ANALYSIS OF FACTORS AFFECTING LEVEL OF HOUSEHOLD COOKING ENERGY CONSUMPTION IN PLATEAU STATE, NIGERIA

Amah, N. E*., Ajibade, B. & Joel-Dada Iyabode Elaine*****

*Department of Agricultural Extension and Management, Federal College of Animal Health and Production Technology (FCAH&PT) NVRI, Vom, Plateau State E-mail: nkeonyeama@gmail.com (+2348063311016)

**Guest House, National Veterinary Research Institute Vom, Plateau State

*** Federal College of Animal Health and Production Technology (FCAH&PT) NVRI, Vom, Plateau State

ABSTRACT

The investigation was conducted to analyze factors affecting the level of household cooking energy consumption in Plateau State, Nigeria. Data were collected from a sample of three hundred and eighty-four (384) respondents using a questionnaire. Mean score and factor analysis were used for analyzing data collected for the study. The study reveals that firewood ($\bar{x}$=2.85), charcoal ($\bar{x}$=2.70), leaves and litters ($\bar{x}$=2.68) and kerosene ($\bar{x}$=2.59) were highly consumed in the northern agricultural zone; kerosene ($\bar{x}$=3.06), firewood ($\bar{x}$=2.86), animal dung ($\bar{x}$=2.64) and corn stalk ($\bar{x}$= 2.66) were highly consumed in the central agricultural zone, while, the highly consumed household energy sources in the southern agricultural zone were firewood ($\bar{x}$=2.86), kerosene ($\bar{x}$=2.83) and groundnut shell ($\bar{x}$=2.68). The finding submits that animal dung, charcoal, corn stalk, firewood, groundnut shell, leaves/litters and kerosene were highly consumed in Plateau State. The study also discloses that the availability of energy sources ($\bar{x}$ = 3.13), type and source of the energy ($\bar{x}$ = 3.04), kitchen type ($\bar{x}$ = 3.02), the literacy level of the household ($\bar{x}$ = 3.01), awareness of the effect of smoke on health ($\bar{x}$ = 3.00), age of the occupants ($\bar{x}$ = 2.99), the average income of the household ($\bar{x}$ = 2.96), type of stove ($\bar{x}$ = 2.94), household size ($\bar{x}$ = 2.88), affordability of the energy source ($\bar{x}$ = 2.83) as the major factors that affect the level of household cooking energy source consumption in the study area. Further, the study reveals that the respondents' level of household cooking energy consumption was highly affected by environmental and cultural factors, health and psychological factors, and socio-economic factors. The study recommends that respondents should consider using modern cooking energy sources which are cleaner and improve ventilation, reduces indoor air pollution and improve health status and environment.

Keywords: Factors, Household, Cooking, Energy, Consumption

INTRODUCTION

Energy is an ultimate criterion and a do without to economic and social development in every human society. It can prompt transformation in any substance and is the power derived application of physical or chemical resources, especially to provide light, heat and work machines. Energy sources used in the household for cooking are regarded as household cooking energy sources. Household cooking energy sources are consequently, the different types of energy sources used in households to meet the basic cooking needs. The major cooking energy utilization activities in households are cooking, boiling, and heating. Cooking accounts for 91 per cent of the domestic energy use in households (Oyedepo, 2012).

Household cooking energy sources can be categorised into two (2) types: solid/traditional

cooking energy sources which include firewood, charcoal, crop residues, animal dung and coal and non-solid fuels/ modern energy sources which include kerosene, liquefied petroleum gas (LPG) and natural gas. In Africa, traditional cooking energy sources account for about 90 % of the total energy use; two-third (2/3) of this consumption is household cooking energy sources mostly procured by women (Food and Agriculture Organisation (FAO), 2004). The story is not different in Nigeria where about 80 % of the Nigerian populace lives in the rural communities with women constituting about 70 % of the population (Oyekale *et al.,* 2012); and as high as 80 % of rural households are predominantly reliant on traditional cooking household energy sources as their source of cooking energy (Akwa *et al.,* 2013).

