

# Implications Of Fuelwood Demand On Sustainable Forest Conservation Of The Sub-Sahara Africa

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**Abstract:** Forests contribute immensely to economic and social development through formal trade in timber, environmental services, non-timber forest products, safety, net spiritual and aesthetic value. Wood is a key source of energy that has been used for millennia for cooking, boiling water, lighting and heating. Today, about 2.5 billion people depend on biomass energy for cooking and heating with 87% of this energy being provided by wood. In sub-Saharan Africa, more than 90% of the population relies on wood fire, that is, firewood and charcoal as their primary source of domestic energy. Over 80% of urban householders and small industries use charcoal and firewood as their source of energy. Despite their numerous importance, Africa's forest continues to decline rapidly due to increase in agricultural practices into forest lands, population growth and urbanization, increased poverty, high dependence on natural resources for subsistence and income through forest. The study centred on the implications of fuel wood demand on forest conservation in sub-Saharan Africa - a regional focus on Akure metropolitan area, Ondo State. The specific objectives of the paper were to identify firewood consumption pattern in Akure metropolitan area, and factors responsible for increased fuelwood demand in the study area. The paper adopted direct observation, oral interview and 0.05% of the study area as sample size for the study. The study observed lack of adequate alternative; poor implementation and enforcement of government regulation on forestry; poverty and poor awareness on the menace of forest depletion among others. The paper posited provision of alternative fuel with subsidy, regular awareness campaign, proper monitoring, implementation and enforcement of forest regulations with a view to achieving sustainable conservation.

**Keywords:** Degradation, Depletion, Energy, Poverty, Urbanization

## INTRODUCTION

The contribution of natural resource to livelihood and development of national economy is highly significant. Forests are important assets in Nigeria, offering numerous goods and services in the National Economic Development and the sustenance of local livelihoods [1]. Forests and woodlands are recognized as important resource base for Nigeria socio-economic development as it provides many basic benefits and opportunity to both rural and urban communities [2]. However, man's actions and activities on the environment in his quest for developments have given rise to increase and serious environmental degradation and consequently threatening sustainability of the natural environment [1]. [3] opined that, as one looks at the developing world, different fuel sources used can be noted across the different landscapes and socio-economic divides that exist. Fuel is needed for light, heat and cooking and is the source needed for the household to survive [3]. [4] reported that in the sub-Saharan African countries, especially Nigeria, fuelwood is the dominant source of energy for cooking and other activities. In the same vein, 73% of the rural areas and urban household rely on fuelwood as a major source of energy for cooking [5]. Despite these opportunities, fuelwood collection has series of environmental implications and it leads to deforestation and erosion which contributes to global climate change, as demand for fuelwood is directly related to population and poverty.

The increasing current demand on the natural purifies (trees) for fuelwood without concomitant replenishment is an indication that the forest area will disappear fast, which makes the environment situation more precarious if no measures are put in place to check these threats. The environment might not be able to support life after a few years, particularly in the savanna ecological zone that is more fragile relative to the rainforest. In view of the foregoing, this study assessed fuelwood demand and consumption pattern in Akure metropolitan area and its implications on the environment with a view to proffer solutions to identified problems towards achieving sustainable forest conservation in the study area

## LITERATURE REVIEW

Fuelwood is a source of energy derived by burning wood materials like logs and twigs and is common among the rural dwellers of the Sub-Sahara Africa. It is a traditional source of energy and has remained a major source of fuel for over half of the world's population [6]. It has been reported that half of the world's population depend on fuelwood for cooking and other domestic uses, with a daily per capita consumption of about 0.5kg to 1.00kg of dry biomass [7]. In Nigeria, it was reported that Fuelwood constitute a major cooking fuel for about 60 per cent of households in 2006 [8]. Scholars around the world perceived fuel wood demand from different perception based on their nativity, cultural heritage and national policy among others. An analysis based on a wide range of case studies in Nigeria found fuelwood harvesting to be important mainly in some situation where deforestation is associated with wood extraction [9]. Fuelwood is still the main domestic fuel in rural households in most developing countries. Household surveys over large areas in India found that wood accounted for 50% of their energy use. [10] said that about 55% of household needs of fuelwood were collected free. In Nigeria, more than 70% of the total population relies on fuel wood as their major source of energy for cooking purposes [11,12]. The increasing use of fuelwood has resulted in environmental hazards such as deforestation. The rate of deforestation in Nigeria is

