

ASSESSMENT OF RISK POTENTIALS OF SOME INDIGENOUS TREES TO DEFORESTATION IN KANO STATE NIGERIA

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SUMMARY

The rate of deforestation nationally and locally in Northern Nigeria is alarming. Native tree species are vulnerable to overexploitation as firewood due to expensive and unavailable alternative fuel supplies. This study was carried out to assess the diversity and local origin of native tree wood samples sold at Badume firewood depot, Bichi Local Government Area, Kano State, Nigeria. Data were collected using structured questionnaires to count and identify the species sold in the market. A total of 55 structured questionnaires were administered to firewood sellers. Data were analyzed as percent relative frequencies. A total of 15 native tree species were identified. *Parkia biglobosa* (Jacq.) Benth. had the highest frequency of 276 (16.03%) while *Cassia siebriana* (DC.) recorded the least frequency of 17 (0.99%). In terms of source, Bichi recorded the highest number of species of 474 (27.53%) while Dambatta recorded the least (48; 2.79%). *P. biglobosa* in addition to being used as firewood is also reported to be utilized as food, shade and in stool making. *Anogeissus leiocarpus* (DC.) Guill. and Perr. has medicinal value according to most of the respondents; all other species were identified as sources of medicine by varying number of sellers. Only *Phoenix dactylifera*, *C. siebriana*, *Ceiba pentandra* and *Faidherbia albida* were not recognized as food. Species used as stool, mortar and pestle include *P. biglobosa*, *Diospyros mespiliformis*, *Tamarindus indica*, *Butyrospermum parkii*, *Piliostigma reticulatum* and *F. albida*. It is recommended that field studies are conducted to assess the conservation status of native tree species utilized as firewood.

Keywords: Deforestation, Firewood, Indigenous Trees, *Parkia biglobosa*, *Anogeissus leiocarpus*

Firewood/fuel wood is dry wood in the form of logs and branches that are unprocessed enough to recognize the species burnt for the generation of heat energy for cooking. It is common knowledge that trees are plant cover of the earth surface that prevent the surface from degradation and provide food and shelter to man and other organisms. Fuel wood is largely obtained from individual's farms, surrounding forest reserve, and exotic trees plantations and shelter belts (1). Increase in human populations and infrastructural

developments have negatively impacted tree diversity, abundance, species composition, indigenous knowledge of tree flora and conservation (11). Trees provide many ecosystem services such as species conservation, prevention of soil erosion, and preservation of habitat for plants and animals (4). Sustainable development advocates that humans and biodiversity co-exist side by side.

Nigeria is known to cover a total land area of 923,768 km square with a population of 180 Million with about 10% of the total

land area covered with trees that are fast diminishing; the rate of deforestation in Nigeria is known to be the highest in the world (2). Fuel-wood harvesting is a major cause of the massive destruction of the indigenous trees in many parts of Nigeria (3). **For most of the** rural populace and the urban poor, firewood is the preferred option of energy for cooking especially with the recent hike in electricity, oil and gas prices. This has been noted to lead to an unprecedented increase in tree felling for firewood (Daily Trust, 17th November, 2021). Preference for choice of species as fuel wood include the ability to generate considerable heat with minimum smoke, softness of the wood during cutting and splitting and the ability to dry quickly when cut (1). About 146 species on the International Union for Conservation of Nature (8) list of threatened species are found in Nigeria out of which 18 fall under the category 'endangered' and 15 under the category 'critically endangered' (7). To protect trees from declining, it is essential to examine the current status of species diversity, composition and abundance as it will provide guidance for their management and valuable reference for conservation (14).

Preliminary survey through personal interactions with local wood sellers in this work indicated three major firewood depots

within 50 kilometers of Kano metropolis. These are located in Badume, Bichi local government; Mariri, Kumbotso local government and Rimin Gado, Rimin Gado local government. Badume depot was established almost 11 years ago, it spread from inside the market to the main road side. The Mariri depot was established about 9 years while Rimin Gado wood depot was established about 10 years ago. Badume was chosen for this study due to its larger wood quantity and species diversity. The aim of this survey therefore is to determine the diversity of native tree species sold at the market, the locality where the trees are sourced and profile of the sellers through personal interviews with the sellers. Availability of the species at the source, other uses of the trees, estimated age of the logged trees and species preference by users will be determined through the administration of semi structured questionnaires.