Rural women are principally responsible for cooking in many homes thus play a major role in household cooking energy systems. Empirical evidence in the entire African region and the developing nations confirm that women are users, collectors and managers of household cooking energy especially traditional energy sources (Adepoju et al., 2012; Baigunhi & Hassan, 2014). Universally, more than three billion families depend on traditional cooking energy sources to meet rudimentary household cooking energy needs (World Bank, 2014). Indeveloping countries, more than 50% of the populace, especially in the rural communities depend on different types of household energy sources for their cooking. Over half of these individuals live in India, China, Africa and Indonesia; however, a proportion of this population is highest in sub-Saharan Africa (SSA) (World Health Organisation (WHO), 2006). In many parts of sub-Saharan Africa, more than 90% of the rural populace relies on traditional cooking energy as the main source of energy especially fire-wood and charcoal; while in China, a large proportion of households use coal instead (Ma, 2011) and poor households in Asia and Latin America depend on firewood.

Significant reliance on traditional cooking energy sources as household energy is intense in, but not limited to, rural areas (WHO, 2006). In Nigeria, the traditional cooking energy sources account for over 86% of household energy consumption (Nabinta *et al.,* 2007; Yahaya *et al*., 2007). Women, children, as well as men are forced to search further afield for household cooking energy sources. Firewood, charcoal, crop stalk, animal dung and other agricultural residues dominate household cooking energy use in Nigeria (Nabinta *et al.,* 2007; Audu, 2013). Rural families gather cooking energy from various sources: animals, forest land or open land surrounding their villages, local retailers, etc. while in many urban regions, these cooking energy sources have become traded goods (WHO, 2006).

Household cooking energy source utilization patterns are dependent on energy services, energy carriers and energy conversion devices. This entails that, the type of cooking energy source used depends on several factors which include cooking device owned by the household, the type of fuel available, the food being cooked, cooking processes and others (Njong & Johannes, 2011; Oyekale *et al.,* 2012). Traditional energy sources appear to be the most important source of energy for cooking because of the relative affordability; since rural families do not so much possess the infrastructure for LPG supply, they rely solely on traditional cooking energy sources, although, the use of LPG and kerosene is now growing rapidly (ESMAP, 2004; Laiter, 2000).

The processing of energy sources play important role in the energy service system and utilization. Laxmi *et al*. (2003) identified energy processing activities to include

chopping, cutting and pruning of fuel-wood, drying of dung and charcoal. Chopping activity involves cutting to pieces especially a log of wood for the firewood to be used easily for cooking, heating and other uses. Cutting includes felling parts of the tree or branches of trees with an implement such as axe and cutlass while pruning has to do with cutting out leaves and other unused parts of the tree (Laxmi *et al*., 2003). Women generally are considered not strong enough for tasks as chopping and felling trees (World Bank, 2004). One of the most efficient ways to utilize crop waste and dung as domestic cooking energy is to produce cakes. The process of compressing the material into a doughnut shape creates more efficient combustion which contributes to reduced emission levels. A simple device allows for this process and it can be done locally (World Bank, 2014).

Traditional cooking energy sources are mostly utilized because of their availability. Although the use of LPG for cooking has grown rapidly in rural areas, its consumption is still below 10% of total cooking energy usage. Laiter (2000) reported that traditional cooking energy appears to be the second most important source of household energy for cooking because of its relative affordability. Biological matters thus are the prevailing source of household energy in rural areas. Modi *et al.* (2006) recapped that traditional cooking energy sources are utilized in rural areas due to their availability and affordability. Christople *et al*. (2016) iterated that obviously availability and accessibility of especially traditional cooking energy sources contribute to explaining the use of traditional cooking energy sources as domestic cooking fuel in rural areas.

