceae, Ulmaceae and Verbenaceae recorded the lowest number of representation of 1 and 4.76% frequency and percentage frequency respectively. Notwithstanding the large number of tree stands recorded, majority of which were exotic trees, the various distribution pattern of the various parameters accessed was typical of savanna vegetation. Concerted effort should be made for the conservation of these species, most especially the indigenous ones, some of which might be extinct in the campus if adequate measures are not taken.*

**Keywords:** Tree species composition, Savanna, Indigenous tree species, Forest Conservation

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### INTRODUCTION

Trees are known to provide diverse benefits which ranges from ecological (soil erosion control, watershed management, windbreak and shelterbelt, desertification control, climate

change mitigation) Socio-economic (source of income from the sale of fuel-wood, timber, edible fruits, and other non-timber forest products) and cultural (medical, spiritual, aesthetic, historical). Nigeria is endowed with

a rich biodiversity with an estimated plant species of about 7,895 from 338 families and 2,215 genera (FGN, 2006). However, these plants species are disappearing at an alarming rate owing largely to deforestation and other land use practices. For example in Africa 60 – 80% of the population were reported to depend solemnly on plants for their wellbeing (Adesuyi, *et al.*, 2012), while about 85% of domestic energy use in Nigeria was reported to come from wood (FMEnv, 2006). In Northern Nigeria over 80% of the population depend on wood as their source of energy and fuel wood collection accounts for about 90% of forest removal in Nigeria (Abdulrashid and Yaro 2014; Adegbehin, 1990). With a large and ever growing population, it is expected that these figure will continue to rise unless a viable alternative devoid of irregularities in supply, affordable as well as accessible is provided.

The vegetation type of Kano state is mainly savanna, climatically defined into Northern

guinea savanna and Sudan savanna. The vegetation is characterised with little vegetation of shrubs, tree and few trees. The vegetation cover is now altered as a result of climate change and human activities. Some part of the sudan has now become part of the semiarid region as a result of desertification attributed to firewood collection, overgrazing, urbanization, land clearing for agriculture and bush burning. Shrubs, grasses and few trees dominate the vegetation of Northern Nigeria landscape (Tukur, 2013).

Unless deliberate and consistent effort are made towards the management and conservation of our vegetation resources particularly in Northern Nigeria and other similar region worldwide, we might be face with a serious crisis in the near future occasioned by scarcity of resources. There is therefore the need for accurate and adequate information on the prevalence and composition of tree species as an important step towards the management and

conservation of our vegetation resources. However, such information are scarce (Zisadza-Gandiwa *et al.*, 2013), it will not be surprising if species of plants that are thought to be abundant might actually be endangered while those thought to be endangered might be on the verge of extinction due to limited data on flora composition (Ikyaagba *et al.*, 2015) hence the justification of this study, moreover we have not come across any documented material detailing the composition of tree species within Kano State University of Science and Technology which is vital for management and conservation purpose.

## **METHODOLOGY**

### **Study area**

Kano state lies between latitude 12<sup>0</sup>40' and 10<sup>0</sup>30' N and longitude 7<sup>0</sup>40' and 9<sup>0</sup>30' E. The climate is characterised into dry and wet season. The dry season usually starts from November – March, while the rainy season

starts from May to September. Mean annual rainfall is about 690 mm while mean annual temperature ranges between a maximum of 33<sup>0</sup>C and a minimum of 19<sup>0</sup>C.

The vegetation is mainly savanna, climatically defined into Northern guinea savanna and Sudan savanna. Northern guinea savanna is characterized by open woodland or brush with shorter grasses while the southern guinea savanna has taller grasses. The Sudan savanna has scattered trees in open grassland. common tree and shrubs found in this region includes; *Adansonia digitata*, *Vitex doniana*, *Diospyros mespiliformis*, *Tamarindus indica*, *Khaya senegalensis*, *Acacia senegal*, *Acacia nilotica*, *Acacia seyel*, *Faidherbia albida*, *Balanites aegyptiaca*, *Parkia biglobosa*, *Guiera senegalensis*, *Borassus aethiopum*, *Piliostigma thonningii*, *Ziziphus spina-christi*, *Hyphaene thebaica* and *Anogeissus leiocarpus*.



