FUELWOOD TO CHARCOAL PRODUCTION IN THE NEW JUABEN MUNICIPALITY OF THE EASTERN REGION OF GHANA CHALLENGES AND OPPORTUNITIES IN SEEKING LIVELIHOOD

Jamal Mohammed,

Lecturer,
Department of Liberal Studies,
Koforidua Polytechnic, Koforidua, Eastern Region, Ghana.

Isaac Tetteh Jnr,

Past Students,
Department of Accountancy,
Koforidua Polytechnic, Polytechnic,
Koforidua, Eastern Region, Ghana.

Mercy Mills,

Past Students,
Department of Accountancy,
Koforidua Polytechnic, Polytechnic,
Koforidua, Eastern Region, Ghana.

ABSTRACT

Excessive utilization of forest resources like fuelwood for charcoal production is a perturbing occurrence in the New Juaben Municipality. Using the case of New Juaben Municipality, this study looked at the opportunities and challenges of charcoal production in this area of Ghana. The researchers used both structured and unstructured questionnaires to collect data from the commercial producers and simple regression analysis undertaken. The study revealed that charcoal production is an income generating activity, although it presents dismal environmental consequences to forested resources. Although commercial charcoal production has been perceived to be harmful to the environment, closing the industry is challenged by its role in employment creation and the provision of household income. The charcoal activity provides an average monthly income of GH¢50 per producer in the study area. Live trees, essential for the sustenance of lives are preferred over dead trees by charcoal producers because they produce quality charcoal. To achieve a weighing scale between forest protection and livelihood sustainability, there is the need for the adoption of efficient and appropriate technologies and strategies like the mobile metal kiln method for charcoal burning. The excessive cutting of tree species for charcoal has brought about unpleasant ecological outcomes. The method applied by charcoal producers thus, traditional earth method frequently brings about bush fires, causing rigorous harms to the already suffering vegetation.

Keywords: Fuelwood, charcoal,new juaben municipality,challenges, opportunities.

INTRODUCTION:

It is increasingly recognized that, fuel wood plays a major role in the energy requirements of many developing countries. According the Food and Agriculture Organization (FAO), 2000), fuel wood supplies about 95 percent of the domestic and commercial cooking energy needs in the developing countries. In Africa, energy consumption in rural areas is still low and is limited mainly to fuel wood. Majority of African households depend on traditional fuels to meet their daily energy needs and this is most likely to continue for many years to come (Kituyi, 2002; Mwampamba, 2007). Available estimates indicate that over 90% of the people in Africa depend on either firewood or charcoal for cooking and other heat applications (Kituyi, 2002; Temu, 2002 cited in Erakhrumen et al., 2010). Similarly, in Ghana, the bulk of energy supply is from fuel wood which accounts for about 65% of the country's energy supply mix (Energy Commission, 2010a).

According to the UNDP, household energy consumption in Ghana is primarily for cooking and lighting with about 72% of total energy consumption at household level used for cooking (UNDP, 2012). The UNDP further stressed that more than 90% of this is from fuel wood (firewood or charcoal), and LPG and electricity use which are considered as cleaner fuels together account for less than 7%. Duku et al (2011) also noted that about 68% of the population in Ghana lives in rural areas, where biomass (charcoal, wood residues, crop residues and human/animal waste) constitutes the dominant source of energy for household use.Since a majority of Ghanaian households (about 80%) depend on fuel wood for cooking and water heating, the demand for fuel wood has for the past years been on the increase and this trend is expected to continue (Energy Commission, 2010a).

Fuel wood is used by more than 90% of the rural population for cooking, whilst charcoal consumption dominates urban cooking and heating fuels with about 70% of city dwellers depending on it. Stosch and Quaye (2002) also noted that about 31% of all families in Ghana; and about 70% of households in the capital city, Accra, are using charcoal for cooking.

Fuel wood and charcoal are also used mainly for some industrial practices like brewing, baking and fish smoking, and so on. Thus, fuel wood also serves as a source of livelihood for most rural people and the increasing number of urban dwellers engaged in the charcoal and fuel wood trade (Anang et al., 2011).

Despite these benefits, the consumption of fuel wood is plagued with numerous problems such as non-sustainability, inefficiency and waste resulting in environmental degradation, forest depletion and reduction of the carbon sink, and there are also concerns about the health hazards from continued smoke inhalation by charcoal producers and firewood users (Eco-discipline, 2012).

The detrimental effects of charcoal production on the environment have raised a growing concern among policy makers, environmentalists and managers of forest resources (Anang, 2011). This concern of the negative effects of charcoal production in Ghana is due to the fact that 90% of the wood fuel supply in the country is derived directly from the natural forest (Sekyere and Okyere, 2007). In Ghana, charcoal is exclusively made by felling of trees with about 90% production made at the site of individual felled trees while the remaining 10% is made from off-cuts from sawmills processing felled trees (Anang et al., 2011).

Although commercial charcoal production has proven to be harmful to the environment, closing the industry is challenged by its role in employment creation and the provision of household income. Thus, studies are needed on how to harness the benefits of charcoal production in the country in a sustainable way.

