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EFFECT OF INSURGENCY ON THE SUPPLY OF FIREWOOD (FUELWOOD) IN MAIDUGURI METROPOLIS, BORNO STATE, NIGERIA

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ABSTRACT: The study described the socio-economic characteristics of the respondents in the study area, determined the profitability of firewood sellers, assessed the effect of insurgency on firewood supply, determined the relationship between income of sellers and effect of insurgency and identified the constraints associated with firewood business in the study area. The study used both purposive and random sampling techniques to select wards mostly affected by the insurgency and the number of firewood sellers. Data were analysed using both descriptive and inferential statistics. The result of the study showed that majority of the respondents firewood sellers which amount to 63% were within the age bracket of 31-40 years, most of them were males 80%, almost all were married 91%, majority of them about 62% had no formal education, most of them had a household size of 5-10 people, that is 63%, majority of the firewood sellers about 61% operated within medium scale, their primary occupation is trading 70%, most of them sourced their capital from family and friends that is 75%, and most of them used family labour about 61%. The result on the Net Farm Income/month of firewood sellers was N24,000.00/month which was considered profitable despite the insurgency. It was also revealed that the major effects of insurgency on fuel wood sellers included destruction of life and property (86%), restriction of movement (83%) and increase in price of agricultural commodities (70%). The result of the multiple regression analysis had shown that there exist a negative relationship between the variables such as destruction of life and property, restriction of movement, hindering economic activity, poverty, increase in cost of transport, increase in price of firewood and increase in tax and these are the determinants of income. Finally, the major constraints of firewood business were found to be inadequate capital, high cost of resources/raw materials and transportation problem. It is recommended that the firewood sellers should be empowered financially by financial institutions as well as the government in order to boost their business.

Key words: Insurgency, Firewood, Fuelwood profitability, food security, Borno State, Northeast, Nigeria

1. INTRODUCTION

The Merriam-Webster Dictionary version 2.0 defined insurgency as a rebel or revolutionary action of an illegal or informal body rising in opposition against a legal body. While the United States Department of Defense (USSD, 2007) defined insurgency as an organized movement aimed at the overthrow of a constituted authority. It is generally believed to spring up from lack of central state attention to the problems of the population

in such area, one of the typical root causes is a combination of ethnic marginalization and economic grievances. This enhances greatly for radicalized religious or political group.

Insurgency also refers to the use of violence lasting more than a few hours against and established government by a substantial number of people who did not occupy formal authority or rule (Flores, 2004). Restakis (2006) stated that over the course of the last two centuries there

has been an ongoing struggle to interpret and relate the practical aspect of economics and the development of economic institution to the question of social benefits.

In Nigeria, according to Ovaga (2012) the claims and agitations for resource control by the Niger-Delta region, which in practical term means demand for larger share of the oil revenue, marked another calamity and misfortune to meet up with such demand and this led to the Militant Groups of the region taking arms against the Nigerian Government. The timely intervention of the Government is helping to quench the burning flame ignited by the Militants.

While conflicts are at the basis of food insecurity situation in many countries, it is also true that raising agricultural productivity and reducing hunger and malnutrition in poor countries is an obvious path to peace. Predominant among the factors that constrained agriculture in West Africa are stable challenges which include conflict and political instability (Merrick, 2014).

Flores (2004) stated that Nigeria as a Nation is under a severe internal socio-economic and security threats. More recently, Boko Haram a dreaded Islamic Sect, sprung up in North-Eastern Nigeria, particularly Borno State in the year 2000. The sect preached against western education and claimed that it is prohibited. This is the belief the sect emphasized and their belief later metamorphosed into killing anyone that disliked their opinion. The Boko Haram Insurgency in Northern Nigeria and Borno State in particular recorded a high mortality rate consisting mainly of youths most of whom make up the source of labour in the subsistence farming system. A lot of the youths were captured and forced to join the insurgents while others joined the vigilante group. The insurgency situation which later spread to other parts of the country especially the North-east causing destruction of lives and properties. Production and supply of agricultural commodities were faced with challenges. One of the product affected by insurgency is Fuelwood which is a major source of house hold fuel for the people of Borno State (Flores, 2004).