**Figure 1: Map of Nigeria Showing Kano State in red**

*Source: www.en.wikipedia.org*

### **Sampling procedure and data analysis**

The entire university environment includes; the commercial secondary school, technical secondary school, main university campus and the university farm from which total enumeration of all trees was carryout. The data was analysed using descriptive statistics. Spreadsheet package (Microsoft Excel) was used to plot histogram.

### **RESULTS**

Results obtained from this study indicates that, there were eight thousand two hundred

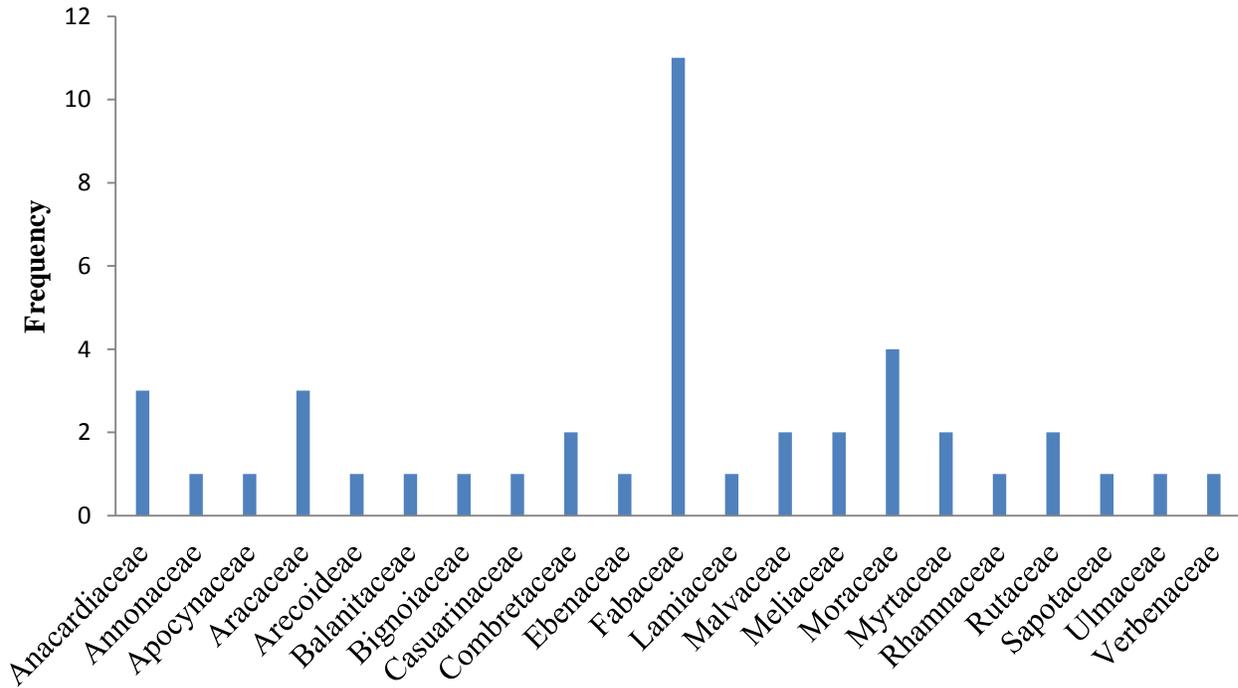
and sixty seven tree stands (8267) within Kano State University of Science and Technology representing forty (43) species of tree cutting across twenty one (21) family and thirty seven (37) genera (Table 1). *Azadirachta indica* recorded the highest frequency (tree stands) of 3959 as well as percentage frequency of 47.89% while *Eucalyptus camaldulensis* recorded 2701 frequency and percentage frequency of 32.67%. *Khaya senegalensis* recorded 240 frequencies and a percentage frequency of 2.9% making it the indigenous tree species

