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Effect of women's socioeconomic characteristics on household fuel consumption in Damboa Local Government Area of Borno State, Nigeria

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Abstract
The objective of this study was to investigate the relationship of women's socioeconomic factors and household fuel wood consumption in Dambao Local Government Area (LGA) of Borno State, Nigeria. Forty households were randomly selected from where respondents for the study were obtained. Data obtained from the study were analyzed by the use of descriptive statistics and multiple regression analysis. The result showed that most of the women in the study were forty years and below (75%) while literacy among the women was about 92.5%. Over 45% of the respondents had household size of more than five persons. The study further observed that 97.5% of respondents used fuel wood solely or complimented with other sources of domestic energy. The quantity of fuel wood consumed by respondent households was determined by income, age, family size, and marital status of the respondents. It was recommended that more sustainable ways of consuming fuel wood should be encouraged. Furthermore, other sources of domestic energy such as kerosene, liquefied natural gas and electricity will need to be introduced to rural women in order to reduce the rate of loss of the natural forest in the study area.
Key Words: Fuel-wood, consumption, women, rural area, household

1. Introduction

Various studies on the factors affecting women's socio-economic characteristics on household fuel consumption have been conducted (Adetunji and Adepoju, 2009; Esin, *et al.* 2009). Energy and women are linked in diverse ways particularly through the nature of the predominantly biomass energy, resource base, the characteristics of the household and community economy, the features of energy policy and the position of women in families and communities. Most rural communities of developing countries have less varied access to energy source and essentially depend on traditional fuel mostly procured by women for virtually all their domestic energy requirements.

Fuel sources of biomass origin (woods, twigs, leaves, charcoal, animal dung and crop residue) account for more than 50% of the total energy consumption in rural areas of developing countries. It currently accounts for about 20% of the world's energy supply and is the most important source of energy for about 75% of the world's population (FAO, 1999). level of fuel wood used is not only determined by fuel-wood availability, but the more by labor availability (Brouwer *et al*, 1997) implying that households with larger household sizes who could provide more labour for fetching wood were likely to use more fuel wood than smaller households. According to the "energy ladder" model that originated some decades ago (Masera et al., 2000), households with low levels of income rely on biomass fuels, while those with higher incomes consume more efficient and more expensive types of energy, such as fuel oil, natural gas or electricity. In this scheme, fuel wood is at the bottom of the energy ladder. Quisunbing and Mduccio (2003) observed that most often, women and girls do all the fetching and carrying of fuel wood especially in rural areas. Women have been known to use fuel wood for cooking, heating, and preservation among other uses.

As a result of population increase, man's dependence on wood as a source of fuel and energy has started showing signs of inadequacy. Presently, this level of inadequacy is evident in the alarming rate at which deforestation is taking place due to man's attempt to have a steady supply of fuel wood and other vegetal resources **(**Esin *et al*.,2009). For instance, Esin *et al*. (2009) in their study of the rural fuel wood exploitation in Mbo Local Government Area in Nigeria coastal settlements reported that 90% of the total local energy requirement is from fuel wood, the average per capita production rate of fuel wood in the local area was 0.38m3 and the average per capita consumption rate was 0.36m3. Major areas of local consumption include domestic energy, fish smoking and canoe making. This

indicates that consumption of fuel wood was faster than production, thus, putting the sustainability of fuel wood consumption to question.

Fuel wood is a very common source of domestic energy in the rural areas with few rural women utilizing other sources of domestic energy. Despite a lot of campaign against the prevalent use of fuel wood for domestic energy, it remains the largest source of domestic energy for rural households. The factors responsible for this may be related to the socioeconomic characteristics of the women. This study therefore intends to investigate women's socioeconomic characteristics and their relationship with fuel-wood consumption.

The objective of the study was to analyze the effects of women's socioeconomic characteristics on household fuelwood consumption.

