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Quantitative and Species Analysis of Wood Sold in Major Commercial Fuelwood Depots in Fika Local Government Area, Yobe State

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Abstract

This study was carried out to identify the quantities and species of trees being exploited, and sold in major commercial fuelwood depots in Fika Local Government Area of Yobe State. It focused on major commercial fuelwood Depots in Janga Siri, Janga Dole and Nahuta, all within Fika Local Government Areas of the state based on purposive selection as population sample. The methodology used for the data collection was consistent direct observation of number of fuelwood-laden pick-up trucks of known capacities, and identification of tree species they bear for fuelwood over a period of two weeks, while the cumulative weigh of each species was obtained by summation. The results obtained were analyzed using a one-way ANOVA to compare the mean of the species of trees most preferred and the quantity of fuel wood extracted per species per location (Depots). Check list of species across depots was prepared to show species of fuel wood present or absent. It was observed that while Combremtum mollei of the family Combretaceae had the least harvest rate (4.2, Anogeisoussus leocarpus a member of the Annonaceae family had 228, thus, the most harvested. Preference for a lot of tree species felled daily for fuelwood in the study location is perhaps due to combustibility, availability or accessibility of such species.

Introduction

Fuelwood use in developing regions of Africa, Asia and Latin America was believed to be a key factor in tropical deforestation, and the loss of forest was projected to result in wide-spread fuelwood shortages. In Nigeria, the population uses fuelwood either for cooking or heating. Both household and non-household

sectors in all the ecological zone of the country demand fuel wood. In the household sector, fuelwood is the domestic energy for cooking and to a lesser extent, for space heating especially during the cold season as is the case in the northern Nigeria. The non-household sector consists of institutions (hospitals, prisons and schools), food industries (restaurants, bakeries) and craft Industries (pottery, blacksmith, burnt brick factories), and this sector consumes a significant proportion of fuelwood (Adegbelin, 2001; Gundimeda and Kohlin, 2003). The FOA had compared fuelwood extraction and the rates of annual growth in biomass from existing forest resources. In those cases where demand exceeded growth, it was assumed that the difference was being met by over cutting and depletion of forests. In addition fuelwood extraction was projected to grow at roughly the same rate as population, with many studies predicting a growing gap between declining fuelwood supply and raising demand (Bhaffarai, 2001; Anorld *et al,* 2009; www.scialert.net 2009).

The choice of these areas was primarily because they have seldom been examined in the previous literature on vegetation degeneration in Yobe state, despite being one of the most densely populated areas in the region. This may be because researchers felt that the area, despite its large population, was less prone to desertification than the northern parts. Yobe state is covered by two vegetation zones; Sahel Savanna to the north and Sudan Savanna to the south. Many commercial fuelwood depots exist in Fika LGA and indeed Yobe State where truckloads of fuelwood are seen on a daily basis transporting wood from the forest to those depots and residence, but the species most exploited and the quality of wood being removed are not known. Domestic fuelwood consumption is a common phenomenon in the rural area of Nigeria. Supply are more often obtained from commercial fuelwood depots with small household sellers scattered around. Supplies are also based on the availability without recourse to the quality. This further compromise their other uses such as for fertilizer and animal fodder, and could lead to severe reduction in agriculture out at a time when even greater production is expected in the sector (Mekonnen, 1996; Bensel, 2008). Research has shown that new global and local trends as regards energy use and supply patterns have great impact on the future society and environment.

This study was initiated with the aim to assess the species and quantity of wood being sold in major commercial fuelwood depot in Fika Local Government Area. There is enough evidence that the whole world is facing an environmental crisis on account of heavy fuelwood extraction, for several years, there has been tremendous destruction, which must be put under control to avoid some bad consequences associated with deforestation. Data is often imprecise and subject to differing interpretations. Many commercial fuelwood depots exist in Fika L.GA and indeed Yobe State where truckloads of fuelwood s are seen on a daily basis transporting wood from the forest to those depots and residence, but the types of species most exploited and the exact quantity of wood being removed is not known. Domestic fuelwood consumption is a common phenomenon in the rural area of Nigeria. Supply are more often obtained from commercial fuelwood depots with small household sellers scattered here and there. Although all people have a legitimate right to and need for energy services which are affordable, healthy, retailable and sustainable energy issues are particularly challenging for developing counties where high energy costs exert

tremendous pressure on fragile ecosystems and economies that have little capacity to adapt to change (IUCN, 2007).

