APPRAISAL OF DEMANDS ON FUELWOOD AS SOURCE OF ENERGY AGAINST OTHER SOURCES IN BAUCHI METROPOLIS, BAUCHI STATE

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ABSTRACT
This study attempts to establish, through the use of questionnaires, the extent on reliance on fuel woods as against other energy sources in metropolitan Bauchi, Bauchi state. There exist inequalities in fuel wood consumption levels between households types with different income categories. Preferences also exist in the type of trees used as fuel wood. Cost of fuel wood was found to be driving force for its demand etc. Ways at curtailing excessive use of fuelwood were recommended

Keywords: *Demands, Fuelwood, Energy, Sources, Bauchi Metropolis, Bauchi State*

INTRODUCTION

The vegetation, of any environment that is removed or cut down to meet the need of man's energy requirement could be termed as fuelwood. The quality of life prevailing in many countries of the developing world is reflected in the source, supply and use patterns of household energy. Reviewing the urban energy situation. One striking aspect that emerged is the way in which supply reliability determines the patterns of domestic energy use.

Fuel wood is a renewable resources and has sustained the human race right from the invention of fire. It continues to supply a major part of domestic energy requirement for a majority of the world's populations. Fuel wood provides the most basic source of domestic energy in both rural and urban areas. The nation continues to face shortage of kerosene and gas, the alternatives to the firewood, as the source of energy for cooking and heating. It is observed that the consumption of fuel wood is increasing and it is the most important traditional source of cooking, lightening and even used for local craft industries, catering industries and road side food sellers. Energy crisis has highlighted the fact that the world cannot rely indefinitely on fossil

fuel, we may have to fall back on renewable resources as a prime source of energy (SMIL AND KNOWLAND 1980).

This situation, therefore needs critical review for the simple fact that world attention is focused mainly on oil which represents over 70% of the total energy supply.

Urban energy consumption patterns have a tremendous impact upon the rural areas, both directly and indirectly. As urban population increase, more land has to be cleared to feed the growing band of urban non-subsistance producers. The demand of firewood and charcoal increases. In essence, the site of fuelwood consumption grows at the expense of areas of fuelwood production.

Although usually more efficient in terms of calorific yield, the prices of these fuels and other related equipment restrict their availability of higher income household. In addition, it is likely that this fuel will be primarily directed into higher priority uses for development. Though some people might argue, and correctly too, that the fuelwood produce relatively lower calories of energy per unit weight compare to other fossil fuel.

But there has often been a general assumption of modernization involving industries, housing, transport, and modern power source chiefly oil and electricity this also lead to a general belief that the increase availability of substitutes sources of fuel is bound to affect the demand for fuelwood and in the long run, even the village will come to depend less on wood for fuel" (Adeyanju 1993). This means that as more electricity supply, kerosene and other modern forms of energy are introduced to the people they may not bother to use the local energy source. This statement when critically reviewed however may not work especially in Nigerian context. According to a survey conducted in kano metropolitant area and some near-by village by (Micheal Mortimore 1984), it was found that wood's replacement as an energy source by other fuel is most evident in the 'modern' suburbs of the metropolitan located outside the Birni (city).

AIM AND OBJECTIVES

The main aim of this study is to study the mode and level of fuelwood utilization as an alternative to other sources of energy in the study area.

The objectives are

i. To establish the extent on reliance on fuelwood as against other energy source.
ii. To establish common tree species used for fuelwood and their demand in the metropolitan Bauchi.
iii. To determine if there is the will on the part of the people to switch away from fuelwood.
iv. To make recommendation based on findings

Methodology

The main source of data for this study is by questionnaire survey. Informations were obtained from household consumers and sellers of fuelwood in the study area. This study shall employ the use of both primary and secondary sources of data. The primary sources of data, shall on the basis of this study, involve administration of structured questionnaire. 100 questionnaires were administered to different households.

Sampling techniques

In the questionnaire administered a simple random sampling technique was applied. Thus for the sake of convenience, the study area were divided into quarters within the Bauchi metropolis. Questionnaire were administered taken into account the population size of each area concerned. Information on the sources of supply of fuelwood to metropolitan Bauchi were obtained from the dealers at main fuelwood depots and also from some of the many sub-urban dealers stationed at site within Bauchi metropolis.

Literature review and conceptual issues

Studies have been carried out on energy especially in the developing world, thus "recent estimate suggests that nine out of ten of the world population depend on wood for cooking and heating and 75% of the households in the third world countries use fuelwood as their primary source of energy. Indeed, world consumption of fuelwood is greater than that of energy from hydroelectric power and geothermal source.

