

# Survey of Endangered Woody Plants Species in Dandi Local Government Area, Kebbi State, North-Western, Nigeria

Umar Haruna, Dharmendra Singh and Jibrin Naka Keta

Department of Plant Science and Biotechnology

Kebbi State University of Science and Technology Aliero, PMB:1144, Nigeria

**Abstract:-** Human actions threaten plant species diversity caused environmental crises. This study aimed to documenting diversity of endangered woody plant species in seven selected villages within Dandi Local Government area (LGA) using 150 semi-structural questionnaires and field point to point distance method. A total of 30 endangered woody plant species belonging to 20 families were documented and authenticated. The families of Mimosaceae and Caesalpiniaceae were recorded with the highest number of plant species (5) each, followed by Combretaceae(4), Moraceae and Anacardiaceae (3) each while families Arecaceae, Bombacaceae, Myrtaceae, Balanitaceae, Ebenaceae, Meliaceae, Chrysobalanaceae, Verbenaceae, Sapotaceae, Lamiaceae had the lowest 1 each. Among all the species there were significant differences in the importance value index with species of *Bombaxcostatum* had (391.66) and *Faidherbiaalbida* (7.75) lowest value. Based on cumulative frequency of respondents *Detariummicrocarpum* were more used (170) compared to others species with *Hyphaenethebaica*(30) least uses. The lowest number of species under some families and importance value index justified that woody plant species in the study area are in endangered or threatened. Therefore, there is need for urgent necessary action to conserve these trees from human agitations.

**Keywords:-** Survey, Woody plants, Threatened, Diversity and Dandi L.G.A.

## I. INTRODUCTION

The current financial situation and increase of human population in Northern part of Nigeria have led to the increase of deforestation which caused threatened on phytogeography diversity of plants species and ecological services losses. Environmental parameters play a vantage role in support the growth and distribution of plant species all over the world (Danjuma and Yakubu, 2017). People of Dandi area since the antiquity time have practiced the use of woody plant species to produce local materials for their daily life leaving and economic development. Globally, billion people rely on woody plants for their livelihoods (David Mand Sheil 2008; Reed *et al.*, 2017). However, ecosystem management in a particular location is important and integral part for the conservation and protection of biological diversity of Nigeria (Bello, 2005).

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). But, increase destruction rate of plants due to human agitation become serious issue of concern and alarming. About, 8000 woody plants are in endangered worldwide with an estimation of 22 and 47% of the world's plants (Graham 2002). This problem would continuously escalatesince no specific comprehensive checklist of the plants. According to Hariramamurthi(2000), 200 countries have signed an agreement aid to protect endangered species Nigeria inclusive (Wakili, 2016).

Many studies documented that diversity of plants species are declined or rare especially in developing countries where human activities are taking places on daily basis (Bello, 2003; David, 2008 and Bello *et al.*, 2019). Due to the harsh conditions of economic crises tribal societies rely on the deforestation and utilization of woody plant species for the purpose of trading, and they have progressively without knowing the ensue they caused. In spite of its importance, the natural plants has continued to diminish rapidly in the world especially in Africa continent particularly Nigeria due to human agitations. This may lead to the extinct of various plants if care is not take in due time. This survey aimed to documented endangered woody plants species in Dandi L.G.A. by provide a baseline report that could be useful in conservation of this species.

## II. MATERIALS AND METHODS

### A. Study Area

Dandi is situated at Kamba Local Government Area in Kebbi State, Nigeria, sharing a boundary with the republic of Niger. Its located approximately on latitudes 11° 51' 6" N and longitude 3° 39' 17" E. Dandi shared different border with four local government; Bunzaat South, Arewa at Northern and SuruEastern part and Bagudo in the Western. It has an area of 2,003 km<sup>2</sup> and a population of 199,300 (NPC, 2016). Agriculture is the main occupation of the inhabitant. (Kebbi State statistical year book, 2007)

### B. Sources of Data

The primary data were obtained through distribution of 150 questionnaires, interview of the respondents while secondary data were obtained using point to point distance method procedures and collected of encountered woody plants species as described by (Singh, 2016).

