

Socio-Economic and Environmental Factors of Firewood Vendors in Damaturu Local Government Area, Yobe State, Nigeria

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Abstract

This study examined the socio-economic and environmental factors of firewood vendors in Damaturu Local Government, Yobe State, Nigeria. The firewood business has increased significantly in Damaturu area. The poor economic status, social needs and obligations on firewood vendors, led to prevalence of firewood trading activities in the area. Sampling technique was adopted for site selection based on the prevalence of firewood trading in the area. Data were collected using well-structured questionnaire. The result of the findings revealed that majority of the firewood vendors have being affected by extreme poverty. Their family welfare has been affected as they lack opportunities to provide basic needs for their families. The findings of the study also revealed that firewood vendors are not able to pursue formal education for themselves and their families. The major consequence of firewood trading is deforestation in the area. Based on the findings, the study recommended that it is important to address this type of activities by engaging in more enlightenment campaigns to educate the people on the dangers of their activity. The concern authorities should provide better job opportunities and more reliable energy source for cooking and other uses so as to reduce forest destruction and environmental deterioration.

Keywords: Damaturu, environmental, factors, firewood, socio-economic and vendors

Introduction

Deforestation is a process of continuous decrease of vegetation over a long period of time which can result in desertification, drought and loss of ecosystem. This process is also known as forest degradation. Certain anthropological factors such as human activities have been in play over a long period of time in the issue of deforestation which in turn has resulted in negative impact and implication on the environment. Direct causes of deforestation include agricultural expansion, wood extraction e.g., logging or wood harvest for domestic fuel or charcoal), and infrastructure expansion such as road building and urbanization (NASA, 2017; FAO, 2012). Firewood business involves the buying and selling of firewood which can be used as fuel for cooking and other domestic activities especially in rural areas. The search for firewood is said to be one of the primary causes of deforestation in developing countries (Mallo & Ochai, 2009). Firewood harvesting is one of the major causes of the massive destruction of the indigenous trees in many parts of Nigeria.

More trees will be cut down to produce the wood and charcoal to satisfy the increasing demand for energy (Culas, 2007). Ayuba and Dami (2011) also pointed out that the demand for fuel-wood is a major cause of deforestation in northern Nigeria. Moreover, deforestation, as one of the anthropogenic activities, is contributing to erosion, flooding, loss of soil nutrients, poor agricultural produce, global warming, climate variability, climate change and desertification (Audu, 2013).

Unfortunately, despite the destructive nature of deforestation to the environment as a result of firewood business, the business has appeared to be on the increase in Nigeria especially in Damaturu, the Yobe state capital. This study therefore is carried out to determine the socio-economic and environmental effects of firewood vendors on Damaturu, the state capital of Yobe state, Nigeria.

Theoretical Framework

The study adopted Environmental Kuznets Curve theory. Originally the theory came from economics field proposed by Kuznets (1995) who correlates between income and equality (the Kuznets Curve). Environmental economists have developed environmental Kuznets curve (EKC) to investigate income effect on environmental degradation. Theoretically, the concept of the ECK for deforestation was discussed by López (1994). As economic or income growth rises, deforestation will decline when the stock effects of forest resource on agricultural production are internalized. According to this concept, deforestation is a function of income or economic growth forming an inverted U-shaped curve. Then, as income rises, the rate of deforestation will decline. Increasing income would incentivize people to improve their forest resources and environmental quality (Culas, 2012; Mahia, 2003). However, the existence of EKC for deforestation is mixed, ranging from no significant correlation (Usivuor, Lehto & Palo, 2002) to significant existence for a specific area - Latin America and Africa. It is so crucial for developing countries to take lessons learned from developed countries experiencing some environmental damages during their early development phases. Such studies could encourage developing countries in restructuring their development programs towards a more sustainable development path without sacrificing economic goals. Man's activities have a considerable effect on vegetation and soil organic matter of an area as reported by (Umar, 1999). Almost 5% of the global deforestation happens because of pasture for cattle rearing which has been the principal replacement for cleared primary forest (Richard, 1995). Forest clearing and subsequent conversion to pasture for cattle ranging has detrimental environmental effect such as loss of biodiversity and resource degradation. The expansion of the livestock sector has gradually led to serious problem as explained by (Richard, 1995). The relevant of the EKC theory to this study is that the firewood business as a part of man's activity with economic and social aspects will increase forest vegetation and other environmental deforestation in the area. Therefore, the main ideas and concepts of this theory are applicable to this study for better understanding of the phenomenon.

