



## EFFECTS OF CHARCOAL UTILIZATION AS A SOURCE OF DOMESTIC ENERGY IN POTISKUM LOCAL GOVERNMENT AREA OF YOBE STATE

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### ABSTRACT

Primary and secondary data were obtained through questionnaire administration, field observation, interview and observations, as well as data from journals, literature and Newspaper respectively. A simple random sampling technique was adopted for the purpose of the research where 150 questionnaires were administered in the selected sample ward. Thus, the finding of the study reveals that majority of the population (70%) utilized charcoal for domestic utilization not knowing its environmental health effect. It further reveals that charcoal as source of domestic energy has detrimental impact to the community as it causes health problem such as asthma, bronchioles, skin rashes and itching and eye problem and also environmental problem such as soil degradation, pollution among other. Hence the study recommended that provision of alternative source of energy such as cooking gases or the use biomass energy which will reduce emission and aid in reducing both health and environmental menace of charcoal as source of domestic energy. Government should provide alternative source of energy utilization which are less harm to the environment and to human health such as solar energy, electrical energy, and wind energy among other. Government should also impose policy on the use of alternative energy and conducts public awareness and enlightenment with regard to the effects and consequences of charcoal utilization to reduce air pollution and other health related issues.

**Keywords:** Charcoal, Energy, Utilization, Source, Effects on health issues

### INTRODUCTION

Charcoal production has been practiced for hundreds of years around the globe. In AD 500 it was used in the iron industry of the central Africa before the industrial revolution in Europe (Ackerman and de Anon 2011). In the late 1800s it was used to power steam boats on the Senegal river (Ribot, 2017). It still used in Brazil for smelting iron because Brazil is not endowed with high quality coal reserves (Ackerman and de Almeida, 1990). The charcoal is the produce in large-scale systems using brick kilns, with dedicated forestry energy plantation as the sources of raw materials Ackerman and de Almeida, 1990). Charcoal has also been produced in Japan for over 1000 years: now it is produced there for purifying waste water, Traditional heaters and special tea drinking ceremonies (Glow, 1990).

Charcoal is a portion of wood with a messy and dangerous parts heated off; often it has additives like borax, lime and nitrate. Charcoal is a burnt wood, which lost all moisture and most volatile contents in the production process. As estimated in 1998, Nigeria is the highest wood producer in Africa producing more than 100 million cubic meters despite this fact, (Boutette and Karch 2017).

Globally more than 2 billion people depend on charcoal for meeting their energy needs (Adetinji, et-al 2007). Almost all African and Asian countries rely on charcoal for meeting their domestic energy needs. It also contributes about 60% African

energy consumption especially in the urban centers. In most of the countries in sub Saharan Africa and central Africa, Charcoal accounts for 60 to 70 percent of residential energy consumption (Sambo, 2005).

Many research on charcoal utilization in Yobe as a source of domestic energy focus on Assessment of charcoal users by women in urban areas of Potiskum. However, this study focused on the impact of charcoal production on the sustainable development of Potiskum Local Government Area, Yobe State, Nigeria.

### MATERIALS AND METHODS

#### Study Area

Potiskum is located between latitudes 11°03' and 11°30' North of the Equator and between longitudes 10°50' and 11°51' East of the green which Meridian. Its distance by road from Damaturu (the State capital) is about 98 kilometers west. Potiskum is a nodal town situated along a trunk "A" Maiduguri - Kano road about 189 kilometers North-West of Gombe, the Gombe State capital, 213 kilometers North-East of Azare in Bauchi State. Potiskum lies within the wet and dry Sudano-Sahelian Savanna belt of Nigeria.

According to the 2006 national population census, Potiskum Local Government Area has a population of 204,866 people and now the population was estimated as 290,700 (National Population Commission 2016).