AIM AND OBJECTIVE OF STUDY

The aim of this is to identify the species of trees being exploited and the quantity of wood being sold in major commercial fuelwood depots in Fika Local Government Area, Yobe State. The specific objectives of the project; are

i. Identify tree species mostly exploited and sold as a fuelwood in the study area.
ii. To determine the quantity of such woods brought to the study area per day.

The use of fuelwood as a source of energy is an important source of livelihood to both rural and urban dwellers and the over exploitation of these trees for fuelwood pose a great threat to the environment and the people as the exploitation is more often based on availability rather than heating value. It is therefore important that the tree species being sold are known and the quantity of such species evaluated. Knowing the most exploited and the amount of biomass removed will be valuable information to conserving with regard to the choice of species for conservation and estimation of wood biomass being lost from forest.

THE STUDY AREA

The southern part of Yobe state- Fika, Local Government Area lies on Latitudes 11°30'33"N & 12°00'00"N & Longitudes 10°50'10"E & 11°14'11"E. The study area falls within the Sudan Savannah vegetation zone, and is characterized by a hot and dry climate for most of the year (Hess, Stephens and Maryah, 1995). The west season falls between May and November. This is characterized by single maxima August. During this season, the moisture laden North East trade wind from the Atlantic Ocean blow over the area. Seventy percent of the total rainfall in the area happen to fall within four months of May to September. The area has average of 62 rainy days while average amount of rainy recorded in the area is 972 mm. the dry season which is the harmattan period is characterized by dry, dusty hazy Northern trade wind that blows over the area of savannah desert (Anderson, 2015). Temperature within the area varies with season. Although the temperature is relatively high almost all the year round, temperature of the area ranges from 27° c - 40° c. December and January is the coldest month with the average temperature of 34° (Anderson, 2014). The dry season starts from early November to late May and the hottest months are March, April and May with temperatures ranging between 39°C and 42°C. The Natural Vegetation of the area is Sudan savannah types which is characterized by thick vegetation around hill and mountain ranges. The vegetation has a wide variety of savannah trees species among which are, *Acacia Senegal, Acacia Albida, Acacia nilotica, Azadirachta indica, Adansonia digitata, Tamarindus indica, Balanites eagyptiaca, Combretum spp, Combretum mallei, Anogeissus leiocarpus, Piliostigma raticulata, Cacia siberania*. The area has a population of 129,855 Persons. The major ethnic groups in this local government include Bolewa, Ngamawa, Karai karai,Fulani and other settlers. The major occupations of these ethnic groups are mostly farming, cattle rearing and trading in food items (N.P.C, 2006).

