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Factors Influecing Choice of Energy Source in North Central Nigeria

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Abstract: *A study of factors influencing choice of energy source was conducted in three states of North Central Nigeria. Using purposive multi-stage sampling procedure, 220 respondents were selected from each state bringing the total number of respondents to 660 for questionnaire interview. In addition, one focus group discussion (FGD) consisting of 20 participants was conducted in each state. The participants were drawn from among bakers, fish smokers, households and hoteliers who use wood and wood products. The interactions were properly recorded. Data collected were collated and analysed using descriptive statistics. Results showed that factors responsible for choice of energy source were reliability (24%), abundance (24.78%) and scarcity (32%).Based on these factors, wood ranked highest followed by biomass as the most preferred energy sources while electricity was the least energy source favoured. It was recommended that deliberate efforts be intensified to improve on the other energy sources to provide options to reduce over-dependence on fuel wood energy source.*

Keywords: *Energy source, availability, affordability, over-dependence and convenience.*

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I. Introduction

As the population of the world increases, there has been corresponding demand on the good things of life. The process of realizing these things requires the use of energy from a particular source. Our cottage industries such as bakeries, hotels, fish processing and most importantly, cooling in our homes, require the use of one type of energy source or the other. For the rural dwellers, the major source of energy derives from wood and wood products. These demands have placed very high premium on our ecosystems. On a daily basis, several tonnes of fire wood are harvested (Dagba*et a*l 2005). Our forests are therefore being depleted. Our biodiversity is constantly over exploited. This ought not to have been the case because there are several other energy sources that man utilizes for several purposes including industrial energy requirements.

The efficiency of some of these alternative energy sources are not in doubt. For example, it is simply stating the obvious that electrical and gas energy sources are not only more convenient to use for all domestic and industrial activities, but that the two energy sources are more efficient than wood energy. Yet the major constraints to the free use of these efficient sources are due probably to their intrinsic qualities which include unreliability, prohibitive costs and its hazardous nature. To crown it all, these energy sources have poor distributive network systems (Amaza, 1999,Onuorah,2000, Adedire,2000, Ogunsanwo and Ajala,2002). In their separate studies, it was found that the major energy source preferred by the rural people is wood. According to studies by FAO (1991), about 80% of the population, of the third world countries depend on wood for their energy. Thulin (1990), Dagba et al (2005) equally reported that over 80% of the rural dwellers and the sub-urban populace in Nigeria depend wholly or partially on wood for cooking and heating. As a result, there is high level of deforestation leading to environmental degradation. As traditional wood resources become depleted throughout developing countries, the issue of how to meet people' future energy needs becomes very pertinent. Therefore, conventional energy source substitution is virtually most compelling if our dwindling forests are to be conserved.

In this part of the world, information about why people prefer certain energy sources is not easily available. This study attempts to identify reasons why this is so, and to suggest ways of addressing the issue for the sake of our ecosystems.

II. Methodology

Study area

The study area comprises three states namely Benue, Nasarawa and Plateau that are located within the Guinea Savannah. The states share common boundaries with relatively similar culture, level of education and income. The populations of the states are Benue 4, 219, 244, Nasarawa 1, 863, 275 and Plateau 3,178, 712 (Population figures, 2006).

Procedure and Data Collection

The study area was stratified into states followed rural, sub-urban and urban areas. Multi-stage purposive sampling procedure was adopted. Two hundred and twenty respondents were drawn from the rural, sub-urban and urban areas for each state, making a total of six hundred and sixty respondents. Selection of respondents was again purposively limited to bakers, households, hoteliers and fish/meat smokers. In addition, one focus group comprising ten participants was selected for each state for a discussion. Six hundred and sixty questionnaire were administered on the respondents selected as described above. A check list was likewise used for the group discussion to elicit information not covered in the main questionnaire.

Data Analysis

Data collected were collated and analysed using descriptive statistics. The proceedings of the focus group discussion were recorded and used to fill in the missing gaps in the questionnaire interviews. The results were later presented in tables in percentages.

III. Results And Discussions

Socio-economic variables of respondents

Results in Table 1 showed that 42% of the respondents were males while 58% were females having age range between 31-45 years as most dominant. The implication of age on the choice of energy source is that if one is not matured, one will not have the opportunity of utilizing any of the energy sources. The female seen to outnumber the males because their involve more in activities involving wood and wood products.

In the case of marriage, 72% of the respondents were married with family sizes of between four to six members. Family size has been reported to have influence on the choice of energy. The larger the family size, the more the energy required, be it food preparation or other household activities and the issue of economics comes into play.

As for education, over 40% of those interviewed lacked formal education which has made most of them farmers. Education seems to promote the understanding of the economics of the energy sources. A person without formal education lacks the capacity to make sound judgements about the economics of energy sources.

Table 2 shows the energy consumption by states in terms of either using it as a major, alternate or supplementary source. In Benue, wood (76%) and biomass (48%) are the sources the people derive their energy from for both domestic and industrial uses. In the same way, Nasarawa (68% for both wood and biomass) and Plateau (48% wood, 53% biomass) prefer these energy sources. Other sources of energy such as electricity and gas that are most preferred by advanced economies are only being used as alternative sources. This is so probably because of a number of factors which range from high costs, un-reliability in distribution, convenience, availability and the economics of usage.