Billions worldwide make use of non-timber forest product for food, medicine, building materials and fuels (Suleiman *et al.*, 2017). One of the important non-timber forest product is fuelwood, understood as minimally processed firewood, charcoal and other solid fuels. Globally, more than three (3) billion people rely on this type of solid fuels particularly in developing countries, empirical research focuses predominantly on Africa (Ebe, 2014).

In Nigeria, the demand and supply for fuelwood is very high because more than 80% of households use fuelwood

for their cooking, making it the most used form of cooking energy. The over dependence on fuelwood in the country has been attributed to its availability and affordability compared to the other sources of energy (Maurice *et al.*, 2015).

Daily consumption of firewood by the rural communities in Nigeria is estimated at 27.5million kg/day (Azeez *et al.*, 2014). The estimated annual requirement of fuel wood in Nigeria is about 55million cubic meter m^3 of which 40million m^3 is for firewood and poles while industrial wood (timber, paper etc.) amount to about 5million m^3 . On the other hand, the estimated annual supply (regeneration) on sustainable basis is only about 45million cubic meter giving an annual deficit (shortfall) of about 10million (Lawan *et al.*, 2017). This imbalance between the supply and actual demand for wood is most obvious in five northern states of Nigeria (Borno, Kaduna, Katsina, Zamafara and Sokoto), and particularly Borno state. In these states, land is rapidly being cleared for agricultural purposes and commercial wood suppliers must travel several hundred kilometers (Kano for instance, get its main supply of fuel wood from Borno state) to collect wood for urban market in Maiduguri and several neighbouring towns (Lawan *et al.*, 2017).

Unemployment, poverty and inequality have continued to expand (United Nation's Development Programme, UNDP, 2010). The National Bureau of Statistics (NBS, 2007) reported that poverty influences the great use of fuel wood in the North-east particularly Borno state (with a poverty rate of 72.2%). The high rate of poverty in the state and the incidence of insurgency has led to the great use of fuelwood by the people of the state especially those displaced by the insurgency.

Insurgency serves as a major hindrance to economic growth of a nation especially to an under developed country like Nigeria. Several efforts have been made to relate losses due to insurgency for citizens to visualize its effect and separate from it. The insurgency situation which started in Borno state spread to other parts of the country especially in North-east leading to destruction of lives and properties and in addition setting barriers or restrictions to economic activities.

Some researches has been conducted in some states of Nigeria on agricultural commodities particularly on fuelwood supply, such states include Bauchi, Niger, Kano, Kaduna and Abuja. Therefore out of a motivated great interest and desire to contribute to the body of research and quest for knowledge, this study was initiated to investigate the effect of insurgency on the supply of firewood in Maiduguri Metropolis, the capital of Borno State, Nigeria.

The main aim of the study is to analyze the effect of insurgency on the supply of firewood. Specifically, the study described the socio-economic characteristics of fuelwood sellers; determined the profitability of firewood business; assessed the effects of insurgency on supply of firewood; determined the relationship between income of sellers and effects of insurgences on firewood supply and identified the constraints associated with firewood selling.

2. METHODOLOGY

2.1. The Study Area

Maiduguri metropolis is the capital city of Borno state. Maiduguri is located between longitudes 11°50'N to 11°83'3"N and 13°09'E to 13°15'E of the equator covering a land mass of about 69, 436 square kilometers (Borno State Ministry of Land and Survey, Maiduguri, 2007) which makes it the largest city in the North-eastern region of Nigeria. Maiduguri metropolis has a projected population of 933,284 people in 2022 when projected at a rate of 2.64% (National Population Commission, NPC, 2006).

The average rainfall of Maiduguri metropolis is about 647mm per annum while the average temperature is about 35.37°C. The vegetation which is typically Sahel Savannah is characterized by drought resistant trees like Acacia albida, Neem trees, Baobab and others. Crops grown in the city include groundnut, cowpea, millet, sorghum, maize and vegetables (such as tomato, pepper, onion, carrot and cabbage). Livestock that are reared in the region include cattle, sheep, goat and poultry.