Many developing countries have large rural residents who engaged mainly in traditional agricultural production. As Ouedraogo (2006) reported, high-level consumption of traditional cooking energy sources and kerosene in rural areas than in urban areas while high-level consumption of gas, electricity and agricultural waste was higher in the urban areas. Variations in the level of cooking energy consumption are closely related to differences in income, access to energy sources, structures of the local economy and geographic/climatic conditions. Most rural families are low-income earners; therefore they use readily available firewood from their farms and forest close to their environment (Onojo, 2012). The availability and accessibility of especially traditional cooking energy sources define the consumption of traditional energy sources by rural households as domestic cooking fuels (Christople *et al*., 2016). Variation in the level of consuming household cooking energy sources is influenced and determined by economic and non-economic factors. The economic factors may include market price, energy sources and household income while non-economic factors include socio-economic characteristics, type of residence, ownership of residence, location of residence, distance to domestic energy sources and access to other clean (modern) energy sources (Onojo, 2012).

The study, therefore, seeks to assess the level of household cooking energy consumption in the three agricultural zones of Plateau States; determine the factors affecting the level of household cooking energy consumption, and analyse the factors affecting household cooking energy consumption among rural women in the study area.

Methodology

The study was conducted in Plateau State, Nigeria. Plateau is the twelfth largest state of Nigeria and is located in the North Central part of Nigeria with its capital in Jos. It is bordered by Bauchi State to the North East, Kaduna State to the North West, Nasarawa

State to the South West and Taraba State to the South East. Plateau State is located in the middle belt region of Nigeria and has a land area of 26,899 square kilometres. The State has an estimated projected population of about 4.655 million people in 2017 (NPC, 2010). It is located between latitude 80°24'N and longitude 80°32' and 100°38' east. The state is named after the picturesque Jos Plateau, a mountainous area in the north with captivating rock formations. Bare rocks are scattered across the grasslands which cover the plateau. The altitude ranges from around 1,200 meters (about 4000 feet) to a peak of 1,829 meters above sea level in the Shere Hills range near Jos. Plateau State falls under the northern guinea savannah. It has tall perennial dominated open woodland, with a rainfall of 1020 - 1270mm/ annum (Plateau State Government, 2012). Plateau State has a near temperate climate with an average temperature of between 18 and 22°C. Harmattan winds have the coldest weather and the warmest temperatures which occur in the dry season.

Plateau State is known as 'The Home of Peace and Tourism'. It is subdivided into seventeen (17) Local Government Areas (LGAs) namely: Barkin Ladi, Bassa, Bokkos, Jos East, Jos North, Jos South, Kanam, Kanke, Langtang North, Langtang South, Mangu, Mikang, Pankshin, Qua'an Pan, Riyom, Shendam, Wase. Plateau State is further grouped into three agricultural zones which are central, northern and southern zones. The state has over forty ethnolinguistic groups. Some of the indigenous tribes in the state include Berom, Afizere, Amo, Anaguta, Aten, Bogghom, Buji, Challa, Chip, Fier, Gashish, Goemai, Irigwe, Jarawa, Jukun, Kofyar, Montol, Mushere, Mupun, Mwaghavul, Ngas, Piapung, Pyem, Ron-Kulere, Bache, Talet, Tarok, and Youm. These ethnic groups are predominantly farmers and have similar cultural and traditional ways of life. They produce mostly potatoes, maize, beans, cotton, shear-nuts, cowpea, sugar cane, onions, pepper, ginger, tobacco, and coffee. Cattle, sheep, and goats are reared by its inhabitant. People from other parts of the country have come to settle in Plateau State. These include Hausa, Fulani/Kanuri in Wase, Igbo, Yoruba, Ibibio, Annang, Efik, Ijaw, and Bini. Each ethnic group has its own distinct language, but English is the official language and Hausa is a common universal medium of communication and commerce as is the case in most of the Northern and middle belt of Nigeria (Plateau State Government, 2012).

The population of this study comprised all rural women in the three agricultural zones (Central, Northern and Southern zones) of Plateau State, Nigeria. The total sample size for the study was selected using multi-stage, stratified and simple random sampling techniques. The first stage involved a purposive selection of one (1) LGA from each of the agricultural zones of the State. The second stage necessitated purposive selection in each of the LGAs selected from among the zones, two (2) districts. The third stage required choosing two (2) communities from the districts using a simple random sampling procedure. The final stage demanded simple random sampling selection of households from the communities by proportional allocation of 10% (0.10) across the board; a total sample size of three hundred and eighty-four (384) respondents was obtained and used for the study.

