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Economic evaluation of the contribution of fuel wood to the livelihood of rural households in Oyo state

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ABSTRACT

In Sub-Saharan Africa, forest goods and services are extremely important for rural livelihoods, providing food, medicine, shelter, fuel and cash income. However, the national statistics on the contribution of forest products to the country's economy are extremely poor. This study seeks to evaluate the economic contribution of fuel wood to the livelihood of rural households in Ibarapa Central LGA of Oyo State. Sixty copies of questionnaires were administered to rural households in six randomly selected villages from the LGA. Descriptive statistics such as frequency and percentages were used to describe the socio-demographic characteristics of the respondents while regression analysis was used to analyse the factors influencing the economic growth among the fuel wood traders in the study area. The findings indicated that fuel wood business is a very lucrative job in the study area judging from the rate of profit realized from the business because for every N1 spent in the sale of fuel wood by the respondents in the study area, 70 kobo was realized as profit. This is so due to an active involvement of family labour in the business which drastically reduces the cost that might have been incurred if such labour is hired.

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Introduction

In Sub-Saharan Africa, forest goods and services are extremely important for rural livelihoods, providing food, medicine, shelter, fuel and cash income (Kaimowitz, 2003). It is estimated that more than 15 million people in Sub-Saharan Africa earn their cash income from forest-related enterprises such as fuel wood and charcoal sales, small-scale saw-milling, commercial hunting and handicraft. In addition, between 200,000 and 300,000 people are directly employed in the commercial timber industry (Oksanen and Mersmann, 2003). For some countries, the forestry sector is an important foreign exchange earner. For example, between 1993 and 2002, the value of net exports of various wood-based products from countries in sub-Saharan Africa amounted to more than US\$2 billion (FAO, 2003). However, the national statistics on the contribution of forest products to the countries' economies are extremely poor (Mabugu and Chitiga, 2002; FAO, 2004; Vincent, 1998) and only in a few countries are there comprehensive government programs of environmental accounting where forestry contributions to the national accounts are captured, e.g. South Africa (FAO, 2004; World Bank, 2006). There is often a strong link between protected areas and the livelihood of local communities. Many rural populations living near to protected reserves depend on them for land, and other environmental resources and services to meet their livelihoods (Salafsky and Wollenberg, 2000).

However, this dependence often contributes to a state of continuous conflict between local communities who carry out subsistence extraction, and administrators trying to restrict the level of extraction. As such, subsistence extractors in protected areas often face greater regulation, policing and fines (Nagothu, 2001). A similar pattern of dependency by local communities on natural resources and conflict between local communities and government institutions exist in Nigeria.

Use of Firewood and Livelihood:

About two billion people use firewood and charcoal as their main source of energy for cooking and heating their homes in the world (CIFOR, 2009). It is estimated that 80% of the Swazi population lives on communal Swazi Nation Land (communal land) and use fuel wood for cooking and heating. Rural households in developing countries, including Nigeria collect food, firewood, medicinal plants and construction materials directly from the forest. The factors that condition a household's economic reliance on forest resources vary depending on the resource endowment of the household, the household's demographic and economic characteristics and other factors such as markets, prices and technologies (Babulo et al., 2008). Forest resources represent a common heritage and tend to be shared by a great majority of people (Nkem et al., 2007). People have realized a business in firewood selling. When driving along the major roads of the country, one is welcomed by piles of firewood on the roadside. The firewood is sold mainly to motorists driving along these roads. Because of the high rate of unemployment many people are joining the firewood selling as a source of income. These leads to an increase in the demand of firewood from the forest and people end up cutting standing trees that are not dry and deforestation is encouraged.

Sustainable Use of Forest Resources:

For sustainable use of wood the site must be maintained with a variety of tree species of various ages and the harvesting practices must select only those trees that can be removed without damaging the forest ecosystem (Natural Resources Canada, 2007). In a study undertaken by the New South Wales (NSW) Scientific Committee it was found that accelerated and ongoing removal of standing dead trees and woody debris on the ground caused by human activity was a factor contributing to loss of biological diversity (NSW Scientific Committee, 2007).

Examples of the process included illegal or poorly regulated firewood collection from forests or woodlands. From an environmental point of view managed forests provide climate change mitigation benefits over time through sequestering carbon, and thus reducing the amount of carbon dioxide released in the atmosphere (Ruddell et al., 2007). Integrated natural resources management, including the management of forest resources can play a vital role in rural development, from both agricultural and environmental perspective (Twomlow et al., 2008). Firewood is a valuable source of renewable energy in South Western Nigeria. Burning wood to warm homes has been part of dominant culture of people of Oyo State for centuries. Dead trees and fallen timber are vital habitat for a diverse range of fauna. Not only does standing and fallen dead wood provide habitat for fauna, but it also plays an essential role in maintaining forest and woodland nutrient cycles. This study therefore seeks to evaluate the economic contribution of fuel wood to the livelihood of rural households in Oyo State.