Maiduguri metropolis is inhabited by all major tribes in Nigeria. However, the predominant ethnic groups that exist in the area are the Kanuri, Babur-Bura, Chibok, Shuwa and Marghi. English language is the official language used and most of the citizens are business-oriented traders, subsistence farmers and civil servants. Maiduguri, and its peripheral areas are endowed with vast fields of trees such as Acacia albida, Balanite and Neem which when dried are fallen and used as fuelwood. The people traders, together with their labourers normally to the fields to fell and collect the fuelwood for sale in the town. The source of data for this research comprises both primary and secondary sources. The primary data were obtained through the administration of questionnaires to the fuelwood Sellers while the secondary source include information from journals, books, internet, newspaper, magazines and students' projects.

The study used purposive sampling technique to select wards mostly affected by the insurgency. These include

Bulabulin, Bolori 1 and 2, Moduganari, Ngomari airport, Shehuri, Mairi, Mafoni, Lamisula, and Maisandari wards. Out of these, six (6) wards Ngomari, Moduganari, Mafoni, Mairi Bolori and Shehuri were selected randomly. Ten (10) major fuelwood sellers were randomly selected from these wards making a total of 60 fuelwood sellers. Questionnaires were administered to the respondents and personal interview was also used. Data were collected in early 2020.

The study made use of both descriptive and inferential statistics. Descriptive statistics which included frequencies and percentages were used to describe the socio-economic characteristics of the respondents, assess the effects of insurgency on firewood supply and identify the constraints associated with the supply of firewood as a result of insurgency. Net farm income was used to estimate profitability of firewood. The inferential used was the regression analysis which was used to determine the effect of insurgency on the income of firewood.

2.2. Net Farm Income

Net Farm Income was used to determine the profitability of selling firewood. It is expressed as follows;

$$NFI = TR - TVC = \sum PiQi - \sum CiXi$$

Where NFI = Net Farm Income (₦/month)
 TR= Total Revenue (₦/month)
 TVC= Total Variable Cost (₦/month)
 Pi = price of output (₦/month)
 Ci = cost of inputs (₦/month)
 Xi = Quantity of inputs (trucks/month)
 Qi = Quantity of output (trucks/month)
 i = 1-n

2.3. Regression analysis

Regression was used to determine the relationship between income of sellers and effect of Insurgency on firewood supply in Maiduguri. The explicit form of the equation is expressed as:

$$Y = b_0 + b_1X_1 + b_2X_2 + \dots + U$$

Where Y = Income of firewood suppliers (₦/month)

X₁ = Destruction of life and property (Dummy: Yes=0; No=1)

X₂ = Restriction of movement (Dummy: Yes=0; No=1)

X₃ = Hindering economic activity (Dummy: Yes=0; No=1)

X₄ = Poverty (Dummy: Yes=0; No=1)

X₅ = Increase in cost of transport (Dummy: Yes=0; No=1)

X₆ = Increase in price of fire wood (Dummy: Yes=0; No=1)

X₇ = Increase in tax (Dummy: Yes=0; No=1)

U = error term

2.4. *A priori* expectation

It is expected *a priori* that the variables: destruction of life and property, restriction of movement, hindering economic activity, poverty, increase in cost of transport, increase in price of fire wood and increase in tax will be negative and significantly affect income.

3. RESULTS AND DISCUSSION

3.1. Socio-Economic Characteristics of the Respondents

This aspect of the study focused on the socio-economic characteristics of the respondents such as age, sex, marital status, educational level, business size, primary occupation, source of capital, and source of labour. The result is presented on Table 1.