Data for the study were obtained through the use of a semi-structured questionnaire alongside an interview schedule. Data collected were analysed using descriptive and inferential statistics. Objective one which assessed the level of household cooking energy consumption in the three agricultural zones of Plateau States was realized by asking the respondents to tick the level of cooking energy source consumed by their household

using a four-point Likert-type scale of "Highly Consumed (4)", "Moderately Consumed (3)", "Lowly Consumed (2)", and "Not Consumed (1)". The values were added to obtain 10 which were further divided by 4 to obtain a mean of 2.5. Any mean value that is equal to or greater than 2.5 was seen as high-level consumption of cooking energy sources, while a mean score of less than 2.5 was regarded as low-level consumption of cooking energy sources.

Objective two determined the factors affecting the level of household cooking energy consumption. This was attained by the respondents indicating factors that affect the level of cooking energy source consumption using a four-point Likert-type scale of "strongly agree (4)", "agree (3)" "disagree (2) and strongly disagree (1). The values were added to obtain 10 which were further divided by 4 to obtain a mean of 2.5. Any mean value that is equal to or greater than 2.5 was regarded as a major factor, while a mean score of less than 2.5 was regarded as a minor factor. Finally, objective three analysed the factors affecting household cooking energy consumption among rural women in the study area. This was evaluated using Factor Analysis and inferential statistics to obtain the factors that affect household cooking energy sources in the study area.

Results and Discussion

Level of Household Cooking Energy Source Consumption by Rural Women in Plateau State

Results in Table 1 revealed that firewood ($\bar{x}$=2.85), charcoal ($\bar{x}$=2.70), leaves and litters ($\bar{x}$=2.68) and kerosene ($\bar{x}$=2.59) were highly consumed in the Northern Agricultural Zone of Plateau State, while animal dung ($\bar{x}$= 1.27), sawdust ($\bar{x}$= 1.43) and groundnut shell ($\bar{x}$= 1.44) were not consumed in the zone. However, kerosene ($\bar{x}$=3.06), firewood ($\bar{x}$=2.86), animal dung ($\bar{x}$=2.64) and corn stalk ($\bar{x}$= 2.66) were highly consumed in the Central Agricultural Zone of the State while leaves/litter ($\bar{x}$= 1.27), coconut shell ($\bar{x}$ = 1.51), sawdust ($\bar{x}$ = 1.58) among others were not consumed. Nonetheless, the most consumed household energy sources in the Southern Agricultural Zone of Plateau State were firewood ($\bar{x}$=2.86), kerosene ($\bar{x}$=2.83) and groundnut shell ($\bar{x}$=2.68) while coconut shell ($\bar{x}$=1.47), saw-dust ($\bar{x}$=1.51) and rubber material ($\bar{x}$ = 1.63) were not consumed in the zone (Table 1).

The finding submits that animal dung, charcoal, corn stalk, firewood, groundnut shell, leaves/ litters and kerosene were highly consumed in Plateau State. This study also depicts that traditional cooking energy sources were mostly used in meeting household cooking energy needs of rural women in Plateau State which include animal dung, charcoal, corn stalk, firewood, groundnut shell, leaves and litters. The differences in household cooking energy sources consumed by rural women in the different agricultural zones of Plateau State could be as a result of geographical, climatic and vegetative variations, shortage of a particular energy source, socio-economic and cultural factors inherent in the zones. Although certain cooking energy sources are consumed based on the distinctiveness of the zones which could be a consequence of terrestrial variations like agricultural practices, the crop or animal they keep. This result is in pact with ESMAP (2004) which reported that traditional energy sources are collected from the local environment and therefore viewed as cheap; if not "free" sources of energy in most households and that kerosene, wood and coal were the leading primary sources of cooking energy in rural areas of underdeveloped nations.

