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EVALUATION OF FUELWOOD CONSUMPTION PATTERN IN NORTHERN PART OF TARABA STATE, NIGERIA

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ABSTRACT

The study examines fuelwood consumption rates. Data was obtained from a survey of 250 systematically selected household, out of which 243 were successfully retrieved, 104 were systematically selected from non-households. The data was subjected to descriptive statistics analysis. The result showed that the rate of fuelwood supplied and consumed was high as both fuelwood supplied and consumed is sourced from or within the area. It is recommended that to avoid total collapse of the ecological balance of the study area, a conscious and sustained afforestation and reforestation programs must be embarked upon. The promotion of the cheap, reliable and safe alternative to fuelwood would free large number of woodland trees which could be used in other woodland demands.

INTRODUCTION

Fuelwood is the primary source of cooking energy for households in many developing countries. In Nigeria, the vast majority of the populace depends on forest resources in meeting their various household energy uses. The country lost 81% of its old growth forest in just fifteen (15) years (1990-2005) as a result of uncontrolled subsistence agriculture and the collection of fuel wood which has destroyed the country's forest (Maryam, 2010). In northern part of Taraba state, accelerated degradation and depletion of wood land resources particular by fuel cutting is one of the most serious environmental problems. Here, woodland resources have long been a

target of ruthless destructions through wood collection particularly. It is of little wonder therefore that such practice of indiscriminate felling of trees for fuel wood is on the increase.

Thus the vegetation cover is gradually on the decline and in some places it seems to have been resulting to irreparable destructions of the land. In the past, the source of fuel wood was simple, and the ecological impacts were minimal due to low human population. As human population continue to increase rapidly, man's dependency on fuelwood as a source of fire and energy started showing signs of inadequacy. Today the level of inadequacy is reflected upon the rate at which deforestation is taking place as a result of man's attempt to have a regular supply of fuelwood.

This study will lead into discovery of the fuel wood alternatives in the study area, and the consumption rate pattern in the study area. Some knowledge on the state of wood land in relation to the perception of fuel wood suppliers will also be portrayed. For academic purpose, this research work will serve as an essential reference material and thereby increase the number of literatures available on fuel wood consumption in both rural and urban areas and in Northern Taraba state in particular. The study will help in making appropriate recommendation for the protection and conservation of our natural heritage.

The works of Foskett and Foskett (1999) on fuel wood in the less developed world reveals that the average amount of fuel wood consumed per person per year in Nepal is 600kg and the population of that country grew from 5 million in 1953 to 16 million in 1999, so fuel wood has become scarce and forests have been thinned and

cleared. The rate of consumption of fuel wood in Nigeria seems to exceed the rate of production and as such the country appears as one of the countries with fuel wood shortage in Africa (Evelle, 1980; Rodda, 1991).

The studies of Tukur and Adebayo (1998) on fuel wood exploitation and environmental degradation around Yola, Nigeria shows that the rate of fuel wood consumption is very high at Yola as shown by the large daily inflow of woods into the city. The rate of consumption of fuel wood in Nigeria has been found to exceed the rate of production and as shown, the country has been classified as one of the countries with fuel wood shortage in Africa.

MATERIALS AND METHODS

The Study Area

Taraba State lies between latitude $6^{0}30^{11}$ and $9^{0}36^{11}$ and North and longitude $9^{0}10^{11}$, $11^{0}50^{11}$East. It is bounded on the North by Bauchi State and Gombe State in the North-East and Adamawa State on the East, and Plateau State in the North West, Benue State, in the south west while it shares an international boundary with the Republic of Cameroon to the South-East (Taraba State Diary, 2006).

The study area of this research includes KarimLamido, Lau and Ardo-Kola Local Government Areas which are located in the northern part of Taraba state (Figure 1). KarimLamido Local Government Area shares common boundaries with Lau and Ibi Local Government Areas respectively in the southern part of the state, with inter-state boundary shared along the northern axis, by Kaltungo and Shongon Local Government Area of Gombe state. Besides, it is a close neighbor to the

people of Lamurde Local Government Area of Adamawa state in the eastern axis and Alkaleri Local Government Area of Bauchi State in the western axis at the north-east region of Nigeria (Martin *et al.,* 2007). The Local Government is located at latitude 09^0 30^100^{11} N and longitude 11^0 $20^{11}00^{11}$East. It covers a total area of 6,789km^2 (NPC, 2006).

