



## ASSESSMENT OF TREE SPECIES AND THEIR UTILIZATION IN KURFI LOCAL GOVERNMENT AREA OF KATSINA STATE, NIGERIA

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### ABSTRACT

*The study was carried out in Kurfi Local Government Area of Katsina State, Nigeria. Situated in dry land region of the State. Data was collected with pre-tested questionnaires administered to 120 farmers randomly selected as sample for the entire population. Information was gathered on the demographic characteristics, utilization of the tress species; including the different parts used and their uses, benefits and challenges of tree species. Data collected were analyzed using a descriptive statistic. The results from the respondents indicated the uses of tree species, the different part used and their functions, 11% of the respondents uses the leaves of *Adansonia digitata*, and 12% uses the leaves of *Acacia albida* as animal feed, other uses include mulch, condiments and medicinal purposes. Also, 67% and 33% of the respondents use seeds for animal feed and food, respectively. Among the challenges faced by the farmers, 48% of the respondents indicated the occurrence of pest and diseases as well as urbanization as one of the factors endangering tree species in Kurfi Local Government Area. From the result obtained, it was discovered that most tree species found in the study area were used for food, medicine and animal feed. The most common trees found in the area includes *Adansonia digitata*, *Parkia biglobosa*, *Tamarindus indica* etc. It is recommended that committee which shall be saddle with the responsibility of conserving and managing tree species within the study area 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.*

**Keyword:** Farmers, Medicine, Respondent, Species, Trees

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### INTRODUCTION

Biodiversity is central to sustainable development, alleviates poverty, improve human livelihoods as well as the socio-cultural integrity of the human populace (Lawal *et al.*, 2020). Plant diversity supports sustainable human development and ecosystem health De Mazancourt *et al.*, (2013). The diversity of plants and other micro elements in and above the ground are now globally threatened as a result of human unrelenting actions of degradation and unsustainable land-use (Murphy and Romanuk, 2014). Forest serves

its host community in a number of ways. However, most of these forests and their resources are under intense pressure and threat from inimical human activities associated with high population growth, unregulated grazing by indigenous and non-indigenous herders and economic demands (FAO, 2016).

Ideally, the conservation of biodiversity should be an essential responsibility for all mankind (IUCN, 2009). Contrarily, the rate at which flora (fodder) ecosystem is being destroyed through human influence within

Katsina State like other Northwestern States is disturbing (Ikyaagba *et al.*, 2015). This necessitates the need to assess the fodder trees composition under different land-use with the aim to contribute data on which sustainable management and conservation of floral diversity in the region could be based.

The knowledge of the tree flora of a community will enhance inhabitant's positive relationship with the trees as well as promote the status and sustainable management of the trees. Tree is one of natural resources that need careful management and sustainability for utilization of future generation. Today there is an urgent need for conservation measures and adoption of sustainable use methods throughout Africa to avoid further degradation of the natural resources. In Nigeria, for instance there is limited accurate data on flora status. Thus, species currently perceived as abundant might actually be endangered while those previously perceived as endangered might be nearing extinction. The research was carried out to assess the tree species and their utilization in Kurfi Local Government Area (LGA) of Katsina State.

## MATERIALS AND METHODS

### Study Area

Kurfi is a LGA in Katsina State, Nigeria. Its Headquarters is in the town of Kurfi, near the Gada River. Kurfi was established 1989 and it is located along latitude 12.66° 61" and 12.39° 58" North of the equator and longitude 7.48° 31" and 7.28° 59" East of the equator. It covers an area of 572 km<sup>2</sup>, it shares boundaries with Batagarawa LGA in the North, Charanchi LGA in the East, Dutsinma LGA in the South, Safana and Batsari LGA in the West. Kurfi has a population of 117,581 people according to the 2006 census and it is constituted of ten (10) wards which include Kurfi A, Kurfi B, Barkiya, Wurma A, Wurma B, Tsauri A, Tsauri B, Rawayau A, Rawayau B, and Birchi ([www.mindat.org](http://www.mindat.org))

### Sample size and sampling techniques

Purposive Simple random sampling was used for this study. Respondent were randomly selected and interviewed in the study area. Nearly equal numbers of respondent were randomly selected and interviewed in each village of the study area. The structured questionnaire contains questions about tree species, the use of tree species as well as their benefits in the study area.