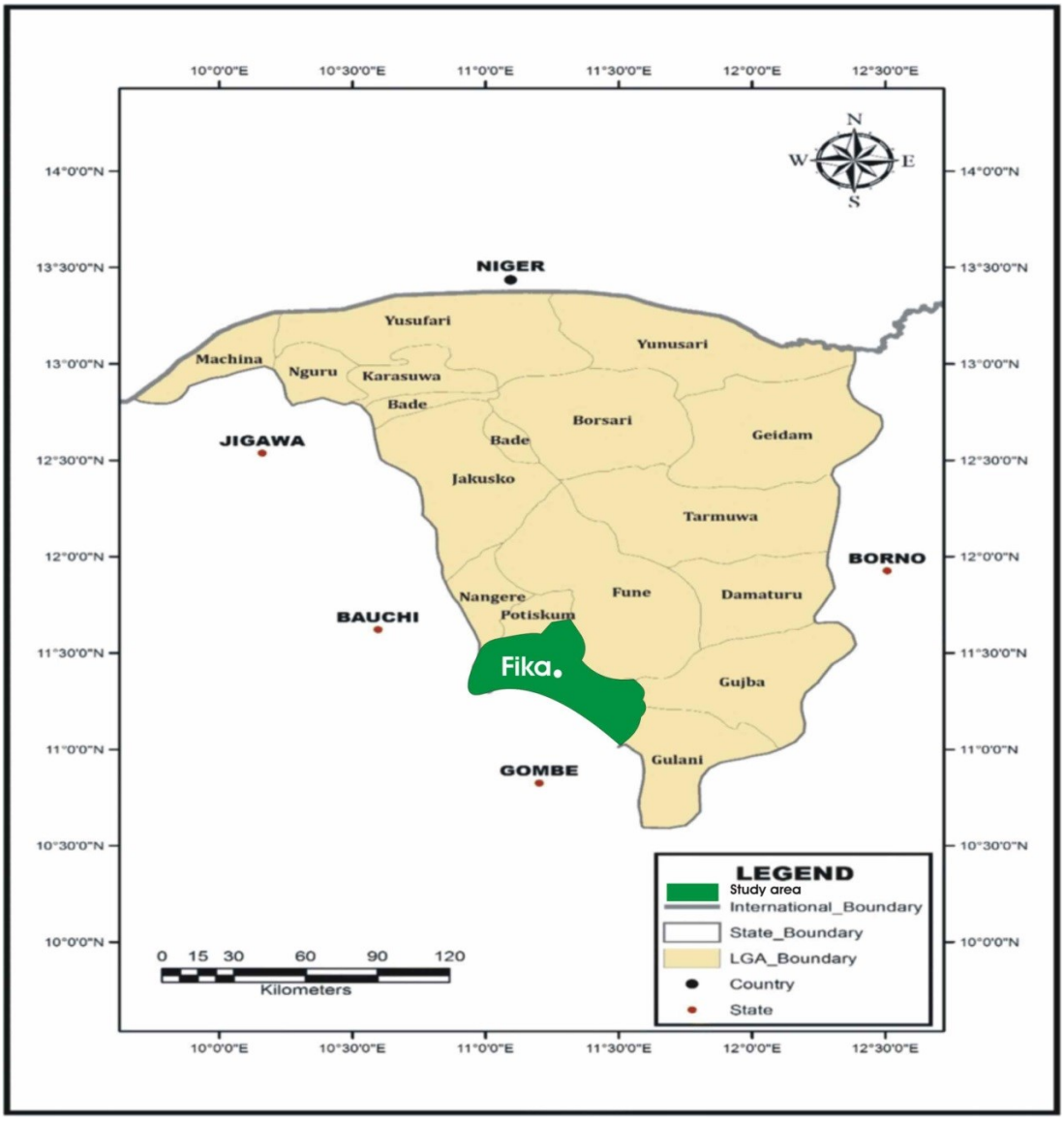

Figure 1: Map of Yobe State showing the Study Sites. **Source**: Hess, Stephens and Maryah, (1995)

DATA COLLECTION

Reconnaissance survey indicated that there were three major commercial fuelwood centers in Fika Local

Government area. These were Janga Dole, Janga Siri, and Nahuta towns. One each of these 3 centers were purposively selected for data collection: one in Janga Dole, one in Janga Siri. Parameters that were considered include (pick-up truck loads) being brought (as adapted by Holmes, 1995; Janas, 2011), and the species of tree species being brought to commercial centers. Tree species brought to the study site were counted per pick-up load. This was done for two weeks in each of the study sites. The cumulative weigh of each species was obtained by summation.

DATA ANALYSIS

The data was analyzed using descriptive statistic (tables, percentages, bar chart etc.). A one-way ANOVA was adopted to analyze the pick-up load per species per to location; while a two-way ANOVA was used to analyze total weight of fuelwood per species per location.

MODEL FOR ONE-WAY ANOVA

Yij=μtbi+Σij
Yij=individual observation
μ=general mean
bi= main effect
ij= associated error

MODEL FOR TWO-WAY ANOVA

Yijk= μij t ai+bij +Σijk
Yijk= individual observation
μij= general mean
ai = main effect of A
bj = main effect B
Σijk= associated error

RESULTS

CHECK LIST OF IDENTIFIED TREE SPECIES EXTRACTED FOR FUELWOOD

The results of tree species commonly sold in the three study sites of Fika Local Government Area Yobe state presented in table; 1 Results showed that there were 14 species belong to 8 families. *Anogeisous leocarpus* and *Prosopis Africana* were common to all the commercial fuelwood depots, *Combretum mollei* and *Piliostigma reticulata* were common to depots A and B while *Acacia nilotica* was common in A and . Table; 2 and 4 show the number of vehicles counted in a week transporting wood from the bush to the selected major commercial fuelwood depots of Janga Siri Janga Dole and Nahuta all in Fika Local Government Area truck (pick-up) were 350, 273 and for Janga Siri Janga Dole and Nahuta respectively.