Lau Local Government Area is bounded with Adamawa State to the north, Karim-Lamido Local Government to the west, Jalingo and Yorro to the east and Gassol Local Government Area to the south. It lies between latitude 9^021^{11} North and longitude 11^028" East (Taraba State Diary, 2006). The Local Government covers an area of 3,525 km^2 (NPC, 2006). Ardo-Kola Local Government Area shares common boundaries with Gassol and Bali Local Government Area to the west, Karim-Lamido to the south-west, Jalingo to the north. It is located at latitude 8^045^{11} North and longitude 11^010^{11} East (Taraba State Diary, 2006). It has a total land area of about 2,262 km^2 (NPC, 2006).

Figure 1: Taraba State Showing the Study Area
Source: (Taraba State Ministry of Land and Survey Jalingo, 2006)

Types of Data

The sources of information for this research involve both primary and secondary data. Primary data source include data collected directly from the respondents by the use of questionnaires and interviews, which were designed to elicit information on fuel wood supply and consumption in the study area. The questionnaires were structured to solicit both open and close-ended responses. Trained field assistants in the Department of Agriculture and Natural Resources of KarimLamido, Lau and Ardo-Kola Local Government Secretariat were engaged to administer the questionnaires. The secondary data for this research were sourced from the Ministry of Agriculture and Natural Resources Jalingo, Taraba State, National Population Commission Jalingo, Department of Agriculture and Natural Resources Karim-Lamido, Lau and Ardo-Kola Local Government Area as well as textbooks, journals, individual works and other published and unpublished materials found relevant to this study or research.

Sampling Procedures

Survey were drawn from four (4) wards each of the local government area, twelve (12) villages were randomly selected as sample villages. They are Karim, Jen, Bachama, Didango, Lau, Kunini, Apawa, Mayo-Lope, Sunkani, Iware, Tau and Mayo-Renewo.

Data Analysis

Data collected were analyzed using descriptive statistics. The descriptive statistics used was mean, simple percentages and tabular analysis of responses.

RESULTS

According to Table 1 fuelwood consumption pattern of the household of sampled villages varied in daily, weekly, monthly and no specific regulation, with consumption on daily basis recording the highest (n=199;81.9%), followed by weekly (n=20;8.2%), and the least monthly (n=7;2.9%) out of a total of (n=243;100%). Likewise, Karim-lamido LGA (n=70) recorded the highest daily consumption, followed by Ardo-Kola LGA (n=68) and the least was Lau LGA (n=61).

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Table 1: Household Fuelwood Consumption Pattern

Settlement / Response	Karim	Jen	Bachama	Didango	Lau	Kunini	Apawa	M.lope	Sunkani	Iware	Tau	M.Ranewo	Total	%
Daily	32	15	11	12	21	15	12	13	25	17	14	12	199	81.9
Weekly	4	3	2	-	5	1	1	-	3	1	-	-	20	8.2
Monthly	1	1	1	-	2	1	-	-	1	-	-	-	7	2.9
No Specific Regulation	3	1	1	2	2	3	2	1	-	2	-	-	17	7.0
Total	**40**	**20**	**15**	**14**	**30**	**20**	**15**	**14**	**29**	**20**	**14**	**12**	**243**	**100%**

Source: (Field Work, 2019)

On daily consumption pattern, thrice was recorded the highest (n=128;52.7%), followed by twice (n=108;44.4%) and the least once (n=7;2.9%). Likewise, Karim-Lamido LGA (n=47) recorded the highest followed by Ardo-Kola (n=42) and the least was Lau (n=39) (Table 2)

Table 2: Household Fuelwood Daily Consumption Pattern

Settlement / Response	Karim	Jen	Bachama	Didango	Lau	Kunini	Apawa	M.lope	Sunkani	Iware	Tau	M.Ranewo	Total	%
Once	2	-	1	1	1	-	1	-	1	-	-	-	7	2.9
Twice	10	10	11	7	14	12	5	7	13	8	5	6	108	44.4
Thrice	28	10	3	6	15	8	9	7	15	12	9	6	128	52.7
Total	**40**	**20**	**15**	**14**	**30**	**20**	**15**	**14**	**29**	**20**	**14**	**12**	**243**	**100%**

Source: (Field Work, 2019)

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Table 3 showed that (n=197;81.1%) of the respondents consumed 1-5 bundles of fuelwood per day, which was the highest, followed by 6-10 bundles per day (n=41;16.9%) and the least 16-20 bundles per day (n=1;0.4%).

Table 3: Quantity of Fuelwood Bundles Consumed Per Day.