Fuelwood is the cheapest fuel for domestic cooking and heating likewise people will continue to use fuel in both urban and rural areas, because its supply is more reliable than any other sources of energy. One of the most important aspect of fuelwood is its unique contrast with all other energy source. It does not need sophisticiated infrastructure for consumption, production and transportation at the places where they are available, in the sense that unskilled labour can always exploit and (utilize fuelwood without much difficulty.

As the other alternative source of energy become more scarce and expensive. The importance of wood is increasing dramatically. This has catapulted tree-growing into the arena of world energy production. Firewood is the first fuel used by man since 1850 A.D. firewood was the main source of energy in the world (Mcphee, 1974). Althrough, there has been a tremendous change from

fuelwood to fossil fuel in highly industrialized countries fuelwood is still the dominant source of energy throughout the developing countries. Fortunately, trees, when properly managed are a renewable resource. The immediate logical response to the firewood shortage on what will have many incidental ecological benefit, is to plant more trees in plantation, on farms, along roads, in shelter belts and on unused land throughout the rural area of poor countries.

The process of urbanization in the developing countries involved using large number of people, many of whom retain rural habits in relation to energy use. This leads to the rural urban energy crisis where large quantities of firewood are supplied from rural to urban areas. The energy alternatives for many of the urban population are restricted due to cost and inadequate infrastructure, wood fuel is the main source of energy in the urban areas of Kano (Falola et-al 1988).

Openshwa (1975) also pointed out that 80% of household in developing, countries used fuelwood as their primary source of energy. There are growing fears in many quarters, that our country Nigeria is facing, an energy problem, particularly with the scarcity of fuel.

DISCUSSION

Table 1: Demand on fuelwood against other energy source

Energy source	Dependance	%	Dependance on more than one source	%
Fuelwood	71	77	4	6%
Kerosene	15	16	29	42%
Gas	2	2.5	31	47%
Electricity	1	1.2	1	1%

Source: Fieldwork 2019

Most of the respondents depended on fuelwood for their domestic use, that is 77%, and the second fuel used is kerosene which constituted about 16% and a few of them use gas and electricity for their energy needs.

Table 2: Fuelwood useage in traditional and modern households

Types of House	Number of Household	% of household using fuelwood
Traditional	38	42.62(%)
Modern	51	57(%)

Total	89	100%

Source: Fieldwork 2019

The table shows that overwhelming majority of modern households in the study area has higher number of households dependant on fuelwood than the traditional households. This constituted for about (57%) while the traditional households has about (43%). This has shown that modern households consumed more fuelwood than traditional household.

Table 3; Preferences in fuelwood usage in the study area

Reasons for preference	Number of households	Percentage
Cheaper and economical	39	43.8
Cultural reason	20	22.5
Don't use for other reason	19	12.3
Others	11	12.4
Total	89	100%

Source: Fieldwork 2019

Most of the inhabitant of the study area use fuelwood for their domestic cooking. They use this fuel energy for economic reasons, availability of the fuelwood at anytime of the day without shortage compared to other fuels like gas, kerosene and electricity whose supply are on the decline considerably and may be interrupted as seen in the above table.
Another reason was due to large extended families and cultural ties. Majority of the respondents in the study area rely on fuelwood, but in some occasions used both fuelwood and other energy source especially kerosene.

Table 4: Reasons for fuelwood usage against other sources of energy in relation to prices.

REASON	Number of Household	Percentage
Cheaper	36	45.5
Doesn't require storage	1	1.26
More convenient	38	48.10
Others	4	5.86
Total	79	100%

Source: Fieldwork 2019

This table shows that out of 79 respondents 45% use fuelwood as against other energy source because of its relative convenience, 45% used fuelwood because is cheaper than any other source when looking at the present condition. Less than (2%) of the respondents use fuelwood without considerations on expenditure on storage.

Table 5; Wood species preferences

Species	Quick Burn %	Slow Burn %	Much heat %	Much Charcoal %	Little Smoke %
Anoigeissus leiocarpus	6.0	27.4	17.2	16.4	30.2
Butyrospernum paradoxum	5.8	30.2	27.4	16.5	20.5
Tamarindus Indica	32.1	16.4	20.5	27.6	5.7
Parkia biglo bosa	26.0	26.0	48	0%	0%
Prosopis mespilitorms	13	-	27	-	-
Prosopis Africana	-	-	-	-	-
Khaya Senegalensis	28	15	11.5	17	6.8
Acacia Albida	55	-	-	20	25
Ziziphus Mountiana	37	24	25	9	5
Combetrum collinum	-	100	-	-	-

Source; Fieldwork 2019

The table above shows that some of the species are most preferred than other species, Anogeissus leiocarpus, Prosopis mespilitoms burn quickly asuch most people don't use it because it cost more. On the other hand, Tamarindus Indica species burn slowly thus more economical. It produces more charcoal, high heat and little smoke.