### C. Field Trip and Field Experimental Procedures

Field surveys were conducted in Dandi Local Government area under seven villages namely; Fana, Fingillah, Geza, Kyangakwai, Shiko, Tungar Rafi and Guru Village Kebbi State. The point to point distance method were used by measuring tape and range pole to take the basal area and point to point distance of woody plant species in each village by employed point centered quarter method procedure to determine the abundance and diversity of endangered woody plant species (Bryant et al., 2005). All the photographs of endangered woody plants encountered during the survey were taken using a high resolution camera from their natural predicament (Mubarak et al., 2022).

### D. Plant Collection and Identification

The woody plants parts (stem, leaves and flower) were collected with extremely care in order to ensure minimum injury using knife. Details of each collected plants organs such as date, location, uses for and local name were documented using field noted book before inserted them into vacuum box and taken to the herbarium section, Department of Plant Science and Biotechnology, Kebbi State University of Science and Technology, Aliero for scientific authentication. The plants were botanically identified based on the morphological and floral characters

such as inflorescence, flower type, leaf morphology, leaf arrangement by Professor of Taxonomy Prof. Dharmendra Singh, Department of Plant Science and Biotechnology, Kebbi state University of Science and Technology, Aliero and voucher number of each plant species issued and deposited at the Department of Plant Science and Biotechnology, Aliero Herbarium for references.

## III. RESULT

Thirty (30) different endangered woody plant species that belongs to 20 families were encountered identified and documented as shown in Table (1) with their local name voucher number issued. Table (2) showed significant differences in the endangered plants diversity ranged from 10.55 (relative density) to 2667.97 (average dominance) of total means respectively. Different woody plant species were used as firewood, poles, charcoal or crafts but the most cited were; *Detarium microcarpum* and *Combretum molle* with cumulative frequency of 170 each while *Hyphaenethebaica* had less number of uses (30) as indicated in (Table 3). Figure (1-2) showed the photographs of endangered woody plants and local items produce from them.

S/N	FAMILIES	NAME	STATUS
1.	Bombacaceae	<i>Bombax costatum</i> Pellegr. and Vuillet	Indigenous (native)
2.	Anacardiaceae	<i>Anacardium occidentale</i> L.	Exotic (Introduced)
3.	Myrtaceae	<i>Eucalyptus camuldulensis</i> L.	Exotic (Introduced)
4.	Moraceae	<i>Ficus ovata</i> Vahl	Indigenous (native)
5.	Moraceae	<i>Ficus glumosa</i> Del	Indigenous (Native)
6.	Balanitaceae	<i>Balanites aegyptiaca</i> (L)Del.	Indigenous (native)
7.	Ebenaceae	<i>Diospyros mespiliformis</i> HA	Indigenous (native)
8.	Caesalpiniaceae	<i>Tamarindus indica</i> L.	Indigenous (native)
9.	Meliaceae	<i>Khaya senegalensis</i> L.	Indigenous (native)
10.	Sapotaceae	<i>Vitellaria paradoxa</i> Guertn. F	Indigenous (native)
11.	Anacardiaceae	<i>Lannea microcarpa</i> Engl. K. Krause.	Indigenous (native)
12.	Moraceae	<i>Ficus Platyphylla</i> Del	Indigenous (native)
13.	Mimosaceae	<i>Albizia chevalieri</i> Harms	Indigenous (native)
14.	Mimosaceae	<i>Parkia biglobosa</i> (Jacq) R. Br. ex G. Don	Indigenous (native)
15.	Combretaceae	<i>Anogeisus leiocarpus</i> (DC) Guill & Perr	Indigenous (native)
16.	Chrysobalanaceae	<i>Neocarya macrophylla</i> (Sabine) prance.	Indigenous (native)
17.	Anacardiaceae	<i>Sclerocarya birrea</i> (A.Rich) Hochst.	Indigenous (native)
18.	Caesalpiniaceae	<i>Detarium microcarpum</i> Guill & Perr.	Indigenous (native)
19.	Verbenaceae	<i>Vitex doniana</i> L (Sweet)	Indigenous (native)
20.	Mimosaceae	<i>Prosopis africana</i> (Guill & Perr.) Taub	Indigenous (native)
21.	Combretaceae	<i>Combretum molle</i> R.Br.ExG.Don	Indigenous (native)
22.	Caesalpiniaceae	<i>Cassia sieberiana</i> Oliv	Indigenous (native)
23.	Mimosaceae	<i>Faidherbia albida</i> (Del.) A. Chev.	Indigenous (native)
24.	Arecaceae	<i>Hyphaene Thebaica</i> (L.)mart	Indigenous (native)
25.	Combretaceae	<i>Combretum nigricans</i> lepr. ex Guill & Perr.	Indigenous (native)
26.	Mimosaceae	<i>Acacia nilotica</i> Wild.	Indigenous (native)
27.	Lamiaceae	<i>Gmelina arborea</i> Roxb	Exotic
28.	Combretaceae	<i>Combretum glutinosum</i> L.	Indigenous (native)
29.	Caesalpiniaceae	<i>Daniellia oliveri</i> (R.) HFD	Indigenous (native)
30.	Caesalpiniaceae	<i>Acacia sieberiana</i> D.C	Indigenous (native)