Settlement / Bundles	Karim	Jen	Bachama	Didango	Lau	Kunini	Apawa	M. Lope	Sunkani	Iware	Tau	M. Ranewo	Total	%
1-5	31	17	13	11	24	15	13	12	25	15	12	9	197	81.1
6-10	6	3	2	3	5	5	2	2	4	4	2	3	41	16.9
11-15	2	-	-	-	1	-	-	-	-	1	-	-	4	1.6
16-20	1	-	-	-	-	-	-	-	-	-	-	-	1	0.4
21 Above	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**40**	**20**	**15**	**14**	**30**	**20**	**15**	**14**	**29**	**20**	**14**	**12**	**243**	**100 %**

Source: (Field Work, 2019)

In terms of substitutes of fuelwood used in households, kerosene (n=112;46%) was the most consumed, followed by gas (n=58;24%), corn stalk (n=37;15.2%), cow dung (n=19;7.8%) and the least was electricity (n=5;2%). For non-household, corn stalk (Plate I) was the most consumed in restaurants (n=24;53.4%) bakeries (n=10;58.8%) and local bear parlors (n=27;64.2%) followed by cow dung (Plate II), in restaurant (n=10;22.2%), then kerosene in local beer parlors (n=9;21.4%) (Table 4)

Table 4: Types of Fuelwood Substitutes Consumed

Consumers	Household	Non-Household		
Fuelwood Substitutes	**Household**	**Restaurants**	**Bakery**	**Local Beer Parlor**
Cow-dung	19 (7.8%)	10 (22.2%)	1 (5.9%)	3 (7.2%)
Corn-Stalk	37 (15.2%)	24 (53.4%)	10 (58.8%)	27 (64.2%)
Kerosene	112 (46%)	5 (11.1%)	2 (11.8%)	9 (21.4%)

Gas	58 (24%)	-	-	-
Electricity	5 (2%)	-	-	-
Others (maize cob, beans stem, charcoal)	12 (5%)	6 (13.3%)	4 (23.5%)	3 (7.2%)
Total	**243 (100%)**	**45 (100%)**	**17 (100%)**	**42 (100%)**

Source: (Field Work, 2019)

PLATE I: Corn Stalk as a Fuelwood Alternative

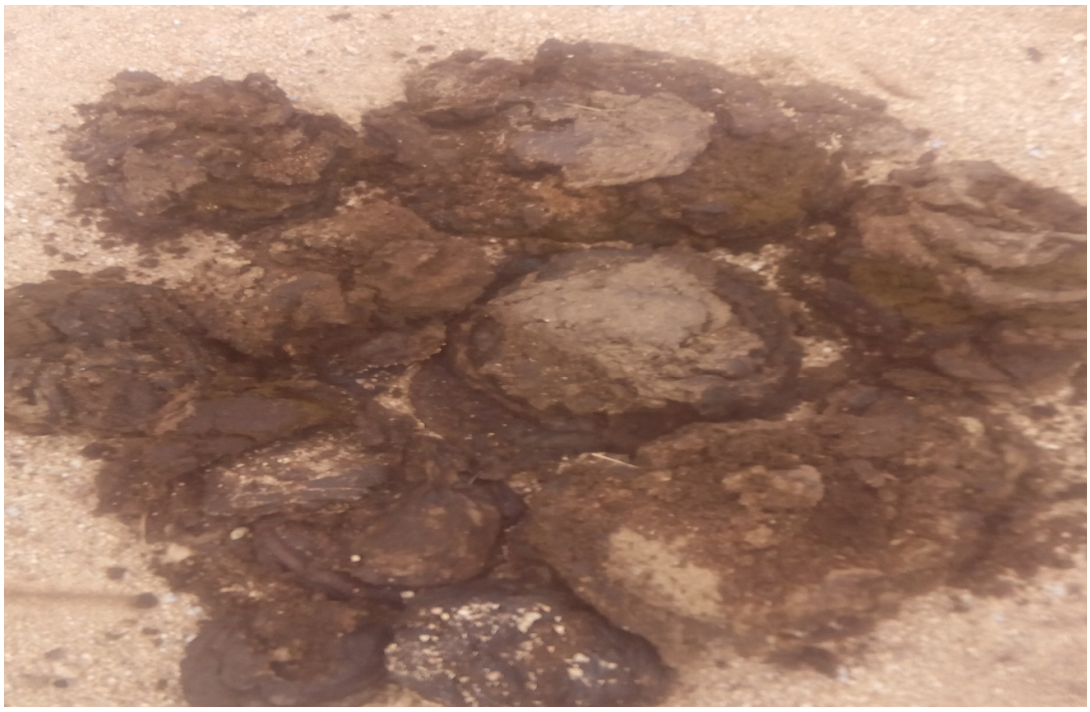

PLATE II: Cow Dung as a Fuelwood Alternative

that they prefer fuelwood rather than its alternatives because it is always available, followed by those who said it cost less (n=74;30.5%) and the least said it is easy to procure (n=17;6.9%) (Table 5)