QUANTITY OF FUELWOOD RECORDEDS IN THE STUDY SITE

The results of the finding form the study indicated that in commercial depot A (Janga Siri) *Anogeosous leocarpus* had the highest weight of 228kg per truck (pick-up) while the weekly weight of this species is 1596kg *Guinea genegalensis* had the least weight of 40.8kg which is 285.6kg in a week. At commercial deport B (Janga Dole) had the highest weight of 222.2kg per truck (pick-up) after weighing while the weekly weight of this species is 1,555.4kg.

Table 1: Table of number (per week) of truckloads of woods from neighbouring forest reserves in each location

Location	Number of pick-up trucks/week
Janga Siri	350
Janga Dole	273
Nahuta	245
Total	868

At commercial depot C (Nahuta), *Anoigeossous leocarpus* had the highest weight of 223kg per truck (pick-up) after weighing, while the weekly weight this species was 1.56kg the least weigh of 20.2kg per truck and 141.4kg per week was obtained for *Parkia biglobosa*.

MEANS OF FUELWOOD QUANTITY BEING EXTRACTED IN THE STUDY AREA

The results in table 3 and figure 2 show the means for each species of fuelwood across depots with *Anogeissous leocarpus* having the highest quality (mean =228kg). *Prosopis Africana* is the second highest quantity with (estimate mean = 129kg) while *Parkia biglobosa* and *Guinea senegalansis* had the least quality of fuelwood across depots with (20.0 and 20.6) respectively. The one-way ANOVA, for quantity (kg) of fuelwood across depots suggest that there was no significant difference among the species in the quantity of fuelwood across depots (p-value = 0.911). The two –way ANOVA result for the quantity of fuelwood across species per location shows that the quantity of each species of fuelwood does not vary significantly at a p-value 0.0623, across species and also across location at a p-value 0.3702 .

Table 2: Means for each Species of fuelwood across depots

Species	Family	Means
1.Tamarindus indica	*Fabaceae*	*40*
2.Anogeisoussus leocarpus	*Annonaceae*	*228*
3.Ximenia Americana	*Alocacaceae*	*98.3*
4.Acacia nilotica	*Minosoideae*	*52.8*
5.Combremtum mollei	*Combretaceae*	*4.2*
6.Cacia seberania	*Caesalpiniodeaae*	*90.8*
7.Terminalia gluacescens	*Combretaceae*	*30.1*
8.Faidhabia albida	*Mimosaeae*	*55.75*
9.Pilostigma raticulata	*Leguminseae*	*50.2*
10.Prosopis Africana	*Mimosoideae*	*129.2*
11.Guinea senegalansis	*Combretaceae*	*20.6*
12.Parkia biglobosa	*Leguminocease*	*20.2*
13.Anona senegalansis	*Anocardiaceae*	*123.5*
Grand mean		**96.96**