Literature Review

Firewood is a primitive source of energy, and the material can be obtained from trunks, branches and other parts of trees (Mann & Singh, 2010). It is one of the most utilized sources of energy across the globe for cooking and heating. About one third of the world population utilizes fuel wood for cooking, and household's fuel wood reliance is the highest in Africa as it accounts for about 53%, (FAO, 2014). The use of wood as a source of energy for cooking and heating is still very much relevant in the developing countries, most especially those of sub-Saharan Africa. It is not only used for domestic and commercial purposes but also for livelihood sustenance. The prevalent use of fuel wood is not only limited to households but extends to non-domestic uses for food preparation in schools and restaurants as well as other small-scale traditional industries and commercial enterprises, such as bakeries as well as tea pottery, and fish smoking shops (Deka, Sedai & Chutia, 2014). In Africa, wood is depended upon for up to 58% of all energy requirements and in many savanna areas, demand for wood supplies far exceeds the rate of growth (Williams, 2003). Regional analysis of the use of wood as a major source of energy requirements indicates that in Eastern, Western and Southern Africa, the majority of rural households depend on fuel wood and charcoal. These unsustainable extraction practices have been regarded as one of the potential causes for forest degradation, deforestation and desertification in Nigeria (Reddy, 2013). Available information at national level and most States in the federation of Nigeria shows that about 40% of heat and cooking energies are derived from fuel wood utilization in the country and this situation worsened by the ever increasing prices of the alternative energy sources following the gradual withdrawal of subsidy on petroleum products accompanied by the depreciated value of the Naira (Gbadegesin & Daura, 1996).

The firewood business has become multi-dimensional phenomenon, because firewood vendors were forced by social and economic factors to practice this type of business, but it will lead to negative environmental implications. In Sub-Saharan nations the consumption of firewood and charcoal is the most common type of biomass utilized and up to 85% of the wood is used to meet household cooking requirements. Wood Energy Today for Tomorrow (WETT, 2002). The economic hard ship status of firewood vendors is the main reason behind intensive use and consumption of firewood. Therefore, firewood situation in developing countries can be improved by providing alternative uses for firewood such as cooking gas and other energy productions, diversified income resources for such categories to improve their economic status and the planting of more trees and by better management of existing forest resources. In creating firewood plantation, fast growing multipurpose trees should be used. Such multi-purpose trees in addition to providing wood for energy may also be sources of forage to livestock and silkworms, medicine and pharmaceuticals, gums, dyes, vegetable oil, timber, pulpwood and shade for pasture (Munasinghe, 1999).

It has been reported that people's participation on large scale is important for the success of any firewood programmed (FAO, 1986). There are numerous ways in which modern engineering principles can be applied to improve the fuel efficiencies of these technologies. Another method

of ensuring sustainable firewood utilization is by encouraging people to use biomass waste products such as agricultural wastes: maize cob, rice husk, coconut shell and bagasse as direct combustion fuel; cow dung, poultry and piggery wastes could be used in biogas production while cheaper methods of tapping solar heat should be devised (Motel, Pirard & Combes, 2009). This will reduce the pressure on the use of wood for energy production. In many cases, firewood savings can be realized even without changes in equipment. Alimba (2004) described that, since economic pressures often prevent proper seasoning of wood, carefully designed credit schemes to ease cash flow problems might enable the populations in developing countries to save millions of tons of firewood annually. Although the fuel wood sector has been criticized due to the perceived environmental degradation, fuel wood commercialization activities have been recognized as enhancing livelihoods and offering regular income generation to those who are involved in harvesting, transporting, trading and selling fuel wood to the end consumer in the market (Reddy, 2013).

Girard (2002) highlighted the domestic use of wood fuels increases with population growth and is a major cause of deforestation, especially in the savannah and in the vicinity of urban centers. Charcoal production has been increasing in the last 10 years, rising by 22% from 400,850 tons in 2003 to 488,128 tons in 2012, in order to meet the demands of a growing, and increasingly urbanized, population. The production of wood fuel has also been increasing, although at a slower rate over the last ten years, from 8,699,979 m³ to 9,034,617 m³, almost a 4% rise and charcoal is typically a fuel used in urban areas as it is seen as having fewer of the negative side effects of cooking with wood while being more cost-efficient than petroleum products (Usivour, Lehto & Palo, 2002). The increasing urbanization rate an average increase of 1.49 percent per year (World Bank, 2014) may help to explain why charcoal production is increasing at a far faster rate than wood fuel production.