with the highest frequency and percentage frequency (Table 1). *Psidium guajava* a fruit tree recorded 190 frequencies and 2.29% frequency followed by *Casuarina equisetifolia* with 122 frequencies and 1.48% frequency (Table 1). *Adansonia digitata* recorded 121 frequencies and 1.46% frequency (Table 1). *Borassus aethiopum*, *Celtis integrifolia* and *Sclerocarya birrea* recorded the least frequency and percentage frequency of 1 and 0.01% respectively

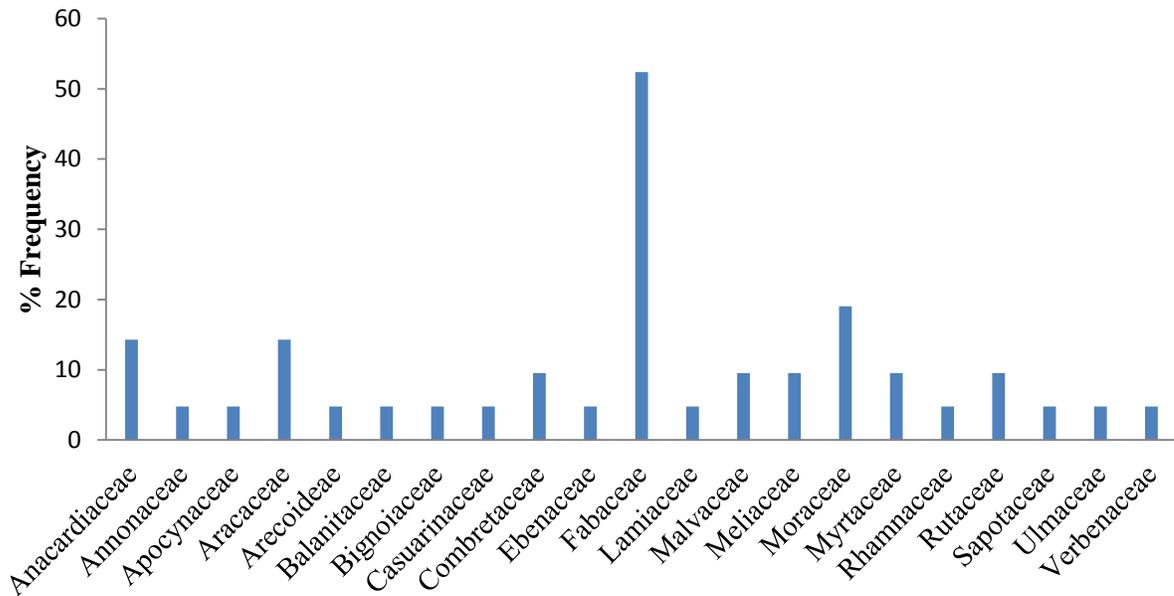
(Table 1). The family Fabaceae recorded the highest frequency and percentage frequency of 11 and 52.38% respectively while *Anonaceae*, *Apocynaceae*, *Arecoideae*, *Balanitaceae*, *Bignoiaceae*, *Ebenaceae*, *Lamiaceae*, *Rhamnaceae*, *Sapotaceae*, *Ulmaceae*, *Verbenaceae* has the lowest number of representation with each recording 1 and 4.76% frequency and percentage frequency respectively (Figure 2 and 3).