The importance of charcoal for rural livelihood has resulted in many studies looking at the benefits and challenges of charcoal production and demand in many parts of Ghana. Most of these studies have, however, focused on rural Ghana, and there is little studies on this subject in urban areas of the country.

The main aim of this study is to assess the challenges and opportunities of fuelwood to charcoal production in the New Juaben Municipality.

Some of the specific objectives that will help in addressing the research questions are as follows;

- To identify the determinants of fuelwood on the environments.
- To investigate the reason for the usage of fuelwood and charcoal production.
- To identify the impact of fuelwood use on the environment.
- To identify the challenges and opportunities associated with the usage of fuelwood for charcoal production.

METHODOLOGY:

A case study design was adopted for the study. The Case study design is a research methodology and also an investigative tool that is commonly used in studying social phenomena (Babbie and Mouton, 2004).

The study adopted both primary and secondary sources of data in order to accomplish the study objectives. An

in-depth interview was held with key informants within the target population. This technique was adopted to collect data from charcoal producers. The secondary sources on the other hand involved published and unpublished documentations such as reports and journals that provided the conceptual framework and a definite meaning to the topic. The secondary sources provided information on the list of charcoal producers, charcoal production activities in other developing countries and projections from Energy Commission.

A combination of a well-structured questionnaire, duly designed to cover the key research objectives and personal interviews were undertaken to obtain information from the respondents. The researchers used simple random sampling and snowball sampling techniques in this study since respondents had to be referred to in order to be interviewed. This technique was chosen to represent a fair basis of sampling among all the towns in the municipality. The selected technique was to aid the researchers administer questionnaire to only respondents under the study.

A sample size of eight (8) respondents each in Koforidua, Asokore, Oyoko, Korle Kwanta, and Nyerede Trom, totaling 40 respondents were chosen for the study. The study therefore modeled a simple regression based on the socio-economic characteristics of the respondents to analyze the respondents' behaviour. In all, both qualitative and quantitative analysis were employed to enhanced the validity of the research findings.

OPERATIONAL MODEL SPECIFICATION

This study specified an Individual Travel Cost Method (TCM) operational model to explain the behaviour of respondents' with regard to socio-economic characteristics and harvest of fuelwood for charcoal production. This model takes the form:

$$V_i = \alpha_0 + \alpha_1 TC_i + \alpha_2 Y_i + \alpha_3 Edu_i + \alpha_4 Age_i + \alpha_5 Talt_i + \varepsilon_i$$

Where: V_i= number of visits for fuelwood for charcoal production by each individual I, α_0= intercept, TC_i= travel cost for fuelwood for charcoal productionby each individual i (expressed in cedis per visit), Y_i = income derive from charcoal production by each individual i (expressed in cedis) , Edu_i = education level of each individual i (years), Age_i = age of each individual i (years), $Talt_i$ = travel cost to an alternative site by each individual i (expressed in cedis per visit), ε_i= error term, which allows for any other factor that has not being included in the tripgeneration function, but which is expected not to affect the value of the coefficients.

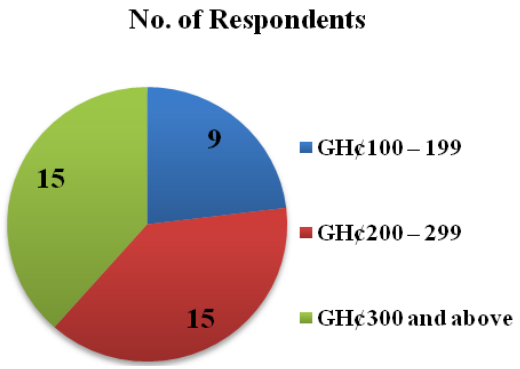
RESULTS AND DISCUSSIONS:

Table 1:Gender Distribution of Charcoal Producers

Gender	Number of Respondents	Percentage (%)
Male	31	78
Female	8	20
Unretrieved	1	2
Total	**40**	**100**

From the above table, thirty (31) out of total respondents of thirty nine (39) who produce charcoal in the New Juaben Municipality which form 78% are males and eight (8) which aggregate 20% are females. Hence, charcoal production is a male dominance activity in this area.

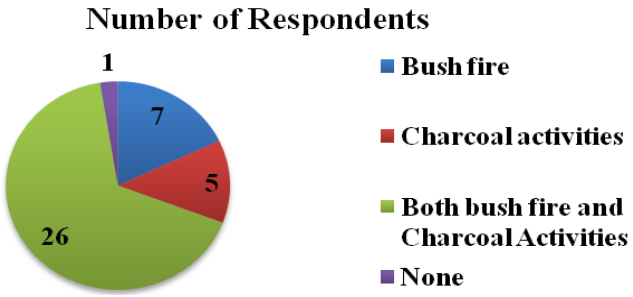
Figure 1. Monthly Highest Level of Income



The above figure 1 shows that, nine (9) respondents out of thirty nine (39) respondents earn between Gh¢100 – Gh¢199, fifteen (15) respondents earn Gh¢200 – Gh¢299 and fifteen respondents earn above Gh¢300. This

results reinforce the fact that, charcoal production provides employment And as such act as a safety net for poverty reduction.