Methodology

The study is confined in Damaturu local government area of Yobe State. The Local Government Area has 10 council wards with the total population of 88,014 according to the National Population Commission of Nigeria 2006 census. The sample size of the study comprises of 98 firewood vendors in Damaturu Local Government. This study used stratified random sampling technique which involves the division of population into smaller groups known as strata. The population of the study was stratified into five (5) wards out of 10 wards. These wards include Maisandari, Pompamari, Gwange, Malari and Nayinawa, having the population of 23,000, 20,000, 18,000, 15,000 and 12,000 respectively. The sample size was obtained by using stratified-judgmental sampling technique according to the total population of each ward 26, 22, 20, 17 and 13 people were selected from each ward respectively making a total of 98. The data were collected by using a well-structured questionnaire as the instrument, and a total of 98 copies of the questionnaire were administered on respondents but only 88 valid questionnaires returned. The final analysis of data was therefore based on 88 questionnaires. The study also used secondary

sources to gather data from different sources such as books, academic articles, magazines, internet, journals and government records.

Result of the Findings

This section presents data collected through questionnaire as main the instrument. A total of 98 copies of the questionnaire were administered on the respondents, but only 88 were successfully completed and returned. The collected data were therefore analysed based on the 88 questionnaires.

Table.1: Demographic Characteristics of the Respondents involved in Firewood Business

1-Gender Distribution	Number of Respondents	Percentage	4-Income Status	Number of Respondents	Percentage
Male	68	77%	Lower	49	56%
Female	20	33%	Middle	28	32%
Total	88	100%	Higher	11	12%
2-Age Distribution			Total	88	100%
18-15	10	11%	5-Number of Household Members		
26-32	40	45%	1-5	9	10%
33-40	25	28%	6-10	25	28%
40 and above	13	15%	11-15	37	42%
Total	88	100%	16 and above	17	19%
3-Education Status			Total	88	100%
Primary School	48	55%	6-Type of house		
Secondary School	30	34%	Modern House	21	24%
Higher Education	10	11%	Mud House	37	42%
Total	88	100%	Block House	30	34%
			Total	88	100%

Source: Fieldwork 2022

Data in Table 1 show that 77% of the respondents were males while females were 23%. This indicates that male was more involved than females. The result also shows that firewood business considered as tough work is not suitable for females, unfortunately, there are a considerable number of females who were compelled to practice this business. The respondent's age range 26-35 constituted 45% is the most significant among the respondent's categories as well as most active category involved in firewood trading in the area. The Table also shows 55% of the respondents attending only primary school which indicates that most of the respondents are lacking opportunities to attend other levels of education. The income status of the respondents, as shown by data in the Table 1 shows that 56% of the respondents are lower income earners. This clearly shows that majority of the firewood vendors are poor. Their income status therefore triggers them to do the firewood business. In relation to the number of households of the respondents, the table indicates that 42% of the respondents have family members of 11-15 people. This is clear evidence that majority of the vendors have large families (11-15) members, which reflect the extended

family system. The table also indicates that 42% of the respondents have mud houses with only 24% having modern brick houses.

Table 2: Socio-Economic factors responsible for firewood business

S/No	Responses	Frequency	Percentage
1	Unemployment	24	28%
2	Poverty	48	54%
3	Lack of non-wood fuel	16	18%
4	Total	88	100 %

Source: Fieldwork, 2022

As shown in Table 2, 28% of the sampled respondents agreed that unemployment was responsible for their involvement in the firewood business, 54% identified poverty while 18% said they were involved in the firewood business as a result of lack of non-wood fuel. This shows that different socio-economic factors are responsible for the involvement of the respondents into firewood business.

Table. 3: Environmental effects of firewood business

S/No	Responses	Frequency	Percentage
1	Deforestation	33	37 %
2	Climate change	28	32 %
3	Erosion	20	32 %
4	Others (not specify)	7	8 %
5	Total	88	100 %

Source: Fieldwork, 2022

Firewood have many effects on the environment. According to data in Table 2, 37% of the respondents identified deforestation as the major effect of firewood business on the environment, 32% identified climate change, 32% identified erosion while 8% could not be specific about the dangers of the business. From all indications, firewood business is dreadful to the Nigerian environment.