**Table 1:** Tree species composition within Kano State University of Science and Technology Wudil

S/No	Species Name	Family	Life form	Frequency	% Frequency
1	<i>Acacia nilotica</i>	Fabaceae	Tree	85	1.03
2	<i>Acacia senegal</i>	Fabaceae	Tree	75	9.91
3	<i>Acacia seyal</i>	Fabaceae	Tree	30	0.36
4	<i>Adansonia digitata</i>	Malvaceae	Tree	121	1.46
5	<i>Albizia lebbek</i>	Fabaceae	Tree	4	0.05
6	<i>Anacardium occidentale</i>	Anacardiaceae	Tree	9	0.11
7	<i>Anogeissus leiocarpa</i>	Combretaceae	Tree	2	0.03
8	<i>Azadirachta indica</i>	Meliaceae	Tree	3959	47.89
9	<i>Balanites aegyptiaca</i>	Balanitaceae	Tree	13	0.16
10	<i>Borassus aethiopum</i>	Arecaceae	Tree	1	0.01
11	<i>Casuarina equisetifolia</i>	Casuarinaceae	Tree	122	1.48
12	<i>Ceiba pentandra</i>	Malvaceae	Tree	3	0.04
13	<i>Celtis integrifolia</i>	Ulmaceae	Tree	1	0.01
14	<i>Citrus aurantium</i>	Rutaceae	Tree	34	0.41
15	<i>Citrus sinensis</i>	Rutaceae	Tree	2	0.03
16	<i>Dalbergia sissoo</i>	Fabaceae	Tree	52	0.63
17	<i>Delonix regia</i>	Fabaceae	Tree	17	0.21
18	<i>Diospyros mespiliformis</i>	Ebenaceae	Tree	44	0.53
19	<i>Eucalyptus camaldulensis</i>	Myrtaceae	Tree	2701	32.67
20	<i>Faidherbia albida</i>	Fabaceae	Tree	43	0.52
21	<i>Ficus iteophylla</i>	Moraceae	Tree	11	0.13
22	<i>Ficus platyphylla</i>	Moraceae	Tree	3	0.04
23	<i>Ficus sycomorus</i>	Moraceae	Tree	7	0.08
24	<i>Ficus thomningii</i>	Moraceae	Tree	17	0.21
25	<i>Gmelina arborea</i>	Lamiaceae	Tree	14	0.17
26	<i>Hyphaene thebaica</i>	Arecaceae	Tree	2	0.03
27	<i>Khaya senegalensis</i>	Meliaceae	Tree	240	2.9
28	<i>Mangifera indica</i>	Anacardiaceae	Tree	119	1.44
29	<i>Nerium oleander</i>	Apocynaceae	Tree	8	0.1
30	<i>Parkia biglobosa</i>	Fabaceae	Tree	19	0.23
31	<i>Phoenix dactylifera</i>	Aracaceae	Tree	9	0.11
32	<i>Piliostigma reticulatum</i>	Fabaceae	Tree/Shrub	3	0.04
33	<i>Polyalthia longifolia</i>	Annonaceae	Tree	101	1.22
34	<i>Psidium guajava</i>	Myrtaceae	Tree	190	2.29
35	<i>Roystonea oleracea</i>	Arecoideae	Tree	13	0.16
36	<i>Sclerocarya birrea</i>	Anacardiaceae	Tree	1	0.01
37	<i>Senna siamea</i>	Fabaceae	Tree	109	1.32
38	<i>Stereospermum kunthianum</i>	Bignoiaceae	Tree/Shrub	9	0.11
39	<i>Tamarindus indica</i>	Fabaceae	Tree	55	0.67
40	<i>Terminalia catappa</i>	Combretaceae	Tree	3	0.04
41	<i>Vitellaria paradoxa</i>	Sapotaceae	Tree	3	0.04
42	<i>Vitex doniana</i>	Verbenaceae	Tree	8	0.1
43	<i>Ziziphus spina- christi</i>	Rhamnaceae	Tree	5	0.06
	Total			8,267	



**Figure 2: Frequency of family distribution of tree species within Kano State University of Science and Technology Wudil, Nigeria**



**Figure 3: Percentage frequency of family distribution of tree species within Kano State University of Science and Technology Wudil, Nigeria**

## DISCUSSION

Kano State University of Science and Technology Wudil house a large number of tree stands and tree species cutting across several family and genera. Although the total number of tree stands recorded is higher than that reported by Ikyaagba *et al.* (2015) and Nodza *et al.* (2013) both of whom assessed tree composition within some Nigerian universities, the number of tree species, family and genera is less. This could be attributed to the sampling intensity and the variation in ecological zones.