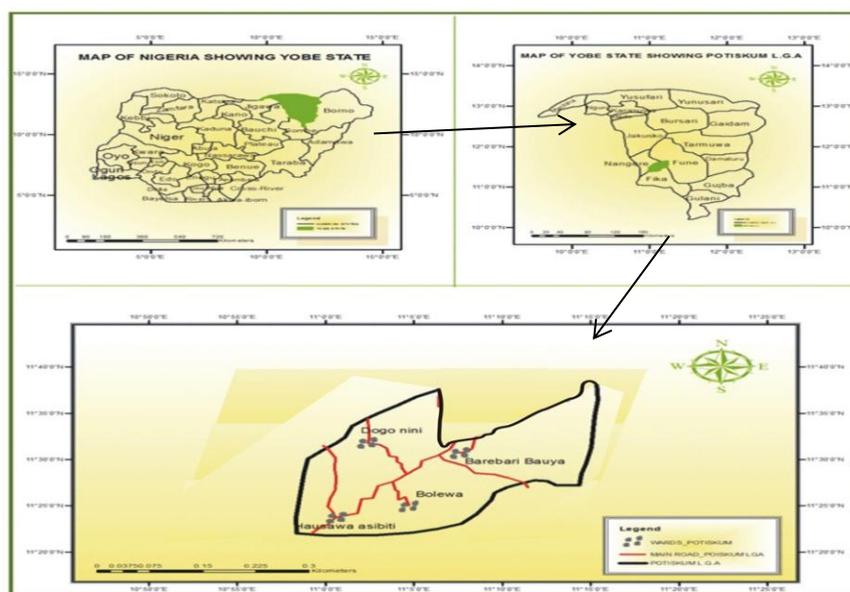


Figure 1: Map of Potiskum L.G. A Showing the Study Area  
Source: G.I.S LAB (BUK) 2025

Climate condition of Potiskum town gives rise to type of vegetation and foods crops found in the area. Potiskum soil type was characterized as mixed farming soil. This soil type is merely fertile and has a satisfactory water holding capacity. Millet, beans, and guinea corn, are the main crops grown, Arabic gum also found there. Most of the land in the area available for ox plough and farming. On the whole, the soil type composition is fertile and is moderate with low moisture and supported grasses suitable for grazing. The climate of Yobe State is hot and dry for most periods, of the year. The mean temperature for most stations in the state is about 37oC. The highest temperature (about 42oC) is normally experienced in April, while minimum temperatures (about 30oC) are usually recorded in December. (Iloje, 2007). The State exhibits a remarkably high annual range of mean monthly temperatures. The mean annual rainy days are one hundred and six (106) days per annum, the onset of rain varies from May to June and terminates around September to October, virtually no rain is received during the dry season which last for at least seven (7) months, that is, from November to May (NIMET, 2011)

There are two vegetation zones in the Yobe state. These are the Sahel in the North and the Sudan Savannah in the south. Vegetal cover is sparse as the grass grows in individual tufts leaving bare surfaces in-between. The grasses in the Sahel are short and tussock, 0.5m to 1.0m high. They are interspersed with sand dunes are the most common types here (Justice, 2000).

As of 2006, the population of Potiskum was 156,859 (NPC 2006) in 2022, the population of Potiskum stands at 483,346 (NPC 2020). The main economic activities of the people in Potiskum are farming and animals' husbandry before it becomes a state capital. But with the modern and technological development, the people engaged in trading, large and small business activities. Some are civil servants, driving and Okada riders while others are labourers.

## Materials

Primary and secondary data were obtained through questionnaire administration and field observation, such as questionnaire, interview as well as observation, similarly data from journals, literature and Newspaper were been sourced. The former was generated through administration of the selected samples and interviews whereas the later source was generated through documented sources mention above.

A Multi-stage purposive random sampling technique was used based on assumption to ensure that study population is adequately represented by the samples. The reason for selecting purposive sampling was the fact that some of the population are constantly using charcoal as the main source of domestic energy in their daily uses as it is well known as non-probability sample method. Thus the study area consists of ten (10) wards out which four wards were selected randomly using random numbers. The selected ward includes; Yari-maram ward consists of 23.3%, Hasuwa asibiti ward consists of 33.3%. Bare-Bare/Bauya Lalai ward consists of 16.6% and Belowa A ward consists of 26.6%. Hence, 150 questionnaires were distributed among the selected wards, also an interview was conducted in some area where the population cannot read and write.

Data generated from the research were analyzed using the descriptive statistics such as percentage, frequency distribution table and bar graph.

## RESULTS AND DISCUSSION

### Major Sources of Charcoal

Charcoal is one of the major sources of energy used in potiskum and its environs, which also served as the cheapest alternative by the respondents.

The table below revealed the major sources of the charcoal in potiskum

**Table 1: Sources of Charcoal used in the Area**

Respondent	Frequency	Percent
Agree	50	33
Strongly Agree	15	10
Not Agree	60	40
Strongly not Agree	5	3
Undecided	20	14
Total	150	100

Source: field work, 2025

Table 1 shows that 50(33%) of the respondent agree that charcoal is one of the major source of energy in the study area, 15(10%) of the respondent strongly agree that charcoal is one of the major source of energy in the study area. 60(40%) of the respondent not agree that charcoal is one of the major source of energy in the study area, 5(3%) of the respondent strongly not agree that charcoal is one of the major source of energy in the study area, 20(14%) of the respondent undecided that charcoal is one of the major source of energy in the study area. Majority of the population were aware the charcoal is one of the major source of energy used in the area.

Charcoal is the primary energy source for cooking as well as major source of income generation and environmental degradation in rural of most African countries include Nigeria.

#### Monthly Charcoal Consume Per Bag

The residents of Potiskum consumed charcoal based on the capability and affordability which depends on the location of the sources.

The chart below is for the monthly charcoal consume per bag by the respondents.