Methodology Study area

Study area

The study was carried out in Ibarapa Central LGA of Oyo State. The area is located in the heart of Ibarapa land and the people in the area are predominantly from Yoruba tribe. It is situated in the derived/guineas savannah agro-ecological zone with between 1700-2200mm annual bi-modal rainfall and with mean annual temperature of 27^{0} C. The pedological characteristics of the area revealed that the soil is loamy and sand-loam which invariably allows it to support both arable and perennial crops ranging from maize, sorghum, tomato, watermelon, golden melon, cassava, yam, it support the growth of some crops such as cashew, mango, guava, oil palm among others. The LGA is endowed with natural forest.

Data Collection

Data were collected with the use of questionnaires. Sixty copies of questionnaires were administered to rural households in six randomly selected villages from the LGA (Kondo Ogundele, Akeroro Imeleke, Ekuku and Tobalogbo). These villages are spatially located and the number of questionnaires administered was proportional to their respective total population.

Data Analysis

Descriptive and Inferential statistical tools such as frequency and percentages were used to describe the sociodemographic characteristics of the respondents. Regression analysis was used to analyse the factors influencing the economic growth among the fuel wood traders while gross margin analysis was used to analyse the profitability of fuel wood enterprises in the study area.

Results and discussion

A. Socio-Economic Characteristics of Respondents

The socio-economic characteristics of fuel wood sellers are presented in table 1 below.

It was observed that seventy five percent (75%) of the respondents were in the work force age range, with average age of 45 years. Fuel wood enterprises is female dominated, of which about 50% of them are married, and 65% of them are educated putting them in good stead for forest products development and utilization. It was also discovered that most fuel wood traders are educated (65%) .Average household size was 6 which are near moderate, and the average income was N10, 000 which is low compared with the household size, thus they need financial assistance in form of credit.

B. Economic Contribution of Fuel Wood to Respondent Livelihood

Table 2 shows the regression model determining the economic contribution of fuel wood to respondent livelihood.

The estimated coefficient on the t-test variable household size of the respondents is positive and statistically significant. The household size is a determinant factor as it has positive correlation to the livelihood of the respondents. It therefore implies that the household members may be probably responsible for the labour used for the business. The coefficient analysis on the labour type was also positive and significant at 5% level. This implied that an increase in the choice of labour i.e. family labour leads to increase in the corresponding contributions of fuel wood business to their livelihood, this conformed with Reig-Martínez, et al (2001) who reported that family labour is usually the most important cost item for small farms. Without taking transaction costs into account, the farmer will allocate optimally his own and his family's labour when marginal labour product equals the wage rate that represents opportunity costs of farm labour. Agricultural household literature provides an analytical framework to treat family's labour shadow price (Singh et al. 1986). This literature has pointed out that the household's utility could depend not merely on the household's total labour supply but on its allocation between on-farm and off-farm employment. This would be the case if farmers have a clear preference for self employment as opposed to a wage-earning activity. Also, transactions costs and the need to supervise hired labourers can prevent household labour and hired labour being perfect substitutes in production. The shadow price of on-farm household work could therefore be exogenously determined only under unrealistic assumptions, as equal either to the off-farm rate or to the hired labour wage rate (López, 1986). Consequently, in many cases an endogenous shadow wage rate must be computed, according to farm production technology, output and input prices. The estimated coefficient on the t-test variable sales measurement is negative and significant at the 5% level. This is an indication that measurement in the sales of fuel wood by the supplier during delivery reduces the profit margin expected to be made and the profit increases when the delivery is done without standard measurement. Age variable is another significant factor that determines the contribution of fuel wood enterprises to the livelihood of the respondents in the study area. Its estimated coefficients are negative and significant at 5% level. This therefore indicate that the more the age of the respondents, the less their economic contribution to the livelihood of the households since most respondents are in their active age which in turn boost the economic status of their respective households. C. Cost And Returns From Fuel Wood Sales

The cost and benefit derived from sales of fuel wood is derived using gross margin analysis expressed as:

GM = TR - TVC	Equation (i)
NI = GM - TFC	Equation (ii)
Where GM = Gross Margin	- · · ·
NI = Net Income	
TVO = Total Value of Output,	
TVC = Total Variable Cost	
TFC= Total Fixed Cost	

The budgetary analysis in table 3 implies that every fuel wood activities on the average would generate total revenue of N 180,200 each month. The total variable cost and the total fixed cost were N 46,600 and N-20, 000 respectively. The economic efficiency for the fuel wood business was 1.70 which implies that for every N1 spent in the sale of fuel wood by the respondents in the study area, 70 kobo was realized as profit.