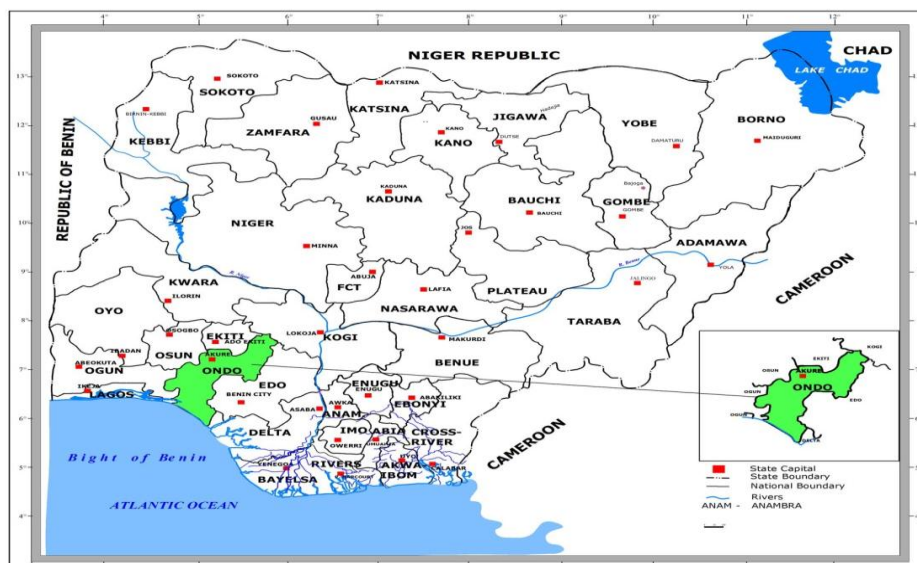
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estimates at 400,000 hectares per annum. [13] observed that the country's forest reserve which was estimated to be at 10% of the total land area in 1970 has been reduced to just 5% as of 1999, which is alarming. The international Energy Agency recently estimated that the number of people using fuelwood and other biomass fuel in Africa will rise by more other than 40% between 2000 and 2030 to about 700million people and that in the after year; there will still be about 1,700million users in Asia [14]. The greater part of consumption is by poor household and so is also seldom reported [15]. Assessment of the actual magnitude of fuelwood use and the impacts on forests and rural livelihoods has consequently been difficult to determine and has been the subject of considerable debate [16]. Fuelwood is mainly used for cooking, water boiling, heating, house heating, lighting and other home businesses. Households are the most important category in wood energy consumption with an estimated consumption of 6.5tonnes per household per year [17]. The second highest consumer of fuelwood are the cottage industries which include brick making, tobacco curing, fish smoking, bakeries [18]. Others include small restaurants or hotels and kiosks and learning institution [17]. Perhaps the most heavily exploited of the forest products are the trees, which form the main structural component of our wooded lands. Timber species are converted on a daily basis into logs and boards of various grades. Rough timbers are equally removed on regular basis for conversion into paper [19] or for use as fuelwoods. Wood used for cooking accounts for nearly 80% of the energy consumption in Nigeria [20] with an estimated national fuelwood demand [21]. However, this situation is not peculiar to Nigeria as the use of firewood in domestic cooking and in bread baking is widespread in developing countries of the World [22]. At the moment, there is no real alternative to fuelwood for cooking especially in the rural areas [20] nor is there any possibility of reducing pressure on timber species. The increase in Nigerian population will continue to increase the demand for these valuable resources that unfortunately are limited in supply [20]. [23] explained that fuelwood is sourced from forest, particularly

from land being cleared for farming area close enough to urban markets to supply fuelwood often being areas and pressure from clearance for agriculture to supply food to the same markets. The general recent information thus tends to support view that demand for fuel is seldom the primary source of depletion or removal of forest cover a large scale. Recent reviews of findings from studies on the causes of deforestation also support these. For example an assessment of economic models of tropical deforestation, while indicating the existence at multiple rather than single causes and nothing that evidence regarding fuelwood is weak, points to it being an occasional cause, mainly in parts of Africa [24]. The increasing current demand on the natural purifies (trees) for fuelwood without concomitant replenishment and replacement is an indication that the forest area will disappear fast, which makes the environment situation more precarious if no measures are put in place to check these threats

