

Wood Fuel Energy Type Dependence in Jos Plateau State Nigeria

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ABSTRACT

The type of wood fuel supplied to Jos was investigated. The data used for the study was gathered through the administration of questionnaires, personal interviews with wood fuel dealers and field surveys. Results showed that fuel wood (Firewood) and charcoal were the most common types of wood fuel supplied to Jos. The most commonly cut tree species is *Anogeissus Leiocarpus* or chewing stick commonly called "Marke". Accessibility to the source regions of wood supply should be improved upon. Wood fuel sites and depots should be included in master plans. Preference of certain species was wide spread and the issue of preference requires urgent resolution to prevent a wide spread loss of biodiversity through over-exploitation of particular species.

INTRODUCTION

Wood fuel is a source of energy derived by burning wood materials like logs and twigs. Wood fuel is a traditional source of energy which has remained the major source of fuel for over half of the world's population^[1]. The share of various energy sources in the total primary energy supply in Nigeria are made up of Oil, 10.4%; gas, 6%; hydro, 0.6% and commercial renewal energy 83%. The greater portion of the commercial renewal energy is wood, while other agricultural wastes constitute the remaining smaller portion. The over-dependence on wood fuel for energy is chiefly because of its relatively low prices and easy accessibility^[2]. Other reasons are constraints in the supply of the conventional fuel and the growing population with a larger segment still falling below incomes that cannot afford the cost of conventional fuels^[2]. Wood fuel is consumed in diverse ways and at different levels and the life of the majority of rural dwellers depends either directly or indirectly on wood fuel. However, wood fuel energy needs in the country has become a herculean task due to the enormous quantity of wood required. Daily consumption of fuel wood (firewood) by rural communities in Nigeria is estimated at 27.5 million kg/day^[3]. This observation was buttressed by another recent data published by the Solar Cooking Archive which put the estimate of Nigeria's fuel wood consumption of energy at about 87%, therefore, majority of the Nigeria rural people have been using and will continue to use the dried biomass fuel for energy for many years to come^[4]. The unsustainable level of production of wood fuel in Nigeria is likely to continue for some time as long as the energy crisis facing the country remains unresolved. The country still witnesses erratic supply of petroleum products (Kerosene and Gas), and when available the prices are beyond the reach of the ordinary people. The implication is not farfetched, as more people will resort to wood fuel, which is already in short supply^[5]. Analysis of wood fuel data over the decades has revealed certain trends in the wood fuel consumption. Fuel wood (firewood) is the predominant fuel used in the rural areas of developing countries, where charcoal is the preferred fuel in urban centers replacing fuel wood as incomes rise^[6,7]. In Asia the consumption of wood fuel is declining in favor of alternative fuels, reflecting the rapid economic growth of the region since the 1980s, however, in Africa, one of the most marginalized regions in the world, economic growth has been slow and wood fuel consumption is increasing^[7]. This growth is associated with the rural to urban migration found in many African countries, combined with low incomes and savings, which inhibit the transition to other fuel types. As a result, Africa's wood fuel dependence is likely to persist for decades to come, which could have significant consequences for forest resources and the rural livelihoods dependent upon them^[8].

Types of Wood Fuels

The bulk of Nigeria forest production is wood fuel, consumed either as fuel wood or charcoal. In 2005, wood fuel production was 61 million cubic meters (2.2 billion cubic feet), harvested mostly near urban areas. Wood fuel may be available as firewood

(e.g. logs, bolt and blocks), charcoal, chips, sheets, pellets and sawdust. The particular form used depends upon factors such as source quality, quantity and application^[9]. There are different categories of biomass fuel used in the household. Firewood (Ice as it is popularly called) and its derivative Charcoal (Gawayi) and cornstalks (Kara). These types of wood are fuel for domestic cooking including the preparation of cooked food for sale and space heating. Wood for domestic cooking fire (Wutar Girki) is conceptually distinct from wood for heating or log fire (Wutar Jindumi). The main industrial activities with any significance for consumption of business energy are baking, blacksmithing and the production of wooden articles like stools, bowls etc.^[10].