Table 1: Level of Household Energy Consumption among Rural Women in Plateau State

	Northern		Central		Southern	
Energy sources	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Animal dung	1.27	0.662	2.64*	0.816	2.36	0.739
Charcoal	2.70*	0.887	2.45	1.024	2.49	0.956
Coconut shell	1.59	0.790	1.51	0.901	1.48	0.846
Cooking gas	2.35	1.144	2.47	1.189	2.26	1.167
Corn stalk	1.49	.789	2.66*	0.888	1.57	0.839
Electricity	2.46	1.260	2.35	1.222	2.41	1.241
Firewood	2.85*	1.262	2.86*	1.104	2.86*	1.183
Groundnut shell	1.44	0.921	1.76	1.016	2.68*	0.969
Kerosene	2.59*	1.237	3.06*	1.053	2.83*	1.145
Leaves and litters	2.68*	0.556	1.27	0.658	2.23	0.607
Rubber	1.55	0.951	1.70	1.009	1.63	0.980
Sawdust (wood shavings)	1.43	0.750	1.58	0.798	1.51	0.474

*Highly Consumed (Cut-off mean, $\bar{x} \geq 2.50$)

Factors Affecting Level of Household Cooking Energy Consumption in Plateau State

Entries in Table 2 present factors that affect household energy consumption among rural women in the study area. The study reveals the availability of energy sources ($\bar{x}$ = 3.13), type and source of the energy ($\bar{x}$ = 3.04), kitchen type ($\bar{x}$ = 3.02), the literacy level of the household ($\bar{x}$ = 3.01), awareness of the effect of smoke on health ($\bar{x}$ = 3.00), age of the occupants ($\bar{x}$ = 2.99), the average income of the household ($\bar{x}$ = 2.96), type of stove ($\bar{x}$ = 2.94), household size ($\bar{x}$ = 2.88), affordability of the energy source ($\bar{x}$ = 2.83) as the major factors that affect consumption of household cooking energy sources by rural women in the study area. This discovery is sustained by Modi *et al*. (2006) who reiterated that traditional cooking energy sources are utilized in rural areas due to their availability and affordability. Agba *et al*. (2010) recapped that the amount and type of energy sources used in households in Nigeria is a function of population. Adepoju *et al*. (2012) acclaimed that large household sizes require more fuel to meet household cooking energy needs. This finding also agrees with Manmoman *et al*. (2015) who opined that the ability to read and write will enable an individual to reason well and participate effectively in household cooking energy procurement, processing and management.

Other factors that affect rural women consumption of household energy sources include marital status ($\bar{x}$ = 2.78), weather ($\bar{x}$ = 2.77), number of meals cooked per day by the household ($\bar{x}$ = 2.73), the status of the energy source ($\bar{x}$ = 2.72), husbands' occupation ($\bar{x}$ = 2.72), kitchen location ($\bar{x}$ = 2.69), energy use purpose ($\bar{x}$ = 2.69), individual preference ($\bar{x}$ = 2.65), major occupation ($\bar{x}$ = 2.63), individual choice and belief ($\bar{x}$ = 2.62), not interested in changing the energy in use ($\bar{x}$ = 2.59) and size of the farm ($\bar{x}$ = 2.51) (Table 2). The result coincides with Audu (2013) which reported that occupation influences the income level of households which in turn affects the choice of consuming domestic cooking energy sources positively.

Table 2: Mean Score of Factors Affecting Level of Household Energy Sources Consumption among Rural Women in Plateau State