Table !	: Distri	ibution	of fai	mers	according	to	their	Socio-	economic	charao	eteristic	CS

Socio-demographic Characteristics	Frequency	Percentage				
Age						
< 30	12	20.0				
31-40	12	20.0				
41-50	12	20.0				
51-60	9	15.0				
60+	15	25.0				
Total	60	100.0				
Gender						
Male	18	30.0				
Female	42	70.0				
Total	60	100.0				
Marital_Status						
Single	9	15.0				
Married	30	50.0				
Divorced	3	5.0				
Widowed	18	30.0				
Total	60	100.0				
Level of Education						
No formal education	21	35.0				
Primary	18	30.0				
Secondary	15	25.0				
Tertiary	6	10.0				
Total	60	100				
House Size						
<3	24	40.0				
3-5	27	45.0				
6-7	6	10.0				
>7	3	5.0				
Total	60	100.0				
Average Monfhly Income	2					
< 5000	10	16.7				
5000 - 9000	15	25				
10000 - 14000	25	41.6				
15000 +	10	16.7				
Total	60	100				
Profitability						
Highly profitable	12	20.0				
Moderately profitable	34	56.7				
Partially profitable	14	23.3				
Total	60	100				
Sou	Source : Field Survey 2012					

Table 2: Regression Model Determining The Economic Contribution of Fuel Wood

Predictors	Co-efficient	Std. Error
X ₁ Household Size	0.568*	0.246
X ₂ Firewood Source	0.013	0.355
X ₃ Labour Type	0.510	0.276
X ₄ years of Experience	-0.004	0.356
X ₅ Alternative Income Source	0.354*	0.125
X ₆ Stock period	0.108	0.301
X7 Point of Sales	-0.036	0.159
X ₈ Sales Measurement	-0.241*	0.219
X ₉ Variable Input Type	0.017	0.197
X ₁₀ Age	-0.200*	0.247
X ₁₁ Sex	-0.016	0.345
X12 Marital Status	0.030	0.204
X ₁₃ Education	-0.115	0.135
Constant	-0.398	0.807
N	60	
R2	2.080	
Adjusted R2	0.219	
F- value	0.422	

		So	urce: Fiel	d Surve	v 2012		
 -	~				y 2012	 	-

Table 3: Cost And Returns From Fuel Wood Sales

Items	(44)
Total Revenue	180,200
Hired Labour per month	16,000
Transport Cost	25,500
Cost of rope per bundle	500
Cost of wedge per one	800
Cost of axe per one	2,800
Cost of cutlass	1,000
Total Variable Cost	46,600
Gross Margin (TR - TVC = GM)	46,100
Total Fixed Cost	20,000
$Profit = \pi = TR - (TVC + TFC)$	113,400
Profit	113,400
Efficiency Level = Total cost	66,600
-	= 1.70

Source: Field survey 2012

The profit margin is so wide in such a way that the household welfare will be economically improved. This follows the apriori expectation as it was reported by Azeez *et al* (2011) which stated that the economic efficiency for the enterprises was 1.10 which implies that for every N1 spent by the wood craft entrepreneurs in the study area on wood craft production, 10 kobo was realized as profit.

Conclusion And Recommendations

This study revealed that rural women are dominant in fuel wood enterprises which serve as alternative source of employment and render them less dependent. It was also discovered that most fuel wood traders are educated (65%) which is an indication that the rate of unemployment is on high side considering the fact that all these people should have taken the business as secondary occupation rather than primary occupation. Similarly, The findings indicated that fuel wood business is a very lucrative job in the study area judging from the rate of profit realized from the business because for every N1 spent in the sale of fuel wood by the respondents in the study area, 70 kobo was realized as profit This is so due to an active involvement of family labour in the business which drastically reduces the cost that might have been incurred if such labour is hired. It was also discovered that age factor assist the fuel wood traders as most of them are in their active working age which increases their level of productivity in the business. As a result of huge profit derivable from the business, more people tend to be engaging in the business which therefore has direct and/or indirect implications on the environment. Therefore, alternative energy sources such as constant electric power supply, gas energy and kerosene should be made available, accessible and affordable for all particularly the rural poor who engage in fuel wood business in order to ameliorate the impacts of fuel wood cultivation on the eco system. Similarly, Government should as a matter of necessity provide more job opportunity for the people, men and women, youths and adults in order to improve the livelihood of the people. Improved awareness and on family control reorientation must be embarked upon strategies by the concerned authorities so that people will bear the number of children they can conveniently cater for as it was obvious from this findings that rural poor used their children as a source of labour.

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