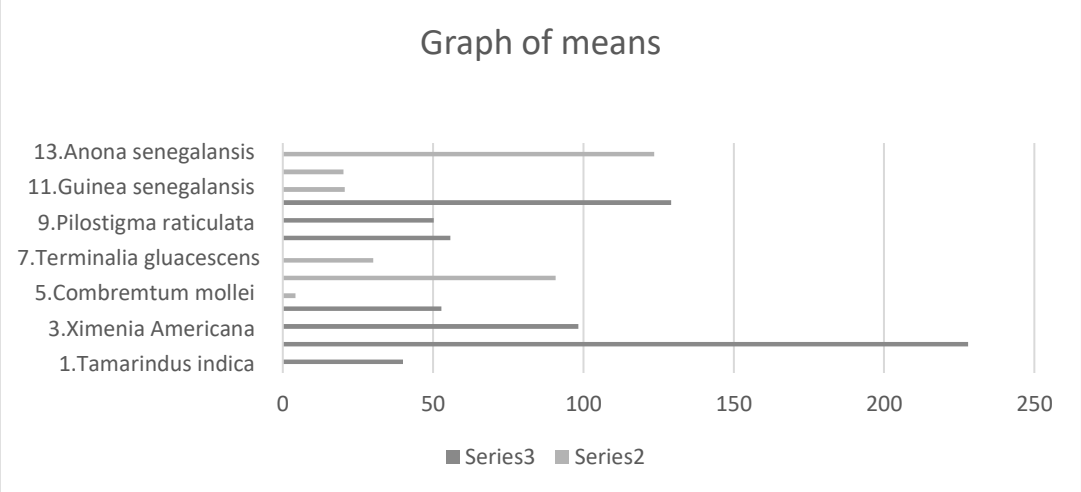

Figure 2: Graph of means for each Species of fuelwood across depots

Table 3: Check list of identified tree species extracted for fuelwood in the study area

Species	Family	Depot		
		Janga siri	Janga dole	Nahuta
Tamarindus indica	Fabaceae	+	-	-
Anogeisoussus leocarpus	*Annonaceae*	+	+	-
Ximenia americana	*Alocacaceae*	-	+	-
Acacia nilotica	*Minosoideae*	+	-	+
Cacia seberania	*Caesalpiniodeae*	+	-	-
Terminalia gluacescens	*Combretaceae*	-	-	+
Faidhabia albida	*Mimosaeae*	-	-	+
Pilostigma raticulata	*Leguminseae*	-	+	-
Prosopis africana	*Mimosoideae*	+	+	+
Guinea senegalansis	*Combretaceae*	+	-	-
Parkia biglobosa	*Leguminocease*	-	-	+
Anona senegalansis	*Anocardiaceae*	-	+	-
+ Present -Absent (Source field survey, 2020)				

ANOVA TABLE

Sv		Df	Sum sq	Means sq	F value	Pr (>F)
Species	13	88520	6809	4.17		0.0623
Location	2	3984	1992	1.22		0.3702
Residuals	5	8164	1633			
Total	20	100668				

Check list of identified tree species extracted for fuelwood

The study showed that, were fourteen (14) species of trees belonging to eight (8) families that were commonly exploited. The species are character to the savannah vegetation the study area belongs. This is conforming to the report of (Markus, 2008). This implies that extracted of wood is based on the availability of species only. Similarly, result show that the fuelwood species most exploited is *Anogeisous leicarpus,* followed by *Prosopis Africana* and *Parkia biglobosa* which shows the least quality of fuel wood. These results agree with the finding of (Audu, 2013) who stated that *Anogeisous leocarpus* most exploited due to the fact that they provided the best fuelwood for domestic use.

Quantity of fuelwood recorded in the study site

This study revealed that Janga Siri deport has the highest quantity of fuelwood extraction, and Nahuta has the least quantity of fuelwood extraction. ANOVA test carried out showed that the quantity does not vary significantly across location and species fuelwood species such as *Anogeisous lecocarpus* and *Prosopis Africana* were present in all the three deports, but *Anogeisous leocarpus* is the most exploited followed by *Prosopis Africana* and the least exploited is *Parkia biglobosa*. These results are not for fetched from the report of (Ayuba, 2001) who stated that *Anogeisous leocarpus* greatly exploited than other species for its high rate of combustion; this may bring the species to extinction if exploitation is not balanced with conservation.

SUMMARY

The study focused on the assessment of different trees species and quality of wood sold in major commercial fuelwood depot in Fika Local Government Area. The methodology use for the data collection was direct identification of tree species for fuel wood. The results obtained were analyzed using a one-way ANOVA to compare the mean of the species of trees most preferred and the quantity of fuelwood extracted per species per location (depots). Check list of species across deports was prepared to show species of fuelwood present or absent.

CONCLUSION

Based on the results of this study it, can be concluded that a lot of tree species are being felled daily for fuelwood in the study location preference shown to species may perhaps be due to combustibility, availability or accessibility of such species.

RECOMMENDATION

In view of finding from this study the following recommendation are made;

i. For the fact that fuelwood extractors prefer some species to the others and the quantity of these species are highly needed by the fuelwood users. Government should have a plantation of some species, and also make available sustainable and affordable energy alternatives like cooking gas..
ii. Individual and non-governmental organizations/government policy makers should work in synergy to regenerate the biodiversity of the natural forest around the study area and indeed, the whole state so as to balance the exploitation with regeneration.

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