Fuel Wood Firewood

Fuel Wood is usually sold either as round wood, mainly for domestic use in stores or open fires, or as split log, chiefly for commercial and industrial purposes. Twigs and very thin material are not usually sold but may be seen as cheap or free fuel in rural areas. For most fuel wood production very little capital is required. An axe or matches are the only tools needed and where large trees must be cut they may be killed by ring girdling or burning at the base and left to dry out. For many farmers fuel wood is still regarded as a free good. No price has to be paid and the tools used are those already in use on the farm^[11].

Charcoal

Charcoal is the most important commercial fuel derived from wood, its smoke free, capable of controlled use in a small and cheap store and also capable of producing greater heat than fuel wood, it is suitable for a wide variety of industrial and domestic uses and especially for use in an urban environment. In most developing countries, it is the chief form in which wood fuel is used in towns, but in few countries such as Nigeria and Zimbabwe fuel wood is preferred to charcoal^[12]. Charcoal is easily stored, takes less space than wood for a given production of heat and does not deteriorate; it is more easily handled in transport and distribution and is less easily ignited so that it is safer to use the fuel wood. Charcoal can however produce fumes, even asphyxia in poorly ventilated rooms and is also generally regarded as a dirty fuel with large quantities of dust^[13].

THE AIM OF THE STUDY

The aim of this study was to identify the different types of wood fuel used for energy and which types were supplied to Jos.

Location of the Study Area

The study area, Jos is the capital City of Plateau State which owes its origin and growth to tin mining on the Jos Plateau which started in 1905. It is located almost in the geographical centre of Nigeria and about 179 miles (288 km) from Abuja the Nation's capital, the location of Jos is marked by the interaction of latitude 10° N and longitude 9° E. It is about 1000 km North of Lagos, 650 km Southeast of Sokoto and 600 km Southwest of Maiduguri. The town is bounded to the South by Jos South Local Government Area, it has Bassa to its West and it is bounded to the East by Toro Local Government Area of Bauchi State (**Figure 1**).

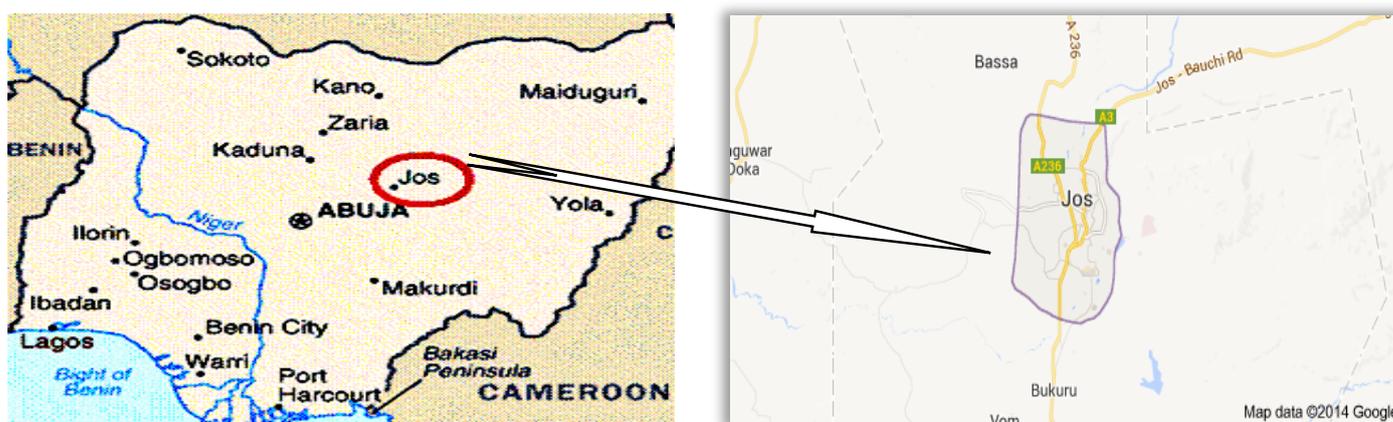


Figure 1. Map of Jos (the study area). Source: Google Map 2014.