Table 1: Showing Endangered Woody Plant Species Encountered, Identified and their families names

Scientific Name	Dominance	Relative Dominance	Average Dominance	Density	Relative Density	Frequency	Relative Frequency	Importance Value
<i>Bombax costatum</i> Pellegr.&Vuillet	105.36	0.02	52.68	31.963	0.050	30.399	13.73	391.66
<i>Anacardium occidentals</i> .L.	56.69	0.01	28.35	27.12	0.04	10.16	4.589	149.3
<i>Eucalyptus camuldulensis</i> .L.	0.406	0.0010	0.20	0.313	0.004	0.013	0.058	31.38
<i>Ficus ovata</i> Vahl	0.089	0.0022	0.045	0.225	0.003	0.026	0.017	10.38
<i>Ficus glumosa</i> Del	10.56	0.0026	5.28	9.6	0.0515	0.068	0.031	25.010
<i>Balanites aegyptiaca</i> (L.)Del.	93.12	0.0023	46.56	25.512	0.040	0.023	0.009	30.99
<i>Diospyros mespiliformis</i> HA	67.14	0.0115	33.57	21.73	0.034	0.072	0.032	39.64
<i>Tamarindus indica</i> .L.	57.22	0.00143	28.6	74.09	0.116	0.209	0.049	86.307
<i>Khaya senegalensis</i> . L.	320.6	0.0824	163.3	86.58	0.135	0.191	0.086	210.22
<i>Vitellaria paradoxa</i> Guertn. F	0.3032	0.007	0.152	0.449	0.0007	0.53	0.23	15.56
<i>Lannea microcarpa</i> Engl. K. Krause.	0.569	0.001	0.285	0.844	0.001	0.034	0.016	37.78
<i>Ficus Platyphylla</i> Del	395.33	04.98	197.67	180.08	0.282	0.34	0.157	56.82
<i>Albizia chevalieri</i> Harms	18.97	44.93	901.48	57.89	0.9058	40.71	18.39	30.68
<i>Parkia biglobosa</i> (Jacq) R. Br. ex G. Don	0.258	0.006	0.129	0.449	0.007	0.053	0.023	15.312
<i>Anogeisus Leiocarpus</i> (DC) Guill &Perr	3.775	0.009	1.887	1.422	0.002	0.088	0.039	77.04
<i>Neocarya macrophylla</i> . (Sabine) prance.	187.4	46.734	936.4	527.51	8.277	53.36	24.103	52.56
<i>Sclerocarya birrea</i> (A.Rich) Hochst.	62.48	0.0155	31.21	1.799	0.003	32.36	14.616	19.51
<i>Detarium microcarpum</i> Guill & Perr.	0.57	0.001	31.215	0.446	0.007	0.017	0.0076	14.92
<i>Vitex doniana</i> L (Sweet)	1.28	0.003	0.06	0.58	0.009	0.053	0.023	23.8
<i>Prosopis africana</i> (Guill &Perr.) Taub	0.815	0.002	0.409	0.67	0.001	14.93	0.67	42.208
<i>Combretum molle</i> R.Br.ExG.Don	212.0	0.0528	106.04	17.43	0.027	0.140	0.663	32.07
<i>Cassia sieberiana</i> Oliv	57.19	0.014	28.59	23.88	0.037	10.87	4.55	89.17
<i>Faidherbia albida</i> (Del.) A. Chev.	31.53	0.786	15.66	66.07	0.103	20.26	9.153	59.7
<i>Hyphaene Thebaica</i> (L.) mart	0.146	0.003	0.073	0.223	0.003	0.026	0.011	7.75