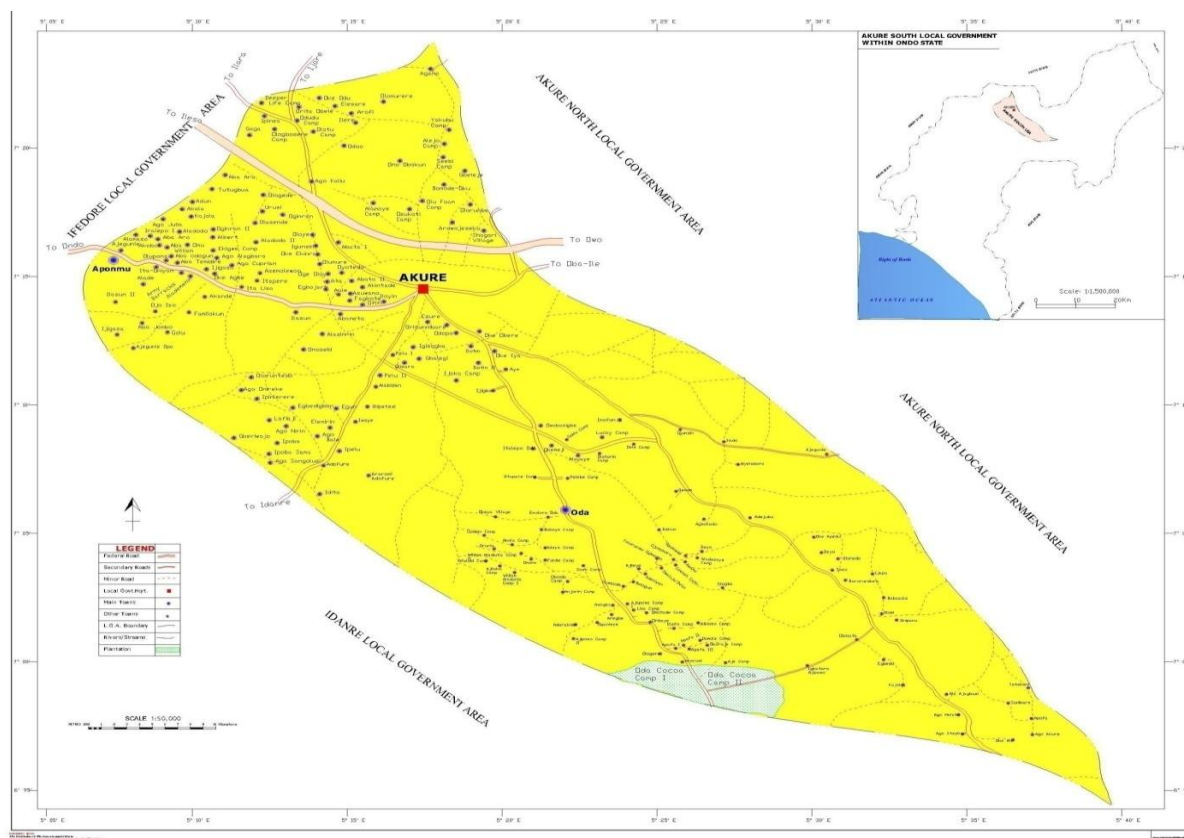
### Study Area

The study area for this research is Akure, the capital city of Ondo State, in the Southwestern part of Nigeria. It lies approximately between latitude  $7^{\circ} 15'$  North of the Equator and longitude  $5^{\circ} 15'$  East of the Greenwich Meridian. The town covers an area of about 16 square kilometers. It is about 370m above the sea level as shown in figures 1 and 2, and the land towards Ado-Ekiti is highly studded with large granite formations said to be of volcanic origin. Akure is located approximately 700 kilometers southwest of Abuja, the Federal Capital of Nigeria, and about 350 kilometers to Lagos, the former capital of Nigeria. It is also located within the tropical rain forest region of Nigeria, where rainfall is high throughout the year. The climate of the area is humid sub-tropical, indicating that it is basically within the tropical rainforest, it is dominated by broadleaved hardwood trees that form dense, layered stands. The 2006 National Population Census put the population of Akure at 353,211 [8]. The estimated population of the town at present (2016) using 2.5 percent growth rate [25] is 452,140.