Table 6: most preferred fuelwood species.

Types of Fuelwood	**English Name**	**Hausa Name**	**No of Species**	**%**
1	Anogiessus leiocarpus	Marke	18	25%
2	Butyrospernum Paradoxum	Kadanya	9	12.5%

3	Tamarindus Indica	Tsamiy	6	8.3%
4	Pakia Biglo bosa	Dorawa	6	8.3%
5	Diospyros Mespiliformis	Kanya	5	6.9%
6	Prosopis Africana	Kirya	8	11.1%
7	Khaya Senegalensis	Madachi	4	5.5%
8	Acasia Albida	Gawo	9	12.5%
9	Zizaphus Mountiana	Magarya	2	2.5%
10	Mountain combetrum Collinum	Kanntankara		

Source Fieldwork 2019

Most households prefer Anogeissus leiocarpus (Marke), butyrospenum paradoxus (Kadanya) and Diospyros Mespilitorms (Kanya) while some households prefer Prosopis Africana (Kirya) and Khaya Senegalensis (Madaci) and Acacia Albida (Gawo), Zizaphus Mountiana (Magarya) and Compretam Coleinum (Kantakara) is not prefer by commercial households.

Table 7: Fuelwood usage and income relations.

Income	Number of Households	Percentage
Annual income earners	5	5.6
Monthly income earners	20	21.6
Daily income earners	54	61.6
Others in the categories	10	11.3
Total	89	100%

Source: Fieldwork 2019

Most households who use fuelwood as a source of domestic energy are daily income earners (61%), followed by monthly income earners (11%), then annual income earners and less than 12% were others in the categories.

Table 8: Daily fuelwood expenditure

Prices (N)	Number of Household	Percentage
100 – 200	19	21.34
201 – 300	14	15.73
301 – 400	10	11.23
401 – 500	13	14.60
501 – 600	9	10.11

601 – 700	7	7.86
701 – 800	6	6.74
801 – 900	5	5.61
901 – 1000	3	3.17
1000 – above	2	2.24

Source: Fieldwork 2019

The table shows that less privileged households used the most of fuelwood, high-income earners also rely to some extent on fuelwood. Households consumers in the study area consumed an average of four bundles of firewood per day and about 51% of them spend N100 to N600 daily on fuelwood while the remaining 41% spend N601 to N700 per day and above.

Table 9: Curtailing dependence on fuelwood

Respondents	Number of Households	Percentage
Alternative energy supply	30	35
Reduction in price of Kerosene	27	32
Constant supply of electricity	13	15
Non	8	9
Others	6	7

Source: Fieldwork 2019

Respondents prefer ways to minimize over dependence on fuelwood, about (35%) said only the supply of alternative energy source could change the trends. 32% of the respondents placed emphasis on pricing, that is price of other alternative energy source like kerosene and gas to be cheaper and affordable to final consumers. The third (15%) are those who were not specific.

CONCLUSION

The consumption of fuelwood varies from one household to another depending on the income level and relative shortage of other alternative energy source eg Kerosene because of its low price compared to gas. It is used by some low and middle-income earners while the high income earner use alternative fuels like electricity and gas. The price of fuelwood has continue to soar over the years, an indication that demand is far above supply. Increase in the prices of other fuels like kerosene, petrol and diesel

creates difficulties in transporting from the source area, and therefore limiting supply.

Most people use fuelwood because certain traditional dishes cannot be easily prepared without it.

Those not making use of fuelwood said it is because of its bulky nature and takes times to cook especially during the wet season, some said it produces smokes which is difficult to be washed from cooking pots and also affect their health, earlier in this work it was pointed out that supply of fuelwood is not in any way keeping phase with rapid growth of population in the study area, and not only metropolitan Bauchi, but in other urban and rural areas of developing world. Population is rapidly increasing with high rate and shortage of alternative source of energy.

This incessant shortage of this fuel may pose danger to the people. This was associated with the fact that only small percentages of households can afford to use other sources of energy in their domestic cooking, despite of the fact the overwhelming majority of the respondents are willing to change to an alternative source of energy. The cheapness of fuewood and its availability makes it popular.

Recommendation

Ways at curtailing excessive use of fuelwood were recommended

(1) Availability of alternative energy at cheaper rates.
(2) Education on hazards of pollution.
(3) There should be stricter punishments for offenders of related laws
(4) The policy of "cut one plant ten" should be encouraged.
(5) There should be a comprehensive inventory of Trees on high demand for control purpose'

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