Discussion of the Results

The findings revealed that majority of firewood vendors in the area were male 77%, while female was 23%. This result shows that the firewood business is a tough one and as such is not suitable for female. It shows further that women are involved more in other house activities, that is more suitable for them. Firewood business consumes more energy. This disagree with the findings of a study conducted in the Peri-Urban and Rural areas of Owerri zone in Southern Nigeria that about 90% and 92% of the people engaged in firewood collection in Owerri North and West local government areas were females, while only 10.30% and 7.60% of the respondents were males respectively. This implies that fuel-wood exploitation in the area is dominated by women, who are aged. This may be due to the fact that women in the southern part of Nigeria are more involved in household duties of which cooking is a key aspect, and they must source for fuels to do so. Men are involved in other activities such as transportation and petty trading (Adeyemi & Ibe, 2014).

The findings also revealed the respondents within the age range of 26-35 (45%) is the most significant among the respondent's categories as well as most active category involved in firewood trading in the area. The results also show that 55% of the respondents have attended only primary school which indicates that most of the respondents are lacking opportunities to attend other levels of education. In relation to family members of respondents, the findings revealed that 42% of the respondent's family members were 11-15. This finding reveal that majority of the vendors have large families (11-15) members, which reflect the extended family. This confirms the findings of a survey conducted by Adeniyi and Felix (2011) on socio-economic aspects of fuel wood business in the forest and savanna zones of Nigeria, that majority of the households have 3-8 persons. This relatively large household size has implication on rural energy consumption pattern, a significant number of the men have more than one wife, presumably in order to provide more hands for agricultural activities. In terms of socio-economic factors responsible for firewood business, the study has identified poverty, unemployment and lack of non-wood fuel 54%, 28% & 18% respectively as major push factors for firewood trading in Damaturu. Also, increase in cooking gas prices and other sources of energy leads to high demand for firewood consumption. This confirms the findings of a study conducted on *Evaluation of Indigenous Knowledge and Fuel Value Index of Some Selected Sudano-Sahelian Fuel wood Species in Damaturu, Yobe State of Nigeria*, the study indicated that the high cost of cooking compelled some residents in Damaturu to begin using firewood and charcoal for cooking (Dadile & Sotannde, 2010). Furthermore, a survey study conducted by the News Agency of Nigeria (NAN) in the South-South zone has revealed that 1 kilogram of gas is sold for ₦11,250. With the high cost of gas, the residents still preferred using firewood (The Guardian, 2021). The findings also revealed that firewood trading in Damaturu caused wide range of deforestation (37%) and climate change (32%) as well as other environmental effects such as forest destruction, desertification and erosion. This confirms also the findings of an assessment study conducted by Ali, Saadun & Norizah (2018) which indicated that uncontrolled tree felling by firewood fetchers that supplies cooking fuel to residents in Damaturu is increasingly threatening the survival of forests in Damaturu. Their assessment study concluded that the livelihood of almost 85% of the State population which depended on subsistence farming was being threatened by firewood business and drought. That was why the state government instituted community-based tree planting campaign within Tikau emirate and planted over 1.4 million trees as further revealed by the study.

Conclusion

This study investigates the major socio-economic factors behind firewood business with the aim of determining the major environmental effects on Damaturu local government area. The study identified poverty, unemployment and lack of other sources of domestic energy such as gas as the fundamental factors responsible for firewood trading in the area. The economic hardship, rapid increase in cooking gas prices, scarcity of other energy sources for domestic use have led to high demand for firewood activities. Many households fetch firewood while others buy from vendors for their domestic energy needs. Uncontrolled firewood harvesting have resulted in increased

pressure on forest resources with negative environmental effects, including forest destruction, deforestation, desertification and so on.

Recommendations

Based on the findings of this study the following recommendations are made:

- i. Government and other stakeholders should introduce properly designed policies and programs on poverty alleviation in order to assist poor people's economic conditions.
- ii. Providing other job opportunities for firewood vendors and other vulnerable categories of people in the society for their self-reliance. Skill acquisition programme should be organized for firewood vendors.
- iii. Also, it's essential for the government to have a policy of providing cooking gas and other energy sources for domestic use with affordable prices for poor families in order to reduce environmental implication of firewood business in the study area.

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