For any source of energy to be preferred, the users must not only be sure of the steady nature of the source of supply, but also, it must be relatively safe to use. With low level of education among our rural dwellers, the people find it very uncomfortable to use sources such as electricity and gas.

Price Assessment/Economics of Energy Sources.

Results in Tables 3 & 4 showed that only 13% of the respondents said wood was exorbitant while 3% said biomass was exorbitant. This showed that cost of energy source was very crucial for choice of energy source. Therefore it can be said that even though energy source may be cheap, if the supply network is not reliable, it might not be preferred. It further explained why electricity which is very efficient could not be preferred due to high cost and poor network of supply systems.

Convenience of use of Energy Source.

Table 5 showed Gas and electricity as energy sources that are most convenient to use by the people. However the need special installations and instructions to be able to use. With the scattered settlement patterns in the study area, it is very expensive to connect households for an effective distribution of electricity. As for gas, the ease with which it catches fire, scares many would be users. Sometimes even when a user decides to go for it, it is not available. So the user decides to look for a cheaper way of achieving the same goal. During focus group interaction, those interviewed expressed their inability to use electric gas cookers and some confessed seeing them for the first time.

Availability of Energy Source.

Table 6 shows that coal, gas and electricity are most reliable energy sources. Other energy sources are unreliable the farmers therefore depend on what is almost always available for them to cook and do other household needs.

IV. Conclusion

Given the socio-economic variables of respondents and the infrastructural developments within which they operate, wood and biomass stand out to be the most favoured energy sources. Factors influencing choice of energy source were found to include availability, affordability and convenience of the energy sources.

V. Recommendation

Electricity networks in the country should be improved upon with every sub-urban and urban area fully connected. The epileptic nature of our lights should be replaced with full current throughout the day as it is done in advanced countries. Excess gas that is being flared every day should be channel to full use, and people should be educated on how to use gas stoves. Finally, enlightenment campaigns should be intensified to conscientize the people on the need to employ other energy.

Table 1: Distribution of Respondents according to socio-economic Variables

	Benue	Nasarawa	Plateau
Variable	**Percentage**		
Gender			
Male	42	28	40
Female	58	72	60
Age			
1 – 15	08	12	04
16 – 30	20	24	24
31 – 45	60	52	56
>45	12	12	16
Marital Statue			
Single	08	12	04
Married	72	76	80
Divorced	08	04	04
Widow	12	08	12
Family Size			
1 - 3	10	12	10
4 – 5	60	62	64
7 – 9	24	22	20
Over 9	06	04	06
Educ. Qualification			
Primary	50	36	36
Secondary	32	26	38
Tertiary	02	00	04
No-formal education	16	38	22
Occupation			
Trading	28	04	12
Civil Service	04	08	04
Farmer	46	60	68
Applicant	16	12	10
Students	06	16	06

Source: Field Survey 2016.

Table 2: Energy type and Consumption Pattern by State

Energy Source	State	Major	Alternative	Supplementary	Total
Wood	Benue	76	18	6	100
	Nasarawa	68	20	12	100
	Plateau	48	40	12	100
Kerosene	Benue	20	42	38	100
	Nasarawa	26	28	46	100
	Plateau	41	32	27	100
Electricity	Benue	28	33	39	100
	Nasarawa	25	31	44	100
	Plateau	39	42	19	100
Gas	Benue	19	30	51	100
	Nasarawa	21	31	48	100
	Plateau	32	42	26	100
Coal	Benue	2	1	97	100
	Nasarawa	22	23	55	100
	Plateau	20	21	59	100
Biomas	Benue	68	12	20	100
	Nasarawa	68	18	14	100
	Plateau	53	12	35	100

Table 3: Distribution of respondents to price assessment of energy sources States (combined)

Energy Source	Affordable	Manageable	Exorbitant
	%	%	%
Wood	24	32	13.0
Kerosene	20	30.0	25.0
Electricity	20.0	10	37.0
Gas	17	05	16
Coal	6.0	03	06
Biomas	23	20.0	03

Source: Field Survey 2016.

Table 4: Percentage distribution of respondents by States Based on opinion about economics of energy sources

Energy Source	Benue	Nasarawa	Plateau
	%	%	%
Wood	38	27	40
Kerosene	08	07	05
Electricity	21	31	20
Gas	17	15	08
Coal	02	0	02
Biomas	12	20	25

Source: Field Survey 2016.

Table 5: Distribution of respondents according to convenience of energy sources States (combined)

	States		
Energy Source	**Benue**	**Nasarawa**	**Plateau**
Wood	38	30	32
Kerosene	30	37	33
Electricity	40	38	22
Gas	50	30	21
Coal	02	0.0	0.0
Biomas	12	20	18

Source: Field Survey 2016.

Table 6: Distribution of respondents according to supply and distribution of energy sources States (combined)

Energy	Supply and distribution			
	Reliable	Not reliable	Abundant	Scarce
Wood	160	40	140	30
Kerosene	30	170	28	180
Electricity	20	180	10	190
Gas	30	140	12	188
Coal	10	200	02	212
Biomas	101	25	163	21

Source: Field Survey 2016.

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