MATERIALS AND METHODS

Study Area

The study was conducted in Badume Firewood Depot, Bichi Local Government Area of Kano state Nigeria. It is located in the Kano South Ecological Zone on latitude N 12° 13' 14.112" and longitude E 8° 15' 57.93". Logs and broken pieces are sold in the market (Fig 1).



Fig : Badume Firewood Depot, Bichi Local Government Kano State

Data Collection

Data were collected by making several visits to the market to seek the cooperation of the leadership of the market as well as the individual sellers. Preliminary investigations were carried out by verbal interactions with the sellers (12).

Numbers of logs per species per seller were counted upon delivery to the depot. All pieces were counted irrespective of size. Deliveries consisting of logs from partially trimmed trees were excluded in the assessment. Identification of the species was done at the market by the sellers. There was no uncertainty among the sellers in naming the species (12).

Administration of Structured Questionnaires

Structured questionnaires were administered to 55 selected sellers in the market who were all males and had good knowledge of trees and their uses. The selection was facilitated by the market Chairman, and was based on the sizes and diversity of their lot. Data collected from the questionnaires included profile of the sellers, species

diversity, species sources of origin, and other uses of indigenous trees (12).

Data Analyses

Numbers of logs per species were pooled and presented as composite and expressed as relative frequencies. Data collected from questionnaires were organized into total counts and relative frequencies using excel spreadsheet (12).

RESULTS

Seller's Profile

Socio-demographically, the wood sellers in Badume vary. All sellers surveyed were males. Age group 31-40 had the highest frequency of 16 (29.09%) followed by age group 21-30 and 41-50 with frequency of 12 each (21.82%), then 20 and below age group with frequency of 10 (18.18%) followed by 51-60 with frequency of 3 (5.46%) while age group greater than 60 has the least frequency of 2 (3.64%) (Table 1). All of the respondents had some level of western education; 28 (50.91%), 26 (47.27%) and 1 (1.82%) had primary, secondary and tertiary education respectively.

Table 1: Sellers Profiles at Badume Major Woodlog Market, Kano State

Variable	Parameters	Frequency (%)
Gender	Male	100(100%)
	Female	0(0%)
Age (Years)	20 and below	10(18.18%)
	21-20	18 (21.82%)
	31-40	16 (29.09%)
	41-50	18 (21.82%)
	51-59	3(5.46%)
	60 and above	2(3.64%)
Formal Education	Primary	28(50.91%)
	Secondary	26(47.27%)
	Tertiary	1(1.82%)
Employment	Wood dealership	51 (92.73%)
	Other	4(7.27%)

Species Diversity and Local Origin of Source

A total of 15 species belonging to 10 families were identified at the market (Table 2). Fabaceae had the highest number of species (5) (*Piliostigma reticulatum*, *Parkia biglobosa*, *Tamarindus indica*, *Faidherbia albida*, *Cassia siebriana*) followed by Anacardiaceae with 2 species (*Lannea barteri*, *Sclerocarya birrea*). One species was recorded for Combretaceae (*Anogeissus leiocarpus*); Meliaceae (*Azadirachta indica*); Sapotaceae (*Butyrospermum parkii*); Malvaceae (*Ceiba pentandra*); Ebenaceae (*Diospyros mespiliformis*); Moraceae (*Ficus thonningii*); Arecaceae (*Phoenix dactylifera*) and Rhamnaceae (*Zizipus spina-christi*).

