

PRELIMINARY STUDIES ON SOCIAL AND ENVIRONMENTAL ISSUES OF CHARCOAL PRODUCTION IN NORTHERN YOBE. YOBE STATE, NIGERIA.

IBRAHIM ALKALI

Department of Sociology, Yobe State University, Damaturu,
Yobe State, Nigeria.

ABSTRACT

Northern Yobe forests are excessively threatened by increased charcoal production fuelled by increased demand crucially in Damaturu town which consumes nearly 65% of all the charcoal produced in the state. The study was conducted in Northern Yobe to investigate charcoal production as a livelihood support system and the lessons that can be learnt to ensure sustainable forest management. Fifty charcoal producers were randomly selected and interviewed using semi structured questionnaires. Focus group discussions were also held with charcoal producers and users. Charcoal production was an important economic activity in the study area involving mostly men (80%) as a search for livelihood and family support. Charcoal production was ranked as the second major occupation in the area. However, understanding how and why benefits from the charcoal trade are distributed among different groups of actors in the commodity chain requires an understanding of the local histories and social relationships in which the trade is embedded. The activity also ranked third in terms of income generation. Deforestation, bush burning and nutrient depletion were identified as the most critical environmental effects of charcoal production in the study area. 67% of charcoal producers and consumers were willing to adopt more efficient energy sources but lacked the means to do so. It was concluded that charcoal production will continue to be an economic activity in the study area into the foreseeable future hence the need for sustainable methods of production. It is imperative to look at charcoal burning as a livelihood support system. What needs to be done is to find ways to reduce the rate of exploitation of forest trees for charcoal production, while at the same time providing a sustainable livelihood system for the people who depend on these resources.

Keywords: Charcoal production, Environment, Forest, Fuel wood, Northern Yobe, Livelihood

INTRODUCTION

Charcoal production is one of the most important economic activities in most rural areas of Northern Yobe, and an important source of energy in the state capital. Energy demand in Damaturu has increased significantly in recent times as a result of mass exodus from the satellite towns, population increase and urbanization due to the security situation in the state, adding that, the increased demand is, however, more pronounced in the consumption of wood fuel, particularly wood charcoal. Fuel wood consumption in Nigeria is estimated to be 118.8 million m³ for firewood and 15.3 million tons for charcoal by 2030 (Dr Kalli, 2000).

Northern Yobe is one of the top states in Nigeria in terms of charcoal consumption. According to a report published by the Yobe state ministry of environment (2006), the number one energy supply in Damaturu is based on biomass, mainly firewood and charcoal (64%), petroleum (14%) and electricity (26%). Fuel wood and charcoal provide energy for domestic cooking and heating (Edjekumhene and BrewHammond, 2001; Somuah et al, 2010). Rural and cottage industries also rely on energy from fuel wood and charcoal. Statistics indicate that close to 90% of households in Yobe use firewood or charcoal for cooking (Derkyi et al, 2011). About 49% of the population in Yobe live in rural areas where biomass constitutes the dominant source of energy for household use. Most of the traditional biomass energy sources continue to dominate the rural energy supply, now and in the foreseeable future. Biomass energy sources in Northern Yobe include wood fuel (firewood and charcoal), wood residues and crop residues. Wood fuels also serve as a source of livelihood for most rural people and the increasing number of urban dwellers engaged in the charcoal and fuel wood trade. Woody biomass is part and parcel of rural livelihood (Daily trust Newspaper 21/06/2009 p.22). Traditional economies can easily be defined as biomass economies. Rural livelihoods are intricately linked to the natural environment and this makes the charcoal problem a delicate one to solve. The detrimental effects of charcoal production on the environment have raised a growing concern among policy makers, environmentalists and local authorities responsible for the management of forest resources. This concern is against the backdrop that ninety percent of the wood fuel supply in

Northern Yobe is derived directly from the natural forest (Sekyere and Okyere,2007). Charcoal production as practiced in NorthernYobe contributes greatly to the deterioration of the environment through deforestation and the associated harmful environmental, health and social effects with the use of fossil fuel and traditional biomass energy such as charcoal has led to growing interest in the search for alternate cleaner source of energy nationally (Augustine, 2011) as well as efforts to popularize efficient energy devises, namely Kerosene stoves.

Specifically, the study seeks to provide answers to the following questions: Why do charcoal producers engage in charcoal production? What are the environmental consequences of charcoal production in the study area? What is the preference of charcoal producers and users for more efficient and modern energy sources, and are charcoal producers and users willing to patronize alternate cleaner energy sources? Answers to these questions will provide insight into how to deal with the environmental problems presented by charcoal production, which will ensure the sustainable management of the environment and particularly of the forest resources.