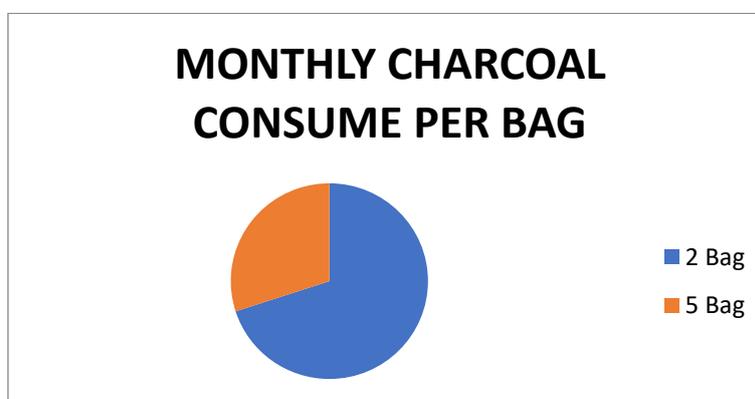


Figure 2: Monthly Charcoal Consume Per Bag

Source: field work 2025

The above Chart shows that of the most of the population utilized 105 2 beg of charcoal monthly, only few among the population consume below 45 3 begs in month. The utilization of huge among of charcoal was realized at the suburb where most of the urban and civil servant dwell while the low

consumption of charcoal was encountered at the suburban periphery and some core area where most of the low income earner dwell. (Ribot 2014) the charcoal among Nigerians as reported charcoal consumption is higher among individual and families that low income with charcoal and fuel wood.

**Table 2: Cost of Charcoal Bag in a Market**

Respondents	Frequency	Perent
3500	95	64
4000	20	13
2800	20	13
3000	15	10
Total	150	100

Source: field work, 2025

The table above shows the majority of the respondent is 64% are buying a bag of charcoal in the rate of 3500 and others buying in the rate of 4000, 2800 etc. It should be noted that the urban population is increasing on daily basis than the rural

areas to the extent that getting fuel energy to feed this population is a problem since most of these people are poor and cannot afford modern cooking fuel.

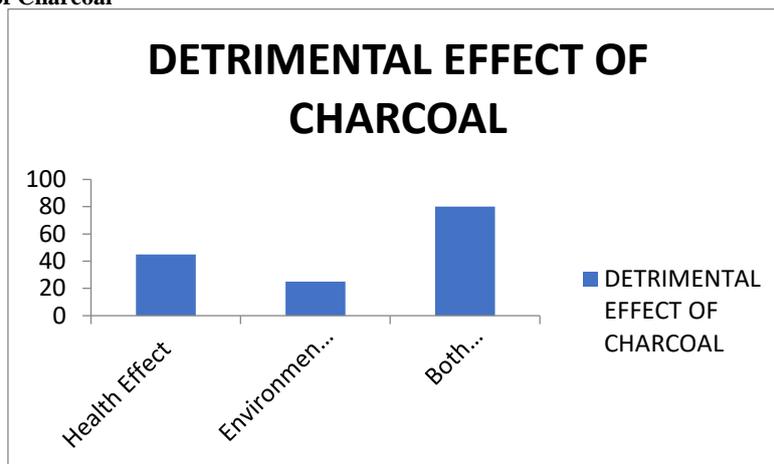
**Detrimental Effect of Charcoal**

Figure 3: Detrimental Effect of Charcoal  
Source: field work 2025

Figure 2 shows that majority of the population were aware on the detrimental effect of charcoal in a terms of both health and environmental as a whole, only few were aware about one of the effect not knowing both of them (i.e. health effect 4% and environmental effect 2). Kalu and Izekor (2007) each stage of the life cycle of charcoal there are impacts on both the environment and human health. Despite the significant utilization of charcoal as source of domestic energy used in lightening, cooking and other demand work has a detrimental health and environmental effect as it causes infectious diseases such as respiratory diseases asthma, bronchitis, catarrh , skin cancer, itching and irritation of eye, cancer deterioration environmental qualities, degradation of aquatic habitat, air and land pollution.

**CONCLUSION**

In conclusion, the advent of charcoal as a source of domestic energy utilization since the mid-19th century has replaced the utilization of firewood and other local alternative source of energy used in household, commercial and industrial utilization especially in the urban hubs. Despite the significant utilization of charcoal as source of domestic energy used in lightening, cooking and other demand work has a detrimental health and environmental effect as it causes infectious diseases such as respiratory diseases asthma, bronchitis, catarrh , skin cancer, itching and irritation of eye, cancer deterioration environmental qualities, degradation of aquatic habitat, air and land pollution.

Government should provide alternative source of energy domestic energy utilization which are less harm to the environment and to human health such as solar energy, electrical energy, wind energy among other. Government should impose policy on the use alternative energy and conducts public awareness and enlightenment with regard to the effects and consequences of charcoal utilization to reduce the menace of it.

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