The sample size was determined using Yamane, (1967).

Multi-stage sampling method was employed to select the sampling unit. Four (4) wards were selected out of ten wards in Kurfi LGA which includes (Birchi, Barkiiya, Rawayau A and Rawayau B). Three (3) villages were selected from each ward given a total of twelve (12) villages. A total number of 120 questionnaire were administered to 120 respondent who were randomly selected across the twelve villages in four wards, in Kurfi LGA of Katsina State, Nigeria.

### Data Sources

Data were collected by the use of semi-structured questionnaire which were administered to 120 respondents in Kurfi LGA of Katsina State. The questionnaire contains question which addresses the socio-economic characteristics of the people, the type and utilization of tree species.

### Data Analysis

The data collected was analyzed using descriptive statistics such as frequencies, percentages and tables. All data were analyzed with SPSS package (Ver. 20).

## RESULTS

### Demographic Characteristics of Respondents

The results in Table 1 represent the demographic characteristics of the respondent. The result showed that majority of the respondents (90.8%) were male with their age ranging between 41-50 years (28.4%), 51-50 (26.7%), 31-40 (23.3%), and 61-70 (15.8%) and they are farmers (70.8%).

**Table 1: Demographic characteristics of respondents**

Variable	Parameter	Frequency	Percentage (%)
Age	21-30	4	3
	31-40	27	23
	41-50	34	28
	51-60	32	27
	61-70	20	16
	>70	3	3
Gender	Male	109	91
	Female	11	9
Marital status	Married	112	93
	Single	4	3
	Divorced	1	1
	Widow/widower	3	3
Household size	1-10	71	59
	11-20	35	29
	21-30	10	8
	31-40	4	3
Educational status	No formal education	4	3
	Quaranic education	63	52
	Adult education	1	1
	Primary education	26	22
	Secondary education	19	16
	Tertiary education	7	6
Major occupation	Farming	85	71
	Trading	26	22
	Craftsman	9	7
Farm size	1-10 ha	111	98
	11-20 ha	9	2
Source of farm land acquisition	Lease	26	21
	Inheritance	71	59
	Purchase	15	13
	Rent	1	1
	Government land	7	6
Ethnicity	Fulani	14	12
	Hausa	106	88

**Inventory of Tree Species**

The list of the inventoried tree species in Kurfi LGA is presented in Table 2 below. The table presents the different trees species found in the study area including their botanical and local

name, the different parts used and their uses. Trees provide many life essentials which includes food and oxygen which are needed by man, and other necessities such as shelter, medicine, income among others, the parts of

most trees (leaves, bark, fruit, pod, seed and root) found in the study area are used for many purposes such as medicinal, food, animal fodder, shade, soil improvement, mulching etc.

**Table 2: List of inventoried trees spp, botanical and local name, parts used and uses found in Kurfi Local Government Area**