The frequencies of occurrence of each of a log of each species and the locality they are sourced from are shown in Table 2. *Parkia biglobosa* was found to have the highest frequency of 276 followed by *Azadirachta indica* (251), *Tamarindus indica* (249), *Butyrospermum parkii* (123), *Ceiba pentandra* (108), *Lannea barteri* (103), *Piliostigma reticulatum* (97), *Sclerocarya birrea* (88), *Diospyros mespiliformis* (86), *Faidherbia albida* (83), *Anogeissus leiocarpus* (76), *Zizipus spina-christi* (57), *Ficus thonningii* (55), and *Phoenix dactylifera* (53) while *Cassia siebriana* has the least frequency of 17. Trees sold at the market are logged from forests and farms located in 8 local governments. These were Bichi (12° 14' N; 8° 16' E), Bagwai (12° 9' N; 8° 8' E), Dambatta (12° 43' N; 8° 61' E), Dawakin Tofa (12° 6' N;

8° 19' E), Gwarzo (11° 54' N; 7° 56' E), Kunchi (12° 41' N; 8° 24' E), Shanono (12° 10' N; 7° 55' E) and Tsanyawa (12° 24' N; 7° 98' E). All the 15 species were sourced from Bichi and Kunchi. Tsanyawa and Dawakin Tofa had all the species except *Cassia siebriana*. Dambatta supplied the least number of species 9(60%) followed by Gwarzo and Shanono with 11(73%).

Logs of *Parkia biglobosa* was found to have the highest frequency 16.03% followed by those of *Azadirachta indica* (14.14%) and *Tamarindus indica* (14.14). *Cassia siebriana* had the least frequency of 17(0.99%).

Sellers Awareness of Other Uses of Native Trees

The 55 respondents identified other uses of the species in addition to fuel. All indicated that *P. biglobosa* is used as food, medicine as well as shade provision. Similarly, *Anogeissus leiocarpus* has medicinal value according to most of the respondents; all other species were identified as sources of medicine by varying number of sellers. Only *P. dactylifera*, *C. siebriana*, *C. pentandra* and *F. albida* were not recognized as food. Species used as stool, mortar and pestle include *P. biglobosa*, *D. mespiliformis*, *T. indica*, *B. parkii*, *P. reticulatum* and *F. albida*. *Butyrospermum parkii*, *D. mespiliformis* and especially *F. albida* used to make whisks.

DISCUSSION

The fact that all the sellers surveyed in the depot are males is not surprising due to the intense physical activity of the

Table 2: Frequencies (%) of Occurrence of Native Species (logs) and Local Governments Areas Found

S/N	Scientific Name	Local Name	Common Name	L.G Found	Frequency (%)
1	<i>Anogeissu leiocarpus</i>	Marke	African birch	BCH, BGW, DTF, KCH, TSW	76 (4.41)
2	<i>Azadirachta indica</i>	Darbejiya	Neem tree	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	251(14.58)
3	<i>Butyrospermum parkii</i>	Kadanya	Shea tree	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	249(14.46)
4	<i>Cassia siebriana</i>	Marga	Drumstick tree	BCH, BGW,DBT, KCH, SNN	17 (0.99)
5	<i>Ceiba pentandra</i>	Rimi	White silk-cotton tree	BCH, BGW, KCH, SNN, TSW	108(6.27)
6	<i>Diospyros mespiliformis</i>	Kanya	African ebony	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	86 (4.99)
7	<i>Ficus thonningii</i>	Cediya	The strangler fig	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	55 (3.19)
8	<i>Faidherbia albida</i>	Gawo	African ring acacia	BCH, BGW, DTF, KCH, TSW	83 (4.82)
9	<i>Lannea barteri</i>	Faru	Olive	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	103 (5.98)
10	<i>Parkia biglobosa</i>	Dorawa	African locust bean	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	276 (16.03)
11	<i>Phoenix dactylifera</i>	Dinshe	Date palm	BCH, BGW, DTF, KCH, GWZ, TSW	53 (3.08)
12	<i>Piliostigma reticulatum</i>	Kalgo	Camel's foot	BCH, BGW,DBT, DTF, KCH, GWZ, TSW	97 (5.63)
13	<i>Sclerocarya birrea</i>	Danya	Marula	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	88 (5.11)
14	<i>Tamarindus indica</i>	Tsamiya	Tamarind	BCH, BGW,DBT, DTF, KCH, GWZ, SNN, TSW	249 (14.46)
15	<i>Zizipus spina-christi</i>	Kurna	Christ's thorn jujube	BCH, DTF, KCH, GWZ, TSW	57 (3.31)
Total					1722(100)