**Figure 1:** Map of Nigeria showing Ondo State

**Source:** Ondo State Ministry of Housing and Urban Development, Akure (Reproduced in AutoCAD by the authors).



**Figure 2: Map of Akure South Local Government**

**Source:** Ondo State Ministry of Housing and Urban Development, Akure (Reproduced in AutoCAD by the authors).

**Methodology**

The study adopted oral interview, direct observation and questionnaire administration. Meanwhile, 0.05% which translates to 220 population of the total population was taken as the sample size from the sample frame of

452,140. Accidental sampling technique was employed for the administration of the questionnaire.

**Findings and Discussions**

**Table 1: Socio-Economic Status of Respondents**

Socio-Economic Status	Frequency	Percentage (%)
<b>Occupational status</b>		
Civil servant	52	23.6
Farming	77	35.0
Trading/business	41	18.6
Craftsmanship	25	11.4
Unemployed	15	6.8
Student	10	4.6
Total	220	100
<b>Average Monthly Income</b>		
Below 18,000	81	36.8
18,000-25,000	52	23.6
25,000-35,000	29	13.2
35,000-45,000	37	16.8
45,000 above	21	9.5
Total	220	100
<b>Educational Level</b>		
No Formal Education	38	17.2
Primary	80	36.4
Secondary/Technical	68	30.9
Tertiary	34	15.5
Total	220	100



Presented in Table 1 is the occupational status of respondents, the Table revealed that 35.0% of the respondents were into farming, 23.6% were civil servants, 18.6% were traders, 11.4% were into craftsmanship, 6.8% were unemployed and 4.6% were students. It is obvious from the table that the dominant occupation in the study area is farming. This consequently contributed to the incessant and unparalleled forest depletion in the study area. Moreover, it could be seen from the table that 36.8% of the respondents earned below 18,000, those that earned between 18,000-25,000 accounted for 23.6%, 16.8% earned between 35,000-45,000, 13.2% earned between 25,000-35,000, while those that earned 45,000 and above accounted for 9.5% of the total respondents. It could be seen from the table that those earning below 18,000 takes

the highest percentage. The implication is that poverty is a common phenomenon in the study area this accounted for their dependence on fuelwood as a source of energy use and this confirms the findings of [26] that the higher the level of income, the less the number of respondents that use fuelwood. Also presented in the table is the educational level of respondents, it was revealed that respondents with primary level of education accounted for 36.4%, secondary/technical education (30.9%), residents with no formal education and those with tertiary level of education accounted for 17.2% and 15.5% respectively. It is worthy to note that education increases the level of awareness, the level of dependency on fuelwood in the study area therefore is a reflection of their level of education.

**Table 2:** Type of fuel used for cooking

S/N	Type of fuel	Frequency	Percentage (%)
1	Firewood	125	56.8
2	Gas	19	8.6
3	Electricity	10	4.6
4	Stove	45	20.5
5	Charcoal	21	9.5
	Total	220	100

From the table above, 56.8% of the respondents used firewood as their source of fuel and energy, 20.5% were using stove as their source of fuel, those that used charcoal as their source of fuel accounted for 9.5%, 8.6% were using

Gas as their source of fuel while the remaining 4.6% depends on electricity as their source of fuel. Conclusively, Fuelwood is the prevalent source of fuel for cooking in the study area.