S/No.	Botanical names	Local name (Hausa)	Parts used	Uses
1	<i>Adansonia digitata</i>	Kuka	Leaves	Food
2	<i>Azadirachta indica</i>	Bedi	Leaves and seeds	Medicine, soap
3	<i>Anogeissus leiocarpus</i>	Marke	Bark	Medicine
4	<i>Anacardium occidentale</i>	Guava	Leaves and fruit	Medicine, food
5	<i>Acacia senegalensis</i>	Dakwara	Leaves	Soil improvement
6	<i>Acacia sayal</i>	Dushe	Leaves and seed	Animal feed
7	<i>Acacia niloticus</i>	Bagaruwa	Fruit	Food, animal feed
8	<i>Balanites aegyptiaca</i>	Aduwa	Leaves and fruit	Medicine, and food
9	<i>Bombax costatum</i>	Kurya	Leaves	Soil improvement
10	<i>Bosewellia dalzielii</i>	Hano	Bark and root	Medicine, insect repellent
11	<i>Bridella ferruginea</i>	Faru	Leaves and bark	Animal feed, medicine
12	<i>Bauhinia rufescens</i>	Tsattsagi	Leaves	Medicine
13	<i>Butyrospermum paradoxa</i>	Kadanya	Bark and fruit	Medicine, food
14	<i>Combretum micranthum</i>	Geza	Leaves and root	Animal feed, medicine
15	<i>Ceiba pentandra</i>	Rimi	Bark	Medicine
16	<i>Diospyros mespiliformis</i>	Kanya	Leaves and fruit	Medicine, food
17	<i>Daniellia oliveri</i>	Maje	Bark	Medicine
18	<i>Deterium macrocarpum</i>	Tauraa	Back, root, seed, roots	Food, medicine
19	<i>Entada africana</i>	Tawatsa	bark and leaves	Medicine, food
20	<i>Eucalyptus camaldulensis</i>	Turare	Leaves	Mulching
21	<i>Ficus glumosa</i>	Kawari	Leaves	Animal feed, medicine and shade
22	<i>Hyphaene thabaica</i>	Doka	Leaves	Medicine
23	<i>Isobertinia doka</i>	Jiga	Root	Medicine
24	<i>Maerua angolensis</i>	Cicciyawa	Leaves	Medicine
25	<i>Mangifera indica</i>	Mangoro	Leaves and fruit	Medicine, food
26	<i>Mitragyna inermis</i>	Giyayya	Leaves and fruit	Medicine, food
27	<i>Neocarya macrocarpum</i>	Gawasa	Bark, leaves and fruit	Animal feed, medicine and food
28	<i>Prosopis Africana</i>	Kiryaa	Bark and seed	Medicine, spices
29	<i>Psidium guajava</i>	Guava	Leaves and fruit	Medicine, shade and food
30	<i>Parkia biglobosa</i>	Dorowa	Leaves seeds	Medicine, food, animal feed and spices
31	<i>Pilostigma thonongi</i>	Kalgo	Leaves, bark and root	Shade, medicine
32	<i>Sclerocarya birrea</i>	Danya	Leaves	Shade
33	<i>Stereospermum kunthianum</i>	Sansami	Leaves	Medicine
34	<i>Tamarindus indica</i>	Tsamiya	Leaves and bark	Medicine
35	<i>Terminalia macrocarpum</i>	Farin baushe	Root, back, fruit	Medicine
36	<i>Terminalia glaucescense</i>	Baushe	Roots, leaves, seeds	Chewing stick, medicine
37	<i>Vitex doniana</i>	Dinya	Leaves and fruit	Medicine, food
38	<i>Ziziphus mauritiana</i>	Magarya	Fruit	Food, medicine
39	<i>Vitelaria paradoxa</i>	Kadanya	Fruit	Ointment

### Utilization of Different Part of Tree Species

#### Distribution of Respondents based on Species leaves usage

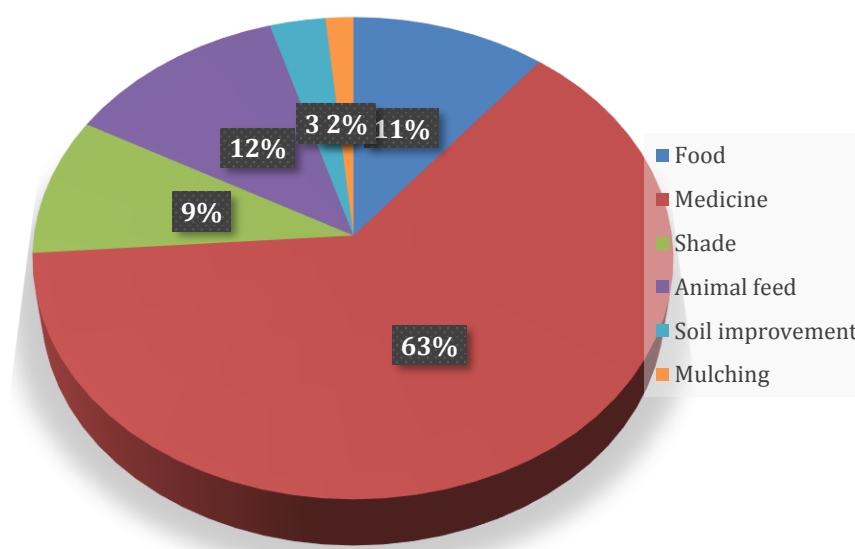
Fig. 1 presents the different uses of tree leaves in the area which clearly shows that 63% of the respondent use leaves of trees for practicing traditional medicines that cures various types of sickness. Leaves were also found to be used

for animal feeds, food, shade, and soil improvement and mulching. Analysis of the data collected indicated that 11% of the respondent that uses leaves of trees in the area use leaves for food. Leaves of trees such as *Adansonia digitata* (is used for making traditional soup in the area) *Parkia biglobosa*, *Ziziphus mauritiana*, *Ziziphus spinachristi*, *Butyrospermum paradoxum*, *Diospyros*

*mespiliformis*, etc., are important leaves used as human food to the people of the area. Furthermore 12% of the leaves of trees were used as animal feed, most especially when there is a shortage of grass for livestock to graze in the dry season.