2. Methodology

The study was conducted in Damboa LGA of Borno state, Nigeria. The LGA lie between latitude 10^0 09' N and 10^0 30'N and between longitudes13^0 E and 13^0 25' E. It LGA shares borders with Kaga and Konduga LGAs to the north, Yobe state to the northwest, Biu LGA to the south west, Chibok LGA to the south, Gwoza LGA to the northwest and Adamawa state to the south-east. It covers a land area of about 6,800 KM^2 with a population of 231,573, according to National Population Commission (Census, 2006).

Forty respondents were interviewed and both inferential and descriptive statistics were used to analyze the data from the survey. The descriptive statistics used were mean, frequency distributions and percentages. The inferential statistics used was multiple regressions. The multiple regression model was implicitly expressed as thus

$Y= f(x_1, x_2, x_3, x_4, x_5, x_6, \ldots\ldots\ldots U)$

Where

Y = consumption level of fuel wood (Kg)
X_1 = income (₦)
X_2 = educational status (years)
X_3 = family size (number)
X_4=occupation (Dummy variables)
X_5=age (years)
X_6=marital status (Dummy variables)
U=error term

3. Results and Discussion

3.1 Socioeconomic characteristic of respondents.

The socio-economic characteristics of the respondents were examined with respect to their age marital status, educational background, position in marriage, family size, primary occupation and income. Table1 revealed that 75% of the respondents were 40 years and below indicating that most respondent were relatively young. Most of the respondents were married (65 %) or had been previously married (32.5%). This implies that domestic fuel supply was a concern for family women. Women's involvement with fuel wood was primarily to meet household welfare need. This is in line with the findings of Adetunji and Adepoju (2009), in their finding on household resource management of rural women in Ibarapa east Local Government Area of Oyo state, Nigeria, which they found that out that 91.3% of the respondents were married while 8.7% were single.

Majority of the respondents had secondary educations (60%), while just 5% had adult literacy class. Only about 7.5% of the respondents were illiterates. Over 50% of the married women were first wives while 18% were second and third wives. This indicates that polygamy was not uncommon in the study area. Any increase in the number of wives in a particular household will lead to an additional increase in the level of fuel wood consumed.

Also, the table indicated that 52.5% of the rural women had family sizes of between 1to 5 members while 47.5% of the respondent had 6 members and above. This indicates that almost half (47.5%) of the respondents had relatively large household sizes (6 and above). The implication is that there would be high consumption of fuel wood among the rural dweller leading to an increase in the cost of fuel wood. Most of the respondents were traders (55%) while only 45% of the respondents earned their income from other sources such as teaching and civil service. This shows that they had sources of income with which they could cater for both domestic fuels and other domestic expenses. The study however, further revealed that 67.5% of the respondent earned income below ₦5, 000 monthly while only 32.5% earned income above ₦5000. This indicates that most of the rural women were low income earners. This could limit their capacity to afford domestic fuel (Table 1).

3.2 Types of domestic fuel for household consumption.

Table 2 indicates that 67.5% of the respondent used mainly fuel wood for their domestic purposes, while only 2.5% used mainly kerosene. The others used a combination of sources. This indicates that fuel wood was the major source of domestic fuel in the study area. This was probably because fuel wood was more available all year round than other cheaper sources of domestic fuel like cow dung and corn stalk. This finding is in consonance with the findings of Broumer and Falcao (2004) which in their study on wood fuel consumption in Maputo, South Africa. The probable consequence of the apparently high demand for fuel wood is that more forest will be depleted to meet the demand, thus increasing deforestation.

3.3 Relationship between women's socio-economic characteristics and source of domestic fuel consumed.

The result of the regression analysis (Table 3) shows that income and age of the respondents were positive and significant at 5% level. This indicates that the higher the income of the respondents, the higher would be the level of fuel wood consumed. It's also shown that the coefficient of age of the respondents was significant at 5% and has a great effect on the level of fuel wood consumed, in that as the age of the respondents' increases, family size also increases thereby indicating an increase in the level of fuel wood consumed. It also shows that the others who did not earn enough to purchase fuel wood probably fell back on substitutes like cow dung and corn stacks to meet their domestic energy needs.