<i>Combretum nigricans</i> lepr. ex Guill &Perr.	1.072	0.002	0.538	1.427	0.002	0.088	0.039	57.07
<i>Acacia nilotica</i> Wild.	48.89	0.121	24.95	12.39	0.198	0.669	0.32	13.47
<i>Gmelina arborea</i> Roxb	0.213	0.005	0.1066	10.449	0.016	20.52	9.057	13.66
<i>Combretum glutinosum</i> L.	27.98	0.069	13.99	27.16	0.042	0.029	0.013	56.68
<i>Daniellia oliveri</i> (R.)HPD	22.44	0.051	12.35	24.17	0.041	0.030	0.013	36.60
<i>Acacia sieberiana</i> D.C	11.44	0.31	6.36	14.22	0.051	0.40	0.022	30.40
<b>Total Mean</b>	<b>505.9</b>	<b>506.67</b>	<b>2667.97</b>	<b>1246.659</b>	<b>10.55</b>	<b>186.98</b>	<b>100.54</b>	<b>1766.93</b>

Table 2: Diversity of Woody Plants in Dandi L.G

Botanical Name	Fire Wood	Poles	Charcoal	Crafts	Commulative Frequency of Respondents
<i>Bombax costatum</i> Pellegr.&Vuillet	20	0	10	30	60
<i>Anacardium occidentals</i> .L.	40	0	30	0	70
<i>Eucalyptus camuldulensis</i> .L.	30	70	0	20	120
<i>Ficus ovata</i> Vahl	40	0	0	10	50
<i>Ficus glumosa</i> Del	30	5	25	20	80
<i>Balanites aegyptiaca</i> (L)Del.	40	0	35	20	95
<i>Diospyros mespiliformis</i> HA	30	0	15	10	55
<i>Tamarindus indica</i> .L.	60	0	0	20	80
<i>Khaya senegalensis</i> . L.	60	0	20	30	110
<i>Vitellaria paradoxa</i> Guertn. F	50	0	20	25	95
<i>Lannea microcarpa</i> Engl. K. Krause.	50	20	30	25	125
<i>Ficus Platyphylla</i> Del	40	0	20	30	90
<i>Albizia chevalieri</i> Harms	40	10	40	30	120
<i>Parkia biglobosa</i> (Jacq) R. Br. ex G. Don	40	0	0	20	60
<i>Anogeisus Leiocarpus</i> (DC) Guill &Perr	40	0	40	20	100
<i>Neocarya macrophylla</i> . (Sabine) prance.	60	0	20	30	110
<i>Sclerocarya birrea</i> (A.Rich) Hochst.	70	0	15	40	125
<i>Detarium microcarpum</i> Guill & Perr.	70	0	25	30	170
<i>Vitex doniana</i> L (Sweet)	70	0	25	30	125
<i>Prosopis africana</i> (Guill &Perr.) Taub	70	0	50	50	170
<i>Combretum molle</i> R.Br.ExG.Don	0		0	30	30
<i>Cassia sieberiana</i> Oliv	50	0	60	30	140
<i>Faidherbia albida</i> (Del.) A. Chev.	50	0	50	50	150
<i>Hyphaene Thebaica</i> (L.) mart	60	0	0	10	70
<i>Combretum nigricans</i> lepr. ex Guill &Perr.	60	0	5	20	85
<i>Acacia nilotica</i> Wild.	60	0	10	20	90
<i>Gmelina arborea</i> Roxb	50	10	10	20	120
<i>Combretum glutinosum</i> L.	60	0	10	20	90
<i>Daniellia oliveri</i> (R.)HPD	60	15	30	50	155
<i>Acacia sieberiana</i> D.C	30	0	10	20	60