Factors (Variables)	Mean	Standard Deviation	Rank
Age of the occupants	2.99*	0.914	7th
marital status	2.78*	0.893	12th
Husband's age	2.45	0.979	22nd
Household size	2.88*	0.924	10th
Farm size	2.51*	0.989	25th
Literacy level of the household	3.01*	0.992	5th
Average income of the household	2.96*	0.868	8th
Major occupation	2.63*	0.911	21st
Husband's occupation	2.72*	0.913	16th
Participation in Cooperative societies	2.40	0.966	27th
Farm ownership	2.47	0.901	26th
Energy use purposes	2.69*	0.773	18th
Status of the energy source	2.72*	0.766	16th
Kitchen location	2.69*	0.915	18th
Awareness of effects of smoke on health	3.00*	0.913	6th
Type of residence	3.04*	0.773	2nd
Kitchen type	3.02*	0.756	4th
No of meals cooked per day	2.73*	0.895	14th
Type of stove use	2.94*	0.785	9th
Source of energy	3.04*	0.756	2nd
Availability of energy source	3.13*	0.822	1st
Affordability of energy source	2.83*	0.932	11th
Climate	2.73*	0.870	14th
Weather	2.77*	0.870	13th
Individual preference	2.65*	0.917	20th
Not interested in changing the energy in use	2.59*	0.835	23rd
Some energy sources change food taste	2.53*	0.968	24th
wood smoke works as insect repellant (belief)	2.62*	0.868	22nd
Wood smoke increases the life of thatch roof	2.24	0.864	28th

Cut-off Mean ($\bar{x} \geq 2.50$)*

Analysis of Factors Affecting Rural Women's Consumption of Household Cooking Energy Sources

The result in Table 3 discloses an analysis of factors affecting the level of household cooking energy consumption among rural women in Plateau State. Based on the item loadings, the result reveals three classes of factors as presumed from respondents' responses; these classes of factors include Environmental and Cultural factors (Factor 1), Health and Psychological factors (Factor 2) and Socio-Economic factors (Factor 3). Variables with loadings of ≥ 0.30 were considered as high loadings and significant, thus were used in naming the factors

Factors that loaded high under environmental and cultural were the source of cooking energy (0.548), smoky energy source (0.507), and kitchen location (0.369), use of firewood in heating the house (0.321). This result aligns with Laxmi *et al*. (2003) who affirmed that the type of housing, kitchen location, number of

rooms and ventilation conditions were important variables affecting the intensity of fuel utilization among households.

Similarly, health and psychological - factors include time spent in the collection of the fuel (0.698), hardship suffered in fuel gathering and processing (0.739), difficulty in kindling the fuel (0.686), the burden of cleaning after cooking (0.657), efficiency and cleanliness of the energy source (0.429), convenience and safety of the energy source (0.531), ability to manage the energy source (0.378), type of food cooked (0.565), individual preference (0.308), traditional beliefs of the people (0.391), lack of time (0.359) and type of residence (0.567). This result confirms the work of World Bank (2004) that acquisition and consumption of domestic cooking energy sources are associated with the burden of carrying fuel on heads, necks, backs and trekking long distances, the cleaning of utensils and walls after cooking and lack of time for income-generating activities and leisure.

Finally, availability and affordability of the energy source (0.442), age of the household head (0.498), household size (0.641), ownership of the house (0.458), household income (0.473), literacy level (0.503), farm size (0.492), primary Occupation (0.480), the standard of living in the country (0.587) and the number of meals cooked per day (0.473) were found to be highly loaded under socio-economic factors. The findings concur with Nnaji *et al*. (2012) who observed that domestic cooking energy use in Nigeria is dependent on factors such as the standard of living of the country, climate, the type of residence, age of the occupants, and literacy level.

Analysis of Factors affecting Level of Household Cooking Energy Consumption in Plateau State

	Factors		
Variables	**1 Environmental/cultural**	**2 Health/psychological**	**3 Socio-economic**
Source of the fuel (SOF)	0.548*	-0.038	0.327
Time spent in collection the fuel (TSICF)	-0.098	0.698*	0.257
Hardship suffered in fuel gathering/ processing (HSIGAP)	-0.176	0.739*	- 0.032
Difficult in fuel kindle (DIFK)	0.093	0.686*	0.003
Burden of cleaning utensils, walls and floor after cooking (BOCU)	0.024	0.657*	-0.490
Smoky energy source (SES)	0.507*	-0.007	-0.420
Efficiency and cleanliness of the energy source (ECOES)	-0.162.	0.429*	-0.011
Availability and affordability of the energy source (AAOES)	0.277	-0.131	.0.442*
Convenience and safety of the energy source (CASOES)	-0.115	0.531*	-0.009
Ability to manage the energy source (ATMES)	-0.010	0.378*	0.370
Household size (HHS)	0.039	-0.147.	0.641*
Type of food cooked (TOFC)	0.228	0.565*	-0.422
Kitchen location (KIL)	0.369*	0.137	-0.363