The use of tree leaves as medicine dominate all other uses of leaves; thus, this will cause no or less damage to trees and lead to sustainable management of tree resources with the exception heavy exploitation. Few numbers of

trees were found to be important for use as shade 9%, soil improvement 3% and mulching 2%. The use of leaves for mulching is in the area is poor and this is because the farmers in the area engage in the planting of grains (maize, millet, sorghum etc.) rather than planting of vegetable crops which need mulching in order to access nutrients, therefore this has made the use of leaves for mulching insignificant. Leaves are also used by the people in the study area as shade for thatch houses and for improving soil fertility.

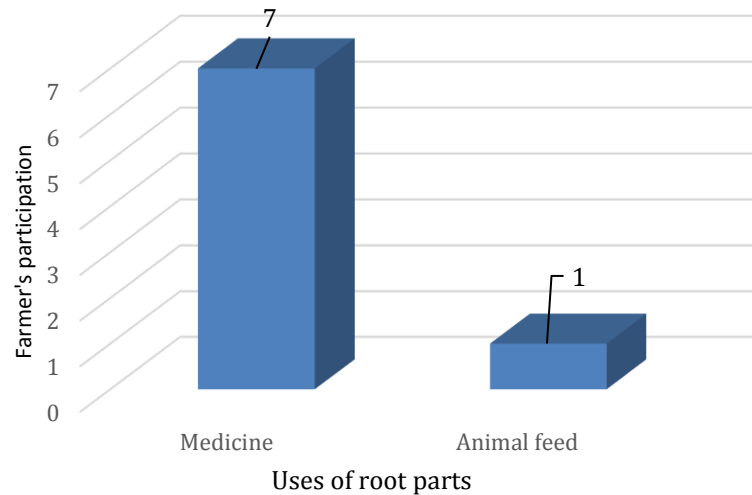


**Figure 1: Respondents' response to tree species leaves utilization**

#### Distribution of Respondents based on Species root usage

Fig. 2 presents the distribution of respondent based on tree species root utilization and it was obvious that the use of tree roots for among the respondent is not common because only 7% of the respondent use roots for medicine and 1% use it for animal feed. Roots of so many tree species are processed and used for curing several illness and tree species such as *Ziziphus spina-christi*, have been found to be used as vitamin supplement for animals, the roots are grinded, processed and mixed in animals feed. Roots of tree species such as *Bomax costatum*, *Daniela oliveri*, *Detarium macrocarpum*, *Parkia biglobosa*, *Terminalia glaucescense*, *Terminalia macroptera*, *Vitellaria paradoxa*, *Azadirachta indica* are used as animal feed and they also have

medicinal benefits. The root and back of *Bombax costatum* are used to cure yellow fever and headache, the root of *Daniela oliveri* are boiled and drunk to cure hernia, the root and back of *Detarium macrocarpum* are soaked in water then drunk to cure diarrhea and dysentery, the roots of *Parkia biglobosa* are cooked with little potash and drunk to cure stomach ache. Bows, walking sticks and chewing sticks are made from the roots of *Terminalia glaucescense*, fever, jaundice and syphilis are treated with the roots of *Terminalia macroptera*, the root and back of *Vitellaria paradoxa*, are soaked in water, drink daily to treat waist pain and venereal diseases and the roots and leaves of *Azadirachta indica* are used to treat malaria, and birds feeds on the fruit.