STUDY AREA

The study was conducted in Geidam (Kimeri, Kaduwwa, Hukumandi), Yusufari (Sunomari, Bulatura, Tulotulo), and Yunusari (Dumbol, Ladi, Dilala, Kalgi) located in the northern Yobe. The area encompasses the semi-arid region of Yobe State, located on latitude 11°45' N to latitude 13°30'N and longitude 9°30' E and 12°30'E. The eastern boundary is immediate to Borno State, to the west is Jigawa and Bauchi States, and to the north boundary is the international border with Niger Republic which is the main study area. Vegetations are characterized by tall grasses interspersed sparsely with short drought resistant trees. Agriculture is the main economic activity in the area. The total land area is approximately 11,127km, of which about 7 percent is forest reserve. The population density is about 28 persons/km Economic trees such as Gum Arabic (*Acoria Senegalensis*), *Prosopis Africana* (Iron Tree), *Moringa Oleifera* (Moringa), *Neem* (*Azadgirata Indiea*) and Cotton abounds in the area. The district experiences a monomodal rainfall pattern usually between May and October and a long dry season between November and April. The result of climate parameters of rainfall and temperature has shown that rainfall has increased to 1,000mm and above while temperature has fallen to as low as 20oC. Dry, hazy and windy harmattan conditions set in from November to February, followed by a fairly warm season with maximum temperatures well over 41 degrees lasting from March to May. The long dry season is characterized by persistent bushfires and drying up of many natural water bodies. Some communities (Bukarti, Bula tura and Kafeya) were purposively sampled for the study because of their proximity to each other and the volume of charcoal produced in these communities.

MATERIALS AND METHOD

A total of 70 charcoal producers took part in the survey. Face-to-face interviews were conducted with each respondent using a semi-structured questionnaire containing both open and close ended questions. Focus group discussions were also held with respondents made up of both charcoal producers and users using a checklist. Data collection and analysis were carried out simultaneously in the focus group meetings. Charcoal producers and users ranked the variables being studied using pair wise ranking. The rest of the data were coded and analyzed with the aid of the Statistical Package for the Social Sciences (SPSS) computer software and the results presented in the form of percentages and tables.

RESULTS AND DISCUSSION

4.1 Charcoal production and consumption

Most people (68.34%) involved in Charcoal making are between ages 25-39. This is not surprising since this is generally the most active age group in human life especially that the activity is an energy exacting one. The proportion of male to female is not same (88.56: 11.44%, M:F) Most are single (63.05%) in the whole population although the proportion varies from village to village. The trade is mostly Involving people with no education, Js 3 drop outs and SS3/School certificate holders (30.05%, 22.38% and 24.00%) respectively. 84% of Charcoal makers are Farmers. Again it is not surprising because the primary occupation of the people of Yobe state is farming. The charcoal making may rather be the secondary occupation during off farm seasons or extra time. This is similar to practices in other Parts of the country as reported in Nasarawa (Bhattarai 1998).

Table 1. Reasons for engaging in charcoal production.

Villages	Reasons		
	Means of income	Family trade	Business opportunity
Kimeri	68.8%	14%	17.2%
Hukumandi	73%	-	27%
Dumbol	71%	11.6	17.4%
Ladi	86%	-	14%
Bula Tura	58%	-	42%
Tulo-Tulo	93.9%	-	6.1%

The above table shows that most people are involved in charcoal production as a means of generating income.

The respondents show they have low level of knowledge about the problems associated with deforestation. This may not be unconnected with their poor level of education since a large proportion of them are those who have not attended any school to school certificate holders and like in most rural areas where charcoal is produced, the activity had a social and economic benefit on the producing community by opening up the rural communities to trade and commerce with traders from other towns and cities.

All the charcoal producers interviewed did not replant trees after cutting.

Generally, trees considered to have spiritual benefits as well as economic trees were not cut down for charcoal production. The most preferred tree species were those which produced charcoal which was hard and burned slowly.

Table 2 Types of trees used for Charcoal Production in various villages in northern Yobe state.

TREE TYPE		Villages					
Local Name	Scientific Name	B/Tura	Bukart	Ladi	T/Tulo	Hukumandi	Dumbol
Karo	(AcoriaSenegalensis)	+	+	+	+	+	+
Zogyale	Moringa	-	-	+	+	+	+
Kirya	Prosopis Africana	+	+	+	+	+	+
Ganye	Neem	-	+	-	+	-	+
Auduga	Cotton	+	-	-	+	-	+
Doruwa	Parkia Bioglobosa	-	+	-	-	+	-

+ =Used - =Not Used

Kirya, Prosopis Africana and Karo Acoria Senegalensis are used by all villages for the production of charcoal, while other species are used only to different degrees. Prosopis Africana and Acoria Senegalensis are widely used because they are hardwoods as interaction with the producers reveal because hardwoods give higher charcoal yield than soft woods. Prosopis is used all over the tropics and hardwoods are likewise the wood of choice all over the world wherever Charcoal is produced (Bhattarai 1998, Essiet 2009).

Two types of bags are used for sale of Charcoal in all villages, but the price varies. Interaction with producers shows that prices are determined by Bargain and Markets. Hukumandi with the highest range of prices has Damaturu, the statel capital of Yobe state as its main market. Charcoal produced here is usually

loaded for delivery to Damaturu. Nayi Nawa with the least price range on the other hand is made of producers who sell to middle men, who retail it.