Figure 2 :Perceived Causes of Forest Cover Reduction



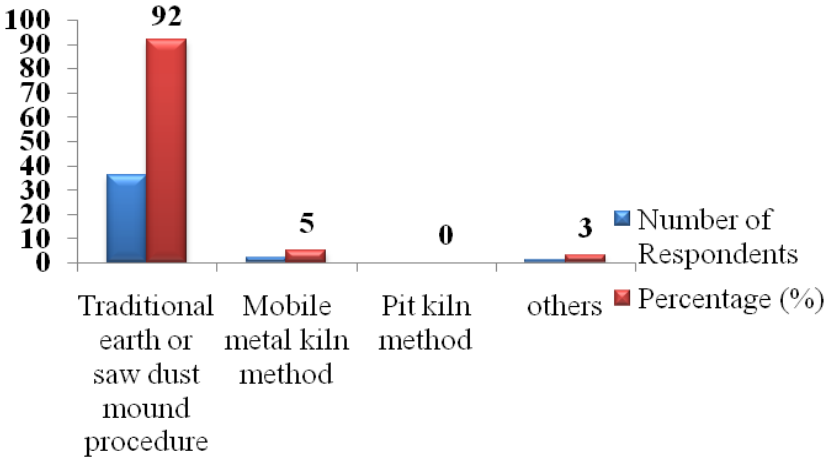
The figure 2 above details out the opinions of the various respondents the researchers interviewed on the causes of forest cover reduction. It was realized that, about twenty six (26) of the respondents were of the opinion that, reduction of forest cover was happening as a result of both bush fire and charcoal activities. This finding confirmed what Sankhayan and Hofstad (2001) have argued that, the widespread demand for fuelwood is linked to a number of environmental problems, including deforestation, biodiversity loss, climate change and land degradation.

Figure 3: Effects of Commercial Charcoal Production on the Vegetation

Source: (google.com)

The above figure 3 from Google further elaborates the consequences of fuel wood harvest for charcoal production.

Figure 4:Method of Charcoal Production in the Municipality



In the production of charcoal, several methods can be adopted and used. This study sought to identify the method used by respondents in the New Juaben Municipality, it was revealed that, the traditional earth or saw dust mound procedure was highly used by the people and 5% were using the proffered method which is the mobile metal kiln method. This demonstrated that, sustainable use of forested resources was compromised and therefore, sustainable development may not be guaranteed.

Table 2. Regression Model Results

VARIABLES	PARAMETERVALUES (COEFFICIENTS)	STANDARD ERRORS	t- VALUES
CONSTANT	7.783	0.152	47.393
*TRAVEL COST	-0.234	0.030	-3.434
*INCOME	-0.506	0.010	-31.282
*EDUCATION	- 0.030	0.050	-4.120
AGE	0.014	0.082	0.982
ALTERNATIVE	0.157	0.090	1.853
R^2= 95%	ADJUSTED R^2= 94%	DW= 1.785	

DEPENDENT VARIABLE:
Number of Visits to Harvest Fuelwood for Charcoal:

From the Table 2 above, the coefficient of the travel cost variable is (-0.234) which shows that as the individual travel cost increases, the number of visits to harvest fuelwood for charcoal decreases by 23.4%. Similarly, the coefficient of the income variable is (-0.506) signifying that as the individual income increases, the number of visits to harvest fuelwood for charcoal decreases. The coefficient of the education variable is -0.030 which means a negative relationship with the number of visits to harvest fuelwood for charcoal. This shows that, those who are educated to the highest level probably may divert their employment portfolios and seek different jobs to charcoal production. Empirical literature showed that an individual level of education influence the choice fuel as found by Muyeye (2004). But, both age and alternative places visited for fuelwood for charcoal were not significantly different from zero at 5% level.

CONCLUSION AND RECOMMENDATIONS:

The objective of the study is to assess the challenges and opportunities of Fuelwood to Charcoal production. The enormous majority 92% of charcoal producers in the study area employ the traditional method of charcoal production. This method, also known as the earth mound method threatens the forest resources sustainability.The charcoal industry has been of significant assistance to the lives of charcoal producers. According to charcoal producers in the municipality, the industry enables them to acquire basic items necessary for their sustenance. The excessive cutting of tree species for charcoal has brought about unpleasant ecological outcomes. The method applied by charcoal producers thus, traditional earth method frequently brings about bush fires, causing rigorous harms to the already suffering vegetation.
There is the need for the Government to reduce or highly subsidize the prices of petroleum gas to reduce the high rate or the dependent rate on the usage of Charcoal as means of preventing the reduction of forest cover.There is the need for the Government and the Municipality to render more educational services on the cutting of trees. Massive creation of awareness on resource management and cutting and planting of trees could ease the pressure on the forest cover.Applying modern methods such as the mobile metal kilns and pit kilns ensures efficiency in the conversion and production of charcoal.

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