Table 1: Distribution of the Socio-Economic Characteristics of the Respondent (n=60)

Socio-Economic characteristics	Frequency	Percentages
Age (years)		
26-30	4	7
31-40	38	63
41-50	10	17
Above 50	8	13
Total	60	100
Sex		
Male	48	80
Female	12	20
Total	60	100
Marital status		
Single	5	9
Married	55	91
Total	60	100
Educational level		
Primary	8	13
Secondary	12	20
Tertiary	3	5
Informal	37	62
Total	60	100
Business size/No. of trucks/month		
Small scale ≤ 1	18	30
Medium scale 2-3	37	61
Large scale 4 and above	5	9
Total	60	100
Primary occupation		
Farming	18	30
Trading	42	70
Total	60	100

Table 1 Cont'd

Socio-Economic characteristics	Frequency	Percentages
Source of capital		
Personal savings	15	25
Family and friends	45	75
Financial institutions	0	0
Total	60	100
Source of labour		
Family	37	61
Hired	12	20
Both	11	19
Total	60	100
Household size		
≤ 5	15	25
6-10	38	63
≥ 11	7	12
Total	60	100

Source: Field survey, 2020.

Table 1 showed that majority 63% of the respondents were aged 31-40 years. This implies that most of the firewood sellers in the study area are within their youthful age and strong enough to handle the activities of the business such as cutting, loading, off-loading, assembling and transporting. Maurice *et al.* (2015) in their study analyzed the factors influencing the consumption of fuelwood in selected Local Government Areas of Taraba State, Nigeria. The results revealed that majority of the respondents were aged between 21-40 years with an average age of 34 years, an indication that they are in their most economically active age.

Meanwhile, about 80% of the respondents were males while 20% were females (Table 1). The gender difference may be attributed to the culture and nature of labour demanded in the business, which is strenuous and also due to the fact that men are stronger than women. The observation is similar with that of Ndaghu *et al.* (2011) who reported male dominance in the firewood trade in Yola, Nigeria.

The result on Table 1 also showed that 91% of the respondents were married while 9% were not. This may be attributed to the lack of interest exhibited by many single people in the business of fuelwood, who believe that the business is for married men. Maurice *et al.* (2015) also discovered that most of the firewood sellers were married men.

Table 1 also revealed that most of the respondents which account for 62% are not formally educated. This may be because the business does not require any formal skills to operate.

Meanwhile, 61% operate within the medium scale range that is from 2-3 trucks per month. This is because the nature of the business requires a lot of capital to be carried out on large scale and most of the sellers are low income earners while some are displaced persons.

From Table 1, the result showed that most 70% of the respondents were traders while 30% were farmers. This is probably because they have a different source of income and do not depend only on firewood for their source of income. They supplement their low income with the sale of firewood.

The result on Table 1 revealed that majority 75% of respondents source their capital from family and friends while 25% used their personal savings to fund the business. This may be because they have no access to financial institutions that will help them obtain loans in other to expand their business and thus they have to access funds from family and friends. The findings of Ufot *et al.* (2017) showed that majority 88% of firewood sellers started the trade with their personal funds.

Table 1 showed that majority 61% of the firewood sellers used family labour. This is because of the availability of family members which make labour easily available. Also, 63% of firewood sellers had household size of 6-10. This ensures availability of labour in the business. This is similar to the findings of Maurice *et al.* (2015) that most of the respondents they studied have an average household size of 7 persons.

3.2. Profitability of Firewood Selling

The profitability analysis was carried out on firewood sellers in the study area. The result is shown on Table 2.

Table 2: Average Net Farm Income/Month

Item/variables	Amount/N
Monthly sale	150,000
Variable costs	
Cost of firewood	100,000
Cost of transport	10,000
Tax	5,000
Rent/annum	9,000
Hired labour	2,000
Total variable cost	126,000
NFI _{fuelwood}	24,000

Source: Field survey data, 2020.

As shown in Table 2, the Net Farm Income of firewood during the insurgency was N24,000.00 per month. Thus, firewood business is considered profitable despite the insurgency because the selling price exceeded the cost price, and the NFI is positive. This is similar to the findings of Ndagu *et al.* (2011) who estimated that profit of firewood traders in Yola, Nigeria was very high. Also, Onaja *et al.* (2011) ascertained the profitability of firewood sale in Kogi State, Nigeria.

3.3. Effect of Insurgency on Firewood Supply

The result on the effect of insurgency on the sale of firewood is presented on Table 3.