Table 5: Fuelwoodpreference

Settlement / Bundles	Karim	Jen	Bachama	Didango	Lau	Kunini	Apawa	M. Lope	Sunkani	Iware	Tau	M. Ranewo	Total	%
Always available	33	11	8	5	22	13	10	8	19	15	5	3	152	62.6
Less costly	5	6	7	8	6	7	4	5	8	3	8	7	74	30.5
Easy to procure	2	3	–	1	2	–	1	1	2	2	1	2	17	6.9
Other specify	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total	**40**	**20**	**15**	**14**	**30**	**20**	**15**	**14**	**29**	**20**	**14**	**12**	**243**	**100 %**

Source: (Field Work, 2019)

DISCUSSION

On fuelwood consumption pattern, daily usage by household lead, recording 81.9% probably because it the only source of energy for every day livelihood and also due to lack alternative source, while those that consume on weekly, monthly and no specific regulation followed probably because there was fuelwood alternatives such as corn stalk, cow dung and kerosene in their areas. Each household consumed 1-5 bundles in a day and a bundle is a number of tree pieces of tied fuelwood weight 5kg. This work is in line with the works of Smith (1984) and Knapp *et al.*, (1989) who said fuelwood is the only common source of energy as a basis requirement for every day live- for cooking, heating and lightening. This also confirms the work of Heltberg (2003) who reported that fuelwood is an essential daily resource needed in the households to survive, it is needed for light, heat and cooking.

The study revealed that kerosene is the most consumed alternatives in households (46.0%), while corn-stalk formed the majority in non-households i.e. restaurant (53.4%), bakeries (58.8%) and local beer parlor (64.2%), probably because it is affordable and available. Corn stalk was the most consumed in non-household because of it availability and abundance in the study area especially during the harvest season. This study is in agreement with Cline-Cole *et al.*, (1990) who reported that fuelwood chief rival for cooking and lightening are kerosene and electricity among households. According to Mercer and Soussan (1992), as urbanization proceeds and the use of fuelwood increases, people tend to diversify and switch to wood alternatives such as gas, electricity etc. as its common to find among households. This study is in line with Barnard and Kristoferen (1985)

who pointed out that in many areas, such as Bangladesh, Northern India and Lesotho, agriculture residues have long dominated households fuels because wood is far too valuable (expensive or scarce). Jimon and Ifabiyi (2003) observed a similar findings that cow dung is used in India, millet and stalks in Burkina Faso, saw dust in some parts of Nigeria especially in urban areas as substitutes for fuelwood.

Fuelwood preference refers to the reason why respondents prefer fuelwood rather than its alternatives. Sixty-Two-point Six percent (62.6%) of the respondents attest that they prefer fuelwood rather than it alternatives because it is always available, it cost less and is easy to procure. They also use fuelwood energy for heating to obtain warmth/illuminating the environment. This work is in-accordance with the works of Adegaye (1986), Mercer and Soussan (1992) and Popoola (1992) who concluded that the availability of fuelwood to consumers in both rural and urban areas and its less cost have helped consumers to prefer fuelwood than it alternatives.

CONCLUSION

From the findings of this research, it can be concluded that the rate of fuelwood consumption is higher than fuelwood supply in the study area and that fuelwood supplied/consumed in the area is sourced from woodland/bush in the study area. Motor vans/trucks and "push-push" are the means by which suppliers transport their fuelwood. Fuelwood suppliers have perceived that there is scarcity of fuelwood resources and an increasing change in its consumption rate, increase in the distance and time spent in order to collect it. Corn stalk, cow dung and kerosene are the most used wood substitutes.

RECOMMENDATIONS

- A conscious and sustained afforestation and reforestation programs must be embarked upon so as to reduce the level of land degradation in the area.
- The community should be educated on the merits of such projects and be encouraged to embark on them.
- Alternatives fuelwood sources should be exploited such alternatives includes kerosene, gas, and saw dust.
- Fuelwood extractors should be encouraged to establish woodlots and fuelwood plantations in order to ensure regular supply of the products.
- The programe of distributing stoves and gas cookers at subsidized rates should be encouraged, this will be supported by regular supply of kerosene and liquefied gas whose prices should be reviewed regularly.
- Emphasis should be placed on setting conservation areas within the study areas.
- The state government annual tree planting campaign should be taken seriously.

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