People and Geography of the Plateau

The Jos metropolis has predominantly the following ethnic groups, Anagutas, Afizeres and Beroms. Tin mining has led to the influx of migrants, mostly Hausas, Igbos, Yorubas and Europeans who make up more than half of the population of Jos. The population of Jos has grown from about 8000 people (1991 census) who inhabited its total land area of 1322 square kilometers to 1.2 million people (2005 census). Average monthly temperatures of Jos range from 21-25°C (7-77°F) and from mid-November to late January, night-time temperatures drop as low as 11°C (52°F) resulting in chilly nights. Hail sometimes falls during the

rainy season, owing to the cool high altitude weather. The annual rainfall in Jos varies from 131.75 cm-146 cm, highest rainfall is recorded in July. The vegetation comprises gallery forests surrounded by grasslands. Presently, only a few remnants of woodland remain and they are restricted to the steep and less accessible margins of Plateau, with open grassland occupying the remainder of the Plateau. This type of vegetation is responsible for wood fuel supplied to Jos. The climate arising from the high altitude on the Plateau has made the production of Irish potatoes, vegetables, apples, strawberries possible. The rest of the state is generally warm and supports the production of crops such as rice, sorghum, millet, cowpea, cotton, yams and cassava.

METHODOLOGY

There are a number of wood fuel depots in Jos but ten (10) major wood fuel depots located in strategic locations around Jos were selected and sampled. Primary data were collected through interviews with wood fuel dealers, field observations and questionnaire surveys were also used to determine the locations of major wood fuel depots in Jos. Secondary data were obtained from magazines, journals, annual reports from Government and Non-Governmental Organizations, relevant and related information were also obtained from the internet.

RESULTS

Table 1. Types of wood fuel supplied to depots in Jos.

S/N	DEPOT	TYPES OF WOOD FUEL SUPPLIED
1.	Apata	Firewood
2.	Nasarawa Gwong	Firewood
3.	Chobe Junction	Firewood and Charcoal
4.	Mallam Audu Street	Charcoal
5.	Tudun Wada Ring Road	Firewood
6.	Bauchi Road I	Charcoal
7.	Bauchi Road li	Firewood
8.	Mango Street I	Firewood
9.	Mango Street li	Firewood
10.	Tafawa Balewa	Charcoal

It shows the different locations of the wood fuel depots and the types of wood fuel supplied to Jos (**Table 1**). Ten major wood fuel depots were identified and critically studied to determine the type of wood fuel supplied to Jos. These depots are located along busy urban streets. The locations of these depots offer them the advantage of easy accessibility to customers, however the issue of road reduction comes to play and causing traffic problems. The issue of environmental sanitation, parking, waste disposal and storage are major problems as well. The study shows that two types of wood fuel are supplied to Jos, Fuel wood (Firewood) and Charcoal with fuel wood supplied to more depots than charcoal. Toro Local Government in Bauchi State being the major supplier of wood fuel to Jos, while some wood fuel are also supplied from Wamba Local Government Area in Nasarawa State, Kaltungo Local Government Area of Gombe State and Binchin Forest in Sanga Local Government of Kaduna State. The survey shows that sixty percent (60%) of the wood fuel depots are supplied firewood, thirty percent (30%) are supplied charcoal and ten percent (10%) both firewood and charcoal. This shows that there are more firewood depots than charcoal (**Table 1**).

DISCUSSION

The types of wood fuel supplied to the study area (Jos) are fuel wood (firewood) and charcoal. Firewood and charcoal may be obtained from four major sources: Plantations, Natural Forests, Farmed parklands and fallows or shrub land. It is widely assumed that the consumer preference for firewood or other wood fuels (charcoal) is an artifact of delayed modernization, or of inefficiencies in the distribution of alternative energies. Studies show that while cooking requirements, capital costs, supply irregularities and cultural attitudes are all relevant, wood provides more energy per naira than the alternatives available for cooking and heating.