Firewood and charcoal were the commonest source of wood energy in the study area, used by 70% of respondents for heating and cooking compared to 20% who used charcoal. The result agrees with Mal. Ibrahim (2014), who reported that about 84% of households in rural use firewood as their source of fuel with a further 13% depending on charcoal as their fuel of choice for cooking. He added that electricity, kerosene and LPG, together account for less than 3% of consumption and are therefore relatively insignificant. Arku et al (2008) also indicate that approximately 80% of households in low income neighbourhoods of Northern Yobe use charcoal and/or wood as their primary source of energy. In Borno State, 85% of rural household energy is from fuel wood (firewood) and only 5% from charcoal (O'Keefe et al. 1984), underscoring the key role of firewood in the rural economy.

Table 3 Knowledge of environmental issues were summarised in the responses on deforestation.

Villages	Problems		
	Desertification	Global Warming	Soil Degradation
Ladi	9.62	13.54	9.32
Dumbol	3.33	4.74	16.84
Bula Tura	24.65	----	29.66
Tulo-tulo	23.42	----	16.27
Kimeri	19.81	2.21	34.82
Dilala	31.33	3.10	5.22

The respondents show they have low level of knowledge about the problems associated with deforestation. This may not be unconnected with their poor level of education since a large proportion of them are those who have not attended any school to school certificate holders.

SOCIAL AND ENVIRONMENTAL IMPLICATIONS

The social and environmental implications of wood fuel use extend well beyond the commonly cited issue of forest cover. Focusing only on the negative attributes of particular household fuels can lead to incoherent policies that are unlikely to succeed. This is evident in Yobe state, where attempts to regulate the charcoal production, have led to the widespread criminalization of the trade. Charcoal is the principal wood fuel in urban areas of many states in Nigeria, including Yobe. There are a number of reasons why people in dense urban settlements favor charcoal over wood: it has a higher energy density, it burns more cleanly (which reduces exposure to harmful pollutants), and it is easier to transport, handle, and store (FAO, 1983; van der Plas, 1995). Charcoal can be purchased in small amounts, making it flexible and affordable even for the poorest households.

Similarly, charcoal-burning stoves are quite inexpensive, making it a more attractive fuel for the urban poor than other fuels available in urban markets such as LPG and electricity. Kerosene, which is, to some extent, a substitute fuel for charcoal, is subject to price volatility. In Yobe state, charcoal has shown much more price stability. Price stability is an important aspect of fuel choice among the urban poor. The price of charcoal has declined in real terms since a climate-induced price spike in 2004-2011. By the end of 2014, charcoal was 20% cheaper than kerosene in energy terms. Finally, many people favour charcoal because it is considered a more modern fuel than wood, and is thus a kind of status symbol. In Yobe, all of these factors play a role (Hosier, 1985; Ministry of Energy, 2002).

RECOMMENDATIONS

It is imperative to look at charcoal burning as a livelihood support system which requires both public and private sector support. Sustainable methods of production are called for. What needs to be done is to find ways to reduce the rate of deforestation and degradation of the environment arising from the exploitation of the forest resources, especially woody biomass.

Plantation forestry is an alternative source of wood to meet the increasing demand for wood energy in wood deficient areas such as the savanna woodlands of Northern Yobe. This is because plantation species are normally selected for their greater wood yields and quality attributes.

The provision of energy efficient stoves is one of the measures to ensure that less wood energy is consumed. The current three stone stove as well as the traditional coal pot used by most firewood and charcoal users is highly energy inefficient and efforts to develop energy efficient stoves and appliances will reduce wood consumption in both rural and urban areas.

Provision of alternative livelihood systems for rural people will reduce the dependence on the forest. Provision of irrigation facilities to facilitate dry season vegetable farming for instance will reduce women's participation in charcoal production. Credit facilities to the womenfolk who are the main producers of charcoal to start their own businesses will also help to reduce dependence on the forest resources.

Enforcement of byelaws on illegal logging and indiscriminate felling of trees will further help to reduce the rate of deforestation and forest tree removal. It was noted that forest reserves in the district were under the threat of exploitation from chain saw operators and loggers who cut down trees indiscriminately to produce charcoal. Enforcement of bye laws will strengthen efforts to sustainably manage the forest resources.

Finally, regulation of the charcoal trade in Yobe is needed to help manage the forest resources on a sustainable basis. The charcoal trade is an informal but very significant business in Northern Yobe. State regulation of the business in terms of granting of permits to charcoal merchants will regularize the market and bring some level of control into the charcoal trade.

CONCLUSION

Charcoal production though new in Northern Yobe is now an additional means of income for the low income and low education segment of the people of the area as shown in this study. However there is a poor knowledge of key environmental issues of degradation and pollution by chemical constituents of wood smoke already elaborated in literature. Though visit by Forestry officers who should be the basic educators is acknowledge, it appears their impact in educating the producers needs to be upgraded to fill the knowledge gap of the producers in order to optimize economic benefit with care to maintain a healthy environment and population for now and the future.

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