The result of the analysis further shows that educational status and occupation were not significant implying that fuel wood consumption was determined by women's economic power more than their education or occupation. It was also observed that family size was significant at 1% level. This indicates that increase in the family size will bring about proportionate increase in the level of fuel wood consumed. Marital status was significant at 1% indicating that marital status has great effect on the level of fuel wood consumed, in that marriage was one of the factors that enhanced increase in household size. Any increase in family size due to marriage was expected to lead to an increase in the level of domestic fuel wood consumption. The forgoing discussion indicates that the level of fuel wood consumed increased as women's income, family size and age increased and as the number of married women increased.

3.4 Conclusion and Recommendation

Women play important role in agricultural and non-agricultural activities especially in fetching fuel wood, crop harvesting, post harvesting operations, homestead and gardening. Shortage of domestic energy (fuel wood) is forcing them to break away from their traditional roles of housewives into fuel wood fetchers. The findings of the present study reveal that socioeconomic characteristics such as: Income, family size, age and marital status is substantial. Moreover the following conclusion can be made from the summary of the findings of the present study.

Women play very important role in meeting the domestic needs of their households like food preparation, child care, food preservation and processing among others. These domestic needs of household often require domestic energy to get them done. Women are therefore often very involved with domestic energy provision for their households. Rural household have been found to commonly consume large amount of fuel wood as domestic energy source compared to other sources. This was found to be so notwithstanding the level of education of the women. Fuel wood was used for rural household increasingly as women's family size and number of married women increased. Increasing level of women's income and age were also determinants of fuel wool consumption in the study area.

It is recommended that more sustainable energy sources like gas, fuel wood energy saving stoves and renewable energy sources should be introduce to the people at subsidized and affordable prices to make them accessible to households whose income is sometimes very small. Family planning should also be encouraged among women to make for future reduction in household size, in other to reduce consumption of fuel wood.

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Table 1: Socio-Economic Characteristics Distribution of the Respondents.

Variable	Frequency	Percentage
Age- group (yrs)		
≤20	4	10
21-30	16	40
31-40	10	25
41-50	7	17.5
>50	3	7.5
Total	40	100
Marital status		
Married	26	65
Widowed	4	10
Separated	5	12.5
Divorced	4	10
Single	1	2.5
Total	40	100
Level of education (yrs)		
No formal education	3	7.5
Primary education	3	7.5
Secondary education	24	60
Tertiary education	8	20
Adult literacy class	2	5
Total	40	100
Position in marriage		
1st wife	22	55
2nd wife	15	37.5
3rd wife	3	7.5
Total	40	100
Family size		
1-5	21	52.5
6-10	13	32.5
11-15	6	15
Total	40	100
Occupation		
Teaching	8	20
Trading	22	55
Civil servant	7	17.5
Others	3	16
Total	40	100
Level of monthly income (₦)		
<5000	27	67.5
5000-24999	7	17.5
25000-44999	2	5
45000-64999	2	5
65000-84999	1	2.5
≥85000	1	2.5
Total	40	100

Source: Field Survey, 2011

Table 2: Distribution of the Type of Domestic Fuel for Household Consumption

Type of fuel	Frequency	Percentage
Kerosene	1	2.5
Fuel wood	27	67.5
Cow dung and fuel wood	2	5
Charcoal and fuel wood	3	7.5
Corn stalk and fuel wood	2	5
Both kerosene and fuel wood	5	12.5
Total	40	100

Source: Field Survey, 2011.

Table 3: Result of Regression Analysis

Variable	Coefficient	Standard error	t-value
Income	0.16	0.064	2.614**
Educational status	0.008	0.090	0.086^{ns}
Family size	0.281	0.059	4.799***
Occupation	0.215	0.203	1.061^{ns}
Age	0.248	0.096	2.590**
Marital status	0.333	0.072	4.600***
Constant	3.441	0.989	3.478
R^2	0.612		

Source: computed from field survey data, 2011. *** and ** are significant levels at 1% and 5% respectively while ns= not significant.

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