BCH (Bichi), BGW (Bagwai),DBT (Dambatta), DTF (Dawakin Tofa), KCH (Kunchi), GWZ (Gwarzo), SNN (Shanono), TSW (Tsanyawa)

business as well as the socio cultural make up of the community. Women tend to be engaged in less strenuous business as well as are mostly operate from home. This was observed by Rabiou and Rabiou (12) in a similar in other parts of Kano State, although they reported four female wood sellers out of 56. The females were operating smaller depots in inner city neighborhoods rather than major depot. Similarly, Rabiou and Rabiou (12) reported 26.8% of the sellers were aged 30-39 years while Yekinni (15) observed that the mean age for agro forestry farmers in Nigeria was within the range of 43.2 years. Obviously this trade requires some level of physical strength that 60 year olds may not possess

while the under 20s may be still in school or engaged in other less strenuous jobs. The lack of government job opportunities in the country leads to the population to terminate their education at the primary and secondary levels to engage in trades that do not require their certifications or advanced education. Perhaps this is why only one respondent had post secondary education and most of them respondents (92.73%) indicated wood selling as their sole of income. More than a decade ago Oladeji (10) reported that farmers have one form of education or the other. The need to engage in such activities as small businesses and farming is more significant now due to the current economic situation and the higher

cost of higher education in the country. Wood selling is also an attractive business due to the current hike in petrochemical sources of energy. The demand for fuelwood is higher in the less vegetated north and in urban cities where most poor who cannot afford the cost of other sources of energy supply use fuel wood for food processing (Nig Fed Min Env, 2015).

A fairly large number of wood trees indicate a modest diversity of native tree species in the forests and farms of these Local Governments Areas, though many may have been brought to the depots from a far (12). The dominance of fabaceae family could be due to their natural diversity. Reasons for this composition are related to their availability to the loggers as well as preference of the buyers (Pers. Observ). It should be noted that the number of logs do not necessarily indicate the number of trees logged per species, rather the size of the tree. Obviously, larger trees such as *P. biglobosa* yielded more logs than smaller species such as *C. sieberiana*. It was established that the logs were from trees that were wholly logged. This was confirmed from the sellers, and as visually observed as the logs were being emptied from the trucks. Furthermore, the logs were of different diameters indicating trunk and branch pieces in some of the cases, root portions as observed. The actual status of these trees in the forests or farms could not be conclusively decided since there were conflicting responses about specific trees. For example; *T. indica*, *A. indica*, *P. biglobosa*, *P. reticulatum*, *S. birrea*, *C. siebriana* and *Z. spina-christi* were all rated plentiful, abundant and rare by various sellers. This is an indication that the distribution of these trees is not uniform in the study area.

These responses stressed the values of these trees to the local community. However,

these uses further increase the threats these species face. Medicinal values of native tree species have long been recognized (5). Other economic values of trees are also well documented (9, 6, 13). In Kano and other parts of north western Nigeria, *T. indica* and *P. biglobosa* are invaluable sources of nutrition to both rural and urban communities. *Daddawa* (Hausa) is a signature soup condiment in Kano is made from the fermentation of *P. biglobosa* seeds. *Kunun tsamiya* (Hausa) is also a famous afternoon porridge made from millet and *T. indica* sour fruit pulp. *Azadirachta indica* is another indispensable species utilized as medicine as well as, recently, an ingredient in health and beauty products. The rating of these three species as plentiful is likely due to their being conserved in the past as a result of their aforementioned significances in daily lives of the local populace. Obviously the trend of conservation of these species may have been overtaken by poverty and scarcity of fuel that led to the logging, resulting in their being presently rare in some localities.

CONCLUSIONS

The survey found that a great variety of indigenous tree species (15) sourced from various Local Government Areas are sold in Badume firewood depot. Compositions of the trees vary in the 8 Local Government Areas that supply the market. Sellers recognized other uses of these species in addition to fuel. Therefore, it is recommended that field studies are conducted to assess the conservation status of native tree species utilized as firewood. Alternative sustainable fuel energy sources need to be explored to safeguard the biodiversity of the Northern Nigerian native tree species to avoid socioeconomic and ecological crises.

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