**Plate 1 and 2:** Depicting fire wood fetching in the study area

**Table 3:** Reason for using fuelwood

S/N	Opinion about using firewood for cooking	Frequency	Percentage (%)
1	Save time	31	14.1
2	Cheaper	92	41.8
3	Economical	23	10.4
4	Easily accessible	71	32.3
5	Others specify	3	1.4
	Total	220	100

Presented in Table 3 is the opinion of respondents about using fuel wood as their source of energy. The analysis shows that 41.8% of the respondents affirmed that they use fuelwood because of it is cheaper. 32.3% of the respondents depend on fuelwood as their source of energy because of its accessibility and availability. Those that depend on fuel wood as a result of its time saving

accounted for 14.1%, while the remaining 10.4% of the respondents use fuel wood due to the fact that is economical. This implies that the dependency of the majority of the respondents on fuelwood as their source of energy was tied to cheapness and inability to afford other means like gas and kerosene among others.

**Table 4:** Frequency of use

S/N	How often do you use firewood	Frequency	Percentage (%)
1	Regularly	128	58.2
2	Occasionally	35	15.9
3	Once in a month	20	9.1
4	Twice a year	5	2.3
5	Others	32	14.5
	Total	220	100

The above table revealed the analysis of how often respondents use firewood in the study area. 58.2% of the respondents use firewood regularly as their mean of energy for both domestic and other uses. 15.9% of the respondents use it occasionally, 9.1% of the respondents use it once in a month and 2.3% of the respondents use it twice a year. This

implies that 58.2% of the respondents were people who depend on fuelwood as their source of energy without any other alternative means of generating energy for their survival or sustenance (see figures 1-3). This consequently further the poverty rate that was earlier revealed in the study.



**Plate 3:** Showing people returning from farm with their fire wood.

**Table 6:** Impact of Firewood on the Forest Conservation

S/N	Impact of fetching firewood	Frequency	Percentage (%)
1	It leads to depletion and erosion	65	29.6
2	It reduce the soil holding capacity	39	17.7
3	It reduces rain formation	41	18.6
4	It result to climate change	40	18.2
5	It causes loss of biodiversity	35	15.9
	Total	220	100

The table above shows that 29.6% of the respondent revealed that the consequences of fuelwood demand bring about forest depletion and soil erosion. 17.7% agreed that it reduces soil holding capacity, 18.6% believed it reduces rain formation, 18.2% says it results to climate change,

while 15.9% believed it causes loss of biodiversity. The interpretation of this is that fuelwood demand has great negative implication on our forest conservation and brings about further environmental degradation.

## Conclusion and Recommendations

The study has revealed that fuelwood is the major source of energy for the residents of the study area. It is utilized for a variety of purposes both domestic and industrial; there is a widening demand for fuelwood, with increasing pressure in the remaining forest trees. In view of this background, it is necessary for the government to further intensify efforts towards encouraging, and if possible, enforcing tree planting. However high level illiteracy coupled with poverty with weak or lack of environmental protection awareness constitute a serious menace to the sustainable and conservation of our forest resources. On the basis of these findings the following recommendations are hereby made towards solving identified problems with a view to achieving sustainable forest conservation in the study area.

- Government and other stakeholders should ensure the prosecution of defaulters of forestry regulations, as prices of other energy sources should be checked and kept on the minimum in order to shift attention from sole dependence on fuelwood.
- To ensure balance and effective utilization of forest resources and attain environmental sustainability, massive awareness should be created particularly, at the grassroots about the adverse effects of over exploitation on the environment.
- The people of the area should be involved in the management of the forests, their roles and responsibilities in the management, conservation and use of the forests resources should be recognized and appreciated since the people are often highly dependent on these resources.
- Poverty alleviation programmes should be embarked upon at the local government and community levels so as to improve the socio-economic status of residents of the study area.
- Conflicting issues in tenure and legislation need to be harmonized and streamlined, whereby customary laws are incorporated into formal land allocation laws. Better inventories and better access to, and dissemination of information should be encouraged to improve sustainable forest conservation.
- More areas of the lowland in Nigerian forests need to be identified and protected to improve biological diversity status in the country.
- Stakeholders should be encouraged in tree planting by providing incentives like seeds, seedlings, equipment, finance and materials for afforestation to meet the demand for fuel wood and curtail environmental hazard.

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