In Nigeria, fuel wood and charcoal account for over eighty percent (80%) of national energy consumption ^[14]. As more and more people depend on the use of fuel wood as a source of energy and fuel, the demand for its exploitation has continued to increase. Fuel wood is consumed in diverse ways and at different levels and the life of majority of rural dwellers depends either directly or indirectly on the fuel wood. Charcoal is attractive for two main reasons: First it is more efficient than fuel wood and it is cheaper to transport. Though charcoal gives advantage of heating efficiency, the environmental problems of deforestation resulting from the use of a large number of trees and pollution from smoke and its constituents in the production process are requiring attention across the disciplines involved ^[15]. The study shows that sixty percent (60%) of the wood fuel depots are supplied fuel wood, thirty percent (30%) charcoal and ten percent (10%) both fuel wood and charcoal. The study also shows that

Fuel wood and Charcoal are the two major types of wood fuel supplied to Jos. The supply of wood fuel to Jos varies from rainy season to dry season. Access to the source regions are difficult during the rainy season, large vehicles which usually go deep into the forests cannot because of the bad roads and therefore depend on smaller vehicles which leads to increase in cost. It was observed that during the dry season wood fuel like corn stalks, twigs, dry branches could easily be obtained and sometimes at no cost at all and thereby causing a decrease in demand.

CONCLUSION AND RECOMMENDATIONS

Studies have shown that inhabitants of developing countries, especially in the rural areas, are dependent upon plant resources for their livelihood and sustenance. The use of biomass, especially wood for energy generation in the country is an issue that may not be easily wished away in the nearest future, probably owing to the vagaries associated with the demographic and socio-economic conditions, coupled with the level of technological advancement. Since a cheaper alternative is yet to be found for the use of wood as fuel, it is important that strategies which can enhance sustainable means of producing wood for energy generation be looked into. Governments and other Development Agents are encouraged to make use of this information to support availability of alternative energy sources to supplement wood fuel. In this regard, converting wood wastages (wood shavings and saw-dust) to briquettes and motivating the public to plant trees would improve supply.

REFERENCES

1. Julia P. World Energy Assessment: Energy and the Challenge of Sustainability. UNDP. 2000.
2. Adedayo AG, et al. Gender roles in forest utilization and its impact on rural environment in Kwara State, Nigeria. *Environmental Sustainability and Conservation in Nigeria*. Proceedings of the 28th annual conference of forestry association of Nigeria at Ondo State. 2005:257-264.
3. Ogunsawa OY, et al. Firewood crises in Lagos: Implication on the suburban and rural ecosystem management. 2002.
4. No authors listed. Fuel wood as a percentage of energy consumption in developing countries. *The Solar Cooking Archive*. 2011.
5. N Wamukonye, et al. The role of wood fuel in Africa. Proceeding of a High Level Regional meeting on Energy and Sustainable Development, Nairobi, Kenya. 2001.
6. Arnold MJE, et al. Woodfuels, livelihoods and policy interventions: Changing perspectives. *World Dev*. 2006;34:596-611.
7. Kituyi E, et al. Towards sustainable charcoal production and use: A systems approach. *CBPS*. 2002:1-7.
8. Tony R, et al. Survey of world energy resources. *WEC*. 2004:1-464.
9. <https://en.wikipedia.org/wiki/Charcoal>
10. Cline-Cole RA, et al. Wood fuel in Kano, Nigeria: The urban-rural conflict. *Social Forestry Network*. 1988:1-18.
11. Morgan WB, et al. Location in the commercialization of fuel wood production and supply in Tropical Africa. *UNU – CEGET*. 1981:181-197.
12. Ferguson IS, et al. Savanna forestry research station, Nigeria: The economics of plantation forestry in the Savanna Region. *FAO*. 1973:79-82.
13. Ay P, et al. Fuel wood and charcoal in West Africa Forest: Field research in Western Nigeria. Rural energy systems in the humid tropics. Proceedings of 1st Workshop UNU Rural Energy Project, Ife, Nigeria, Tokyo United Nations University. 1980.
14. Foley G, et al. Wood fuel: The energy crisis of the poor. 1986.
15. Ogara JI, et al. Preliminary studies on charcoal production and producers knowledge of environmental hazards in Nasarawa State, Nigeria. *PAT*. 2011;7:68:75.