Ownership of house (OOH)	0.240	0.280	0.458*
Seasons problem (SP)	0.411*	0.053	0.214
Household income (HHI)	0.191	-0.072.	0.473*
Literacy level of the household (LLOH)	-0.050	0.281	0.503*
Farm size (FAS)	-0.012	0.050	0.492*
Primary Occupation (PO)	0.042	0.237	0.480*
Individual preference (INP)	-0.084	0.518*	-0.001
Tradition and Beliefs of the people (TBOF)	0.186	0.391*	0.071
Use of wood smoke increases the life of thatch roof (UOWSITR)	0.112	0.438*	0.349
Use of firewood in heating the house (UFIHH)	0.321*	0.066	0.087
Not convinced of advantages of other energy sources(NCAES)	0.203	0.379*	0.041
Lack of time (LOT)	0.137	0.359*	-0.013
Standard of living in the country (SOLIC)	-0.280	0.415	0.587*
Type of residence (TOR)	-0.027	0.567*	-0.204
Dangerous to children (DTC)	-0.081	0.352*	0.045
No of meals cooked per day (NOMCD)	0.350	-0.311	0.473*

* < 0.30 not significant
Method: Varimax with Kaiser Normalization
F1 = Environmental and cultural factors
F2 = Health and psychological factors
F3 = Socio-economic factors

Conclusion and Recommendations

Findings of the study submit that animal dung, charcoal, corn stalk, firewood, groundnut shell, leaves/ litters and kerosene were highly consumed in Plateau State suggesting that traditional cooking energy sources were used in meeting household cooking energy needs of rural women in the State. Major factors affecting the level of household cooking energy source consumption in Plateau State include the availability of the energy sources, type and source of the energy, kitchen type, literacy level of the household, awareness of the effect of smoke on health, age of the occupants, average income of the household, type of stove, household size and affordability of the energy source. The study further reveals that the level of household cooking energy source consumption of the respondents was highly affected by environmental and cultural factors, health and psychological factors and socio-economic factors. The study recommends that

REFERENCES

Adepoju, A.O., Oyekale, A.S, & Aromolaran, O. (2012). Factors influencing domestic energy choice of rural households in Ogun State, Nigeria. *Journal of Agriculture and social sciences*, 8 (4): 129 – 134

Agba A, Ogaboh M, Ushie M.E, Abam F.I, Agba M.S. & Okoro J (2010). Developing the biofuel industry for effective rural transformation in Nigeria. *European Journal of Science Research,* 40(4): 441 – 449

Akwa, L., Markus, N.D., & Rahaman, S.A. (2013). Analysis of Fuelwood Utilization among Rural Women in Akwanga Local Government Area of Nasarawa State, Nigeria. *Abuja Journal of Geography and Development,* 3(2):1-7.

Audu, E.B. (2013). Fuelwood consumption and desertification in Nigeria. *International Journal of Science and Technology*, 3(1):1 – 5. http://www.ejournalofsciences.org

Baiyegunhi & Hassan M.B (2014). Rural Household fuel wood energy transition evidence from Giwa L.G.A, Kaduna, *Nigeria Energy Sustainable Development*, 20 (20): 30 – 35

ESMAP (2004). The impact of energy on women's lives in Rural India. UNDP/World Bank for Reconstruction and Development/the World Bank, Washington, D.C, U.S.A, Pp:1 – 86

Food and Agriculture Organisation (FAO) (2004). Forestry and rural development in Africa. Paper presented at the Sixth session of the African Forestry Commission, Arusha, Tanzania – Fo, AFL/8315, Rome.