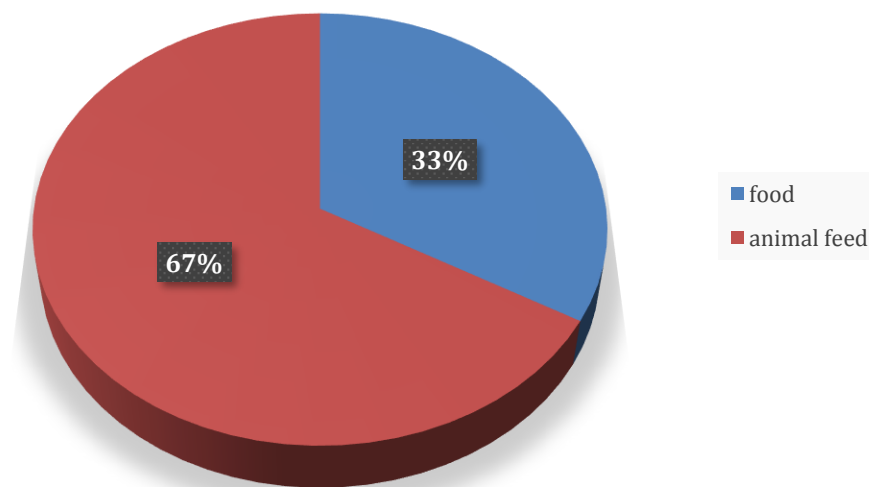


**Figure 2: Respondents responses to tree species root utilization**

**Distribution of Respondent Based on Species Seed Usage**

Fig. 3 below presents the distribution of respondent based on tree species seed utilization and it was discovered that 67% of the respondent used seeds for animal feed, 33% use seeds for food. Seeds of trees such as *Acacia sayel*, *Daniela Olivera*, *Detarium macrocarpum*, *Isoberlenia doka*, *Pilostigma thonngi*, *Prosopis africana*, *Terminalia glaucescens* are used by the respondent for several purposes. The seeds of *Daniela olivera* and *Isoberlenia doka* are eating by birds e.g. grey hornbill and francolin, and also the seeds of *Detarium macrocarpum* are also eating by

primate as well as man. Seeds of tree species are important to the people in the area which is a reason why trees are managed in the area. The seeds of *Prosopis africana* are also used as spices for cooking food, The seeds of *Terminalia glaucescens* attract bees and quality honey is produced from the tree, the management of trees for the production of seed is therefore important because it helps to improve livelihood as it serves as source of food and animal feed. Seeds can also be sold out and provide income and its importance can't be over emphasized because if properly managed, with time different uses can be discovered from seeds.



**Figure 3: Distribution of respondent based on tree species seed utilization**

**Benefits of Tree Species in the Study Area**

The results in Table 3 indicated that there is an intersection of trees among the various benefits derived from trees, further, this clarify that almost every tree is beneficial to the farmers. The highest benefits derived from trees in the study area is the medicinal and soil fertility improvement benefits and it covers 93.3% and 90.8% respectively. Thus, the benefits of medicine and soil fertility improvement in the study area cannot be over emphasized. Most trees and shrubs found in these places were used for medicinal purposes and for improving soil fertility. Leaves of tree such as *Acacia albida*, *Acacia Senegal*, *Acacia seyel*, *Acacia nilotica*, *Azadirachta indica*, *Anogeissus leocarpus*, *Annona senegalensis*, *Parkia biglobosa*, *ziziphus mauritiana*, *Prosopis africana* etc, are important feed for livestock, because, they contain considerable amount of nutrients (Von maydell, 1990). It has been found that combination of contents from the leaves of *Mangifera indica*, *Psidium guajava*, *Anacaudim occidentalis* and *Azadirachta indica* is used to cure fever, and several other leaves like that of *Moringa oleifera* are cooked and properly prepared to cure diabetes. Trees like *Anogeissus leocarpus*, *Borassus aethiopum (big)*, *Isobertinia doka*, *Hyphaene thabaica (big)*, *Prosopis africana*, etc. are important as they provide traditional medicine in the area.

Majority of the trees are found to be beneficial as animal fodder and prevention of soil erosion. The table showed that 81.7% of trees

are beneficial as animal fodder and 80.8% serve as good protectors of soil against erosion. Most of the trees with large canopies help to prevent soil erosion by reducing the impact of rain unto the ground and trees such as *Acacia albida*, *Aacia Senegal*, *Acacia seyel*, *Acacia nilotica*, *Azadirachta indica*, *Anogeissus leocarpus*, *Annona senegalensis*, *Parkia biglobosa*, *ziziphus mauritiana*, *Prosopis africana* among others are used for animal fodder.