Vegetation cover varies from one ecological region to the other largely attributed to the difference in amount of precipitation (Aregheore, 2009). Surprisingly the number of tree stands, family as well as genera are higher than the figures recorded by Bello *et al.* (2013) in a forest reserve of Katsina State (Kogo forest reserve) which has similar climatic conditions with Kano State. Similar observation was reported by Zisadza-Gandiwa *et al.* (2013), they discovered

communal land to contain more woody plant species diversity than protected area, a deviation from preconceived notion which suggest that protected areas contain large population of biodiversity than free or communal lands.

Forest reserve is expected to house many tree stand however the level of exploitation and sampling intensity could possibly be responsible for this observation. Moreover even though the University is not a protected area so to say, felling is not allowed which means the level of protection is higher and/the level of awareness and condition of living of the university community is higher than people outside. This confirms the report which suggested that illiteracy and poverty are some of the factor responsible for overdependence on fuelwood as a source of energy (Naibbi and Healey, 2013) thereby increasing the rate of deforestation as a result of fuelwood collection. Adelusi *et al.* (2002) noted that area originally perceived as forest reserves have suffered from

overexploitation leading to massive decline in tree population.

*Azadirachta indica* and *Eucalyptus camaldulensis* accounts for more than 80% of the total tree stands. This is not surprising because *Azadirachta indica* and *Eucalyptus camaldulensis* has become some of the choice species for planting in Northern part of Nigeria since their introduction in Nigeria. This is attributed to the ease of establishment, fast growth rate and adaptability of these species to the region. They are planted as avenue trees, for shed as well as desertification control in most part of Northern Nigeria.

It is gratifying that indigenous tree species like *Khaya senegalensis*, *Casuarina equisetifolia* and *Adansonia digitata* recorded an impressive number of stands signaling a bit of hope for the future of these species. However, species like *Borassus aethiopum*, *Celtis integrifolia* and *Sclerocarya birrea* recorded 1 tree stand each typical of savanna vegetation signaling the possibility of these trees disappearing in

the campus in the near future if care is not taken. Similar results were reported by Tukur *et al.* (2013) when they carry out an inventory of indigenous tree species within Dutsin-Ma area in Katsina state which share similar climatic condition with Kano state. With the exceptions of Fabaceae and Moraceae, Anacardiaceae and Aracaceae, the family are poorly represented, this poor representation of tree species per family is similar to the observation made by Ikyagba *et al.* (2015) and Nodza *et al.* (2013) implying a possible danger of such plant going into extinction in the near future (Ikyagba *et al.* 2015) unless efforts are made towards their conservation in the campus.

## CONCLUSION AND

## RECOMMENDATION

Kano State University of Science and Technology Wudil house a large number of tree stands. However, majority of the tree stands are exotic trees. Though some indigenous tree species such as *Khaya senegalensis*, *Adansonia digitata* and

*Casuarina equisetifolia* recorded an impressive number of stands, majority of the indigenous tree species recorded few numbers of stands signaling a possible danger of extinction in the campus in the near future if efforts towards the management and conservation of these species are not made. It is therefore recommended that campus tree committee which shall be saddle with the responsibility

of conserving and managing tree species within the campus among other things should be constituted. There is also a need for further study in the future that will focus not only on composition but includes other parameters that will assess species richness, evenness, diversity and similarity. These will provide adequate information for conservation and management purpose.

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