Jan I. (2012). What makes people adopt improved cookstove? Empirical evidence from rural Northwest Pakistan Renew. Sust. Energy Revs. 16 (5), 3200, (2012)

Laitner J.A., (2000). Energy efficiency: rebounding to a sound perspective". *Energy Policy*, 28 (6/7): 826 – 835

Laxmi, V., Parkh, J., Karmakar, S., & Dabras, P. (2003). Household Energy, women's hardship and health impacts in rural Rajasthan, India: Need for sustainable energy solutions. *Energy for sustainable development*, 7(11):50 – 68.

Ma. L. (2011). Sustainable development of rural household energy in Northern China. *Journal of Sustainable Development,* 4(5): 115 – 9

Manmoman, B., D., Shakunga, J & Bello, S.A. (2015). Farmer's perception of services provided by Extention Workers in Lafia Local Government Area of Nassarawa State, Nigeria. In Proceedings of the 29th Annual Conference of Farm Management Association of Nigeria, held at Dutse, 2015, edited by Haruna U., Izaje, A.U., Abdulhamid, A., Iliyasu, Y., Abdulrahaman, S.N and Katanga, Y.N. Pp 400 – 405

Modi, V., Mcdade, S., Lallement, D., & Sighir, J. (2005). Energy Services for the millennium development goals. Washington DC: Millennium project, UNDP, the World Bank and Energy Sector Management Assistance Program (ESMAP)

Nabinta, R.T., Yahaya, M.K., & Wajide, B.R. (2007). Socio-economic implications of Rural Energy Exploitation and Utilization on Sustainable development in Gombe State. Journal of social science, 15(3): 205 – 211. Accessed from www.knepublishers.com./02journals/i on 15th October, 2014

National Population Commission (NPC) (2010). Nigeria Demographic and Health Survey 2008. Abuja Nigeria: National Population Commission:

State's population in Nigeria, Abuja, Nigeria.

Njong, A.M. & Johannas, T.A, (2011). An analysis of domestic cooking energy choices in Cameroon. European Journal of social sciences. 2011; 20:343 – 347

Nnaji, C.E. & Chukwu, O.J. (2012). Analysis of factors determining fuel use for cooking by household in Nsukka area of Enugu State, *Nigeria Continental J. Environmental Sciences* 6(2):1 – 6 http://www.wiloludjournal.com

Onoja A.O. (2012). Economic analysis of factors influencing fuelwood demand in rural and perin – urban farm households of Kogi state. *Sustainable Development* 8:115 – 127

Ouedrago, B. (2006). Household energy preference for cooking in urban Ouagadougou, Burkina Faso. *Energy Policy*. 34(18): 37873795. www.sciencedirect.com

Oyedepo O (2012). Energy and sustainable development in Nigeria. The way forward for Energy sustainability. *Journal of Social Science,* 215: 2 – 7

Oyekale, A.S., Dare, A.M. & Olugbire, O.O. (2012). Assessment of rural households cooking energy choice during kerosene subsidy in Nigeria: A case study of Oluyde Local Government Area of Oyo state. *African Journal of Agricultural Research* 7(39): 5405 – 5411. http://www.academicjournals.org

Plateau State Government (2012). http://plateau.gov.ng

World Bank (2004). Gender and governance in rural services: Insights from India, Ghana and Ethiopia. Washington, D.C, World Bank.

World Bank (2014). Energy for cooking in Developing Countries: Chapter 15. World Energy outlook, Pp: 417 – 445. Retrieved on 2nd July, 2015 from http://www.undp.org/energy/ipg.html

World Health Organisation (WHO) (2012). Indoor air pollution in developing nations. Air pollution in developing nations. *India journal of energy,* 2-3 1(5): 80

World Health Organization (WHO) (2006). Country Health System fact sheet Nigeria

Yahaya, M., Nabinta, R.& Olajide, B.R. (2007). Gender Energy and Environment Nexus in female farmers. Household Energy Management in Gombe state Nigeria *Anthropologist,* 9(8): 203 – 209. Accessed from www.serchnigeria/.../8/...56834 on 10th August, 2014.