The immediate benefit derived from trees after animal fodder and prevention of soil erosion is the improvement of livelihood of the respondent, most of which are trees with few shrubs which covers 79.2% of the trees in the study area. Tree species such as *Adansonia digitata*, *Mangifera indica*, *Anacaudium occidentalis*, and *psidium guajava* are important source of livelihood as the fruit from the trees have monetary value and can be sold out for income. Seventy percent of the trees in the study area serves as protectors against windbreaks and trees use for this purpose are mostly tall tree species such as *eucalyptus*, *camaldulensis*, *Azadirachta indica* among others.

This study found six different benefits of tree species in Kurfi LGA (Table 3) below. The trees in the study area have ample uses to the people of the area, as the various parts (leaves, roots, backs, fruits, seeds etc.) of the trees are of so many uses. The table below gives us the general summary of benefits of tree species in the study area.

**Table 3: Benefits of tree species in Kurfi LGA**

Benefits	Number of tree species	Percentage (%)
Prevention of soil erosion	97	81
Improvement of livelihood	95	79
Medicinal	112	93
Protection against windbreaks	84	70
Improvement of soil fertility	109	91
Animal fodder	98	82

**Challenges of tree species in the study area**

Table 4 clearly presents the challenges faced by tree species in the study area and the percentage each challenge covers. Natural damage covers the highest percentage and it is the most common challenge of trees in the area

shown above from the summary table. Animals cause a lot of damage to trees. Sometimes, weather condition of a particular area at a given time causes damage to trees especially when there is much wind. Machines used in the farms accidentally causes damage

to trees by hurting the trunks of trees, the above table clearly shows that 49% of trees in the area are affected by damage caused by humans. Table 4 also shows that there is a common relationship of pest infestation and

disease infection on trees in the study area which covers 48% and this also indicates that the occurrence of pest is equal to the occurrence of disease and urbanization in the area.

**Table 4: Challenges of tree species in the study area**

Challenges	Number of tree species	Percentage (%)
Disease infection	58	48
Pest infestation	58	48
Natural damage	66	55
Manmade damage	59	49
Urbanization	57	48
Erosion	53	44

**DISCUSSION**

The mean age of the respondents was approximately 48 years. This implies that they are still in their economically active age. Farming is the major occupation of married men 93 % having a household size of 1-10 people covering 59% of the population. Majority of the respondents are literates having Qur’anic education 52% and farm size mostly 1-10 hectares which make up 98 % of the population. This study indicated that most of the respondent acquire farmland by inheritance 59 % from parents and ancestors and they are mostly Hausa 88 % by tribe except for few 12 % which are Fulani by tribe. Similar findings were found by (Agbeje *et al.*, 2021). Kurfi LGA house a large number of trees stands and tree species cutting across several family and genera. Although the total number of trees stands recorded is lower than that reported by Bello *et al.* (2013) whom assessed tree composition within some north western region of Nigeria, 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 trees 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 Kurfi LGA. 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 trees 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 60% 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 *Ziziphus mauritiana*, *Tamarindus indica* and *Adansonia digitata* recorded an impressive number of stands signaling a bit of hope for the



future of these species. However, species like *Vitex doniaana*, *Maerua angolensis* and *Sclerocarya birrea* recorded 1 tree stand each typical of savanna vegetation signaling the possibility of these trees disappearing in the study area 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 Kurfi LGA.

## CONCLUSION

From the findings of this research, trees were mostly used for medicinal purposes, human food and animal fodder. Farmers in the area used trees for different purposes and trees were of great importance to them as it improved their livelihood and also serve as source of livelihood to most of the respondent. Due to some limitation such as inadequate skill and facilities for processing tree resources, unavailability of good storage and lack of available market, farmers in the area mostly use tree resources culturally and

natively but do not regard tree resources as important commerce items.

## Recommendations

Kurfi LGA house a great number of trees stands. However, majority of the tree stands are exotic trees. Though some indigenous tree species such as *Azadirachta indica*, *Adansonia digitata* and *Tamarindus indica* 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 the committee which shall be saddle with the responsibility of conserving and managing tree species within the study area 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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