Table 3: Effect of Insurgency on Firewood Supply

Items	Frequency	Percentage	Rank
Destruction of life & property	52	86%	1 st
Restriction of movement	50	83%	2 nd
Increase price of Agricultural commodity	42	70%	3 rd
Increase cost of transport	40	66%	4 th
Poverty	37	61%	5 th
Hindering economic growth	35	58%	6 th
Increase in Tax	32	53%	7 th

Source: Field survey data, 2020.

Among the effects of insurgency on fuelwood supply destruction of life and property, ranked first, restriction of movement ranked second while the increase in price of agricultural commodities ranked third. This indicated that a lot of lives and properties had been lost and destroyed, movement was restricted because of the closure of some borders and ban from importation of fuel wood were imposed and general increase of agricultural produce because of lack of access to farming in the places affected by insurgency. Awodola (2015) also discovered that the insurgency in Maiduguri, Borno state, Nigeria has affected the supply of most products including firewood.

3.4. Effect of Insurgency on Income of Firewood Sellers

Based on statistical and economic criteria for selection of functional forms, semi log function was chosen as best fit with coefficient of determinant (R^2) of 0.76 (76%). The result is presented on Table 4.

Table 4: Result of the Regression Analysis

Variables	Coefficient	Std. err.	t-value
Destruction of life & property	-0.0560	0.0149	-3.8***
Restriction of movement	-0.2676	0.0736	-3.6***
Hindering economic growth	-0.4668	0.0615	-7.6***
Poverty	-0.1081	0.0333	-3.3***
Increase in transportation	-0.0550	0.0142	-3.9***
Increase in agricultural Produce	-0.3114	0.0636	-4.9***
Increase in tax	-0.2142	0.0803	-2.7**
_cons	-2.0108	0.3998	-5.0***
R-squared = 0.7616			
Adj R-squared = 0.7302			

Source: Field survey data, 2020.

Note: ** and*** are significant at 5% and 1% respectively.

The coefficients of destruction of life and property, restriction of movement, hindering economic activity, poverty, increase in cost of transport, increase in price of agricultural produce and increase in tax were found to be negative and statistically significant at 5% and 1% significant respectively. This clearly shows that these variables affected income of firewood sellers and are the determinants of insurgency on the supply of firewood in Maiduguri.

The sign of the coefficients were all negative, indicating that increase in destruction of life and property, restriction of movement, hindering economic activity, poverty, increase in cost of transport, increase in price of agricultural produce and increase in tax will result to decrease in income of firewood sellers. This is in line with the a priori expectation.

3.5. Constraints Associated with Firewood Supply

Many constraints were found to affect the supply of firewood to Maiduguri. The result is presented on Table 5.

Table 5: Problems Encountered by Firewood Sellers

Problems	Frequency	%	Rank
Inadequate capital	55	91	1 st
High cost of resources/raw materials	48	80	2 nd
Transportation problem	45	75	3 rd
Low level of patronage	44	73%	4 th
Boarder restriction	42	70%	5 th
Location	38	63%	6 th
Taxation	34	56%	7 th

Source: Field survey data, 2020.

As seen on Table 5, the major problems encountered by fuelwood sellers in the business is inadequate capital which ranked first, high cost of resources/raw material which ranked second while transportation problem ranked third. This indicates that there is great need of capital for the business. The high cost of resources and problem of transportation may be due to the fact that there is a lot of risk and danger involved in getting firewood from the bush into the town, for fear of attack by insurgents and because most of the vehicles they use are very bad.

4. CONCLUSION AND RECOMMENDATION

It can be concluded that;

1. fire wood sellers in Maiduguri are young small-scale illiterate married men/traders that have average household sizes and sourced their capital from family and friends;
2. though insurgency affected the income of farmers negatively, fuelwood selling was considered profitable; and
3. the major constraints of firewood supply were inadequate capital, high cost of raw materials and transportation.

Thus, it is recommended that;

- i. Firewood sellers should be empowered financially so as to enable them acquire adequate capital to enlarge their business so as to increase their income and improve their general livelihood.
- ii. There should be awareness on dangers of deforestation and tree planting programmes by the Government, or Non-Governmental agencies on the need to replace lost trees.
- iii. Government in collaboration with the public should make more effort to combat insurgency to an end so as to enable firewood sellers operate their business efficiently and effectively.

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