Table 3: Different Uses of Woody Plant Species within the Study Area

#### IV. DISCUSSION

Phytodiversity is fields of study all over the world especially under developing countries due to the vantage they play in satisfy the human. But human agitations threaten phytogeography of the plant species all over the world. A total of 30 endangered woody plants species belonging to 20 families were encountered and documented in Dandi Local Government area (Table 1). With family of Caesalpiniaceae and Mimosaceae had the highest number of species five each, followed by Combretaceae family four species. This finding is somehow parallel with the survey of Zhigilaet *al.* (2015); Danjuma and Yakubu (2017), which reported species under Combretaceae family are the most diverse in West Tangaza Forest Reserve, Sokoto State and Dryland of Northwestern Nigeria. Combretaceae families are found distributed in savanna region due to the economic value and resistance to harsh conditions (Abduallah and Abba, 2021; Mubarak *et al.*, 2022).

The specie of *Bombaxcostatum* was obtained with the highest importance value (391.66) and *Faidherbiaalbida* (7.75) lowest. This is not in line with the study of Ambursaet *al.* (2020) on assessment of woody tree species biodiversity in Aliero, Kebbi State, Nigeria. In addition, plant species do not only competitive with themselves but also cooperative together to provide favorable

environmental conditions for successful growth and production lead to higher value index. Human activities on plant species are dramatic environmental crises that reduce the number of plant. Use of *Eucalyptus camuldulensis*, *Albiziachevalieri*, *Anogeisusleiocarpus*, *Balanitesaegyptiaca*, *Prosopisafricana*, *Sclerocaryabirrea*, *Combretumnigricans*, *Combretummolle*, *Cassia sieberiana*, *Detariummicrocarpum*, *Tamarindusindica*, *Diospyrosmespiliformis*, *Gmelinaarborea* and *Danielleoliveri* in this study in making various local products such as; fire wood, poles, mortar, Islamic writing board, pestle, charcoal and crafts by local blacksmiths and cooking energy source (fig 2) had put more pressure diversity of woody plant species in the study area. This results consensus with the finding of Bello *et al.* (2019), that reported plants species of Sudan savanna in Katsina state are facing threatened due to their medicinal uses and locally economic value. Moreover, some woody plant species in forest reserve of Guinea savanna zone, Nigeria were facing the challenge of become endangered and extinction (Bello, 2013). Generally, species declines in any ecological area are associated with human richness index despite the control measures taken. Lack of or an insufficient young tree to replace older ones is a biodiversity threatened now days especially in local villages.

## V. CONCLUSION

In this survey, thirty 30 woody plant species belonging to 20 families were found distributed in Dandi LG. The fact that some families were less diversity in the study area it's an indication that species under these families are endangered ones. Therefore, there is biodiversity threatened in Dandi area due human agitations.

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