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ASSESSMENT OF THE IMPACT OF CHARCOAL PRODUCTION ON RURAL LIVELIHOODS IN TORO LOCAL GOVERNMENT AREA, BAUCHI STATE, NIGERIA

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Abstract

Charcoal production has been perceived to be harmful to the environment, however, closing the industry is challenged by its role in employment creation and provision of household income. This study assessed the impacts of charcoal production on rural livelihoods with a view to providing relevant information in the field of energy and rural economy. The research employed the use of qualitative and primary data. Multistage sampling techniques was adopted. However, snowball sampling was used to reach charcoal producers and identify charcoal producing communities in parts of Toro Local Government Areas of Bauchi State, Nigeria. Semi-Structured and key informant Interviews were conducted with the charcoal retailers and transporters, and forestry department respectively, while Focus Group Discussion (FGD) was conducted with the charcoal producers. The Mode of analysing data from interview and focus group discussion in this research was tape-based and analysed using constant comparison and micro interlocutor analysis. Large number of people are employed in different phases of production and supply chain, and additional employment was created. The study also reveals that charcoal producing communities of Toro Local Government Area were the major suppliers of charcoal to Jos Metropolis. Most of the people producing charcoal are youth struggling to improve their livelihood and that of their family. Overwhelming majority of charcoal producers are farmers taken charcoal production as seasonal job. However, forest depletion from charcoal production has been the reason for animal reduction or even loss of animal in the forest. The method of charcoal production in rural communities of Toro Local Government Area is unsustainable, putting the health of producers and present forest resources of the production areas at risk of extinction. The study recommends, improving living standards of people and provision of modern ways of charcoal production, through metal and building blocks kiln.

Key words: Charcoal, Impacts, livelihood, production, Rural,

1. Introduction

Charcoal is linked to poverty in several ways and at multiple scales. At the macro level, charcoal constitute a significant productive proportion of the economies of many rural areas and contribute to poverty reduction Jones, 2015). Despite the negative ecological and social impacts, one must not forget that charcoal represent a significant economic activity in many African countries. Large number of people are employed in different phases of the supply chain through collection and sizing the wood, preparation of kilns for converting wood to charcoal, loading wood into kilns and unloading charcoal after conversion, unloading, bundling, packaging, transportation and marketing. Additional employment is created by the activities that use charcoal, such as food processing industries for baking and brewing, too (FAO, 2010a). Charcoal is not only the major source of household energy for the population, it is also a significant contributor to national energy balances, an important source of household incomes, and a potentially renewable energy source capable of powering significant economic growth while reducing dependency of poor developing countries on costly energy imports (Arnold, Kohlin and Person, 2006; Sepp, 2010).

Forest provide livelihood for people in Africa, at least 70 per cent of urban and rural households in sub-Saharan Africa use wood for cooking and to heat their homes (Somorin, 2010). Besides supporting and sustaining livelihoods, they can support Africa's economic, social, cultural and environmental development, especially in the rural areas (Somorin, 2010).

Charcoal production has been perceived to be harmful to the environment, however closing the industry is challenged by its role in employment creation and the provision of household income (Muhammad, Tetteh and Mills, 2013). Kalu and Izekor (2007) maintained that Charcoal enterprise is adopted to meet some socio-economic benefits and energy needs of the people. Therefore, its production would not stop because available alternatives are limited and expensive. To achieve a weighing scale between forest protection and livelihood sustainability, there is the need for the adoption of efficient and appropriate technologies and strategies like the mobile metal kiln method for charcoal burning (Muhammad *et al.*, 2013).

The need for further empirical research to support the hypothesis that a legalized and regulated charcoal industry can help alleviate poverty for a larger number of participants in the charcoal value chain, particularly the rural poor is apparent (Neufeldt, Langford, Fuller, Iiyama, and Dobie, 2015).

2. Study Area

Toro Local Government Area (LGA) was created in August 1976 and is currently the largest Local Government Area in Bauchi State with a projected population of 562,036 at the rate of 3.2 % per annum from the 2006 census figure of 350,404 and a land area of 7,389,690km^2. Toro L.G.A. lies within latitudes 9º 37′ and 10º 44′ N and longitudes 8º 45′ and 9º 32′ E and bordered to the north by Ningi L.G.A., to the east by Ganjuwa and Bauchi L.G.As, to the south by Dass and Tafawa – Balewa L.G.As and to the south west and west by Plateau and Kaduna States (Figure 1).

Temperatures are usually high, between 280c and 330c. However, the mountainous nature of the Jos Plateau has a moderating influence on the temperature of the study

area to about 220c during winter. Rainfall set in from April/May and terminates in October/ November. The area is characterised with both indigenous and exotic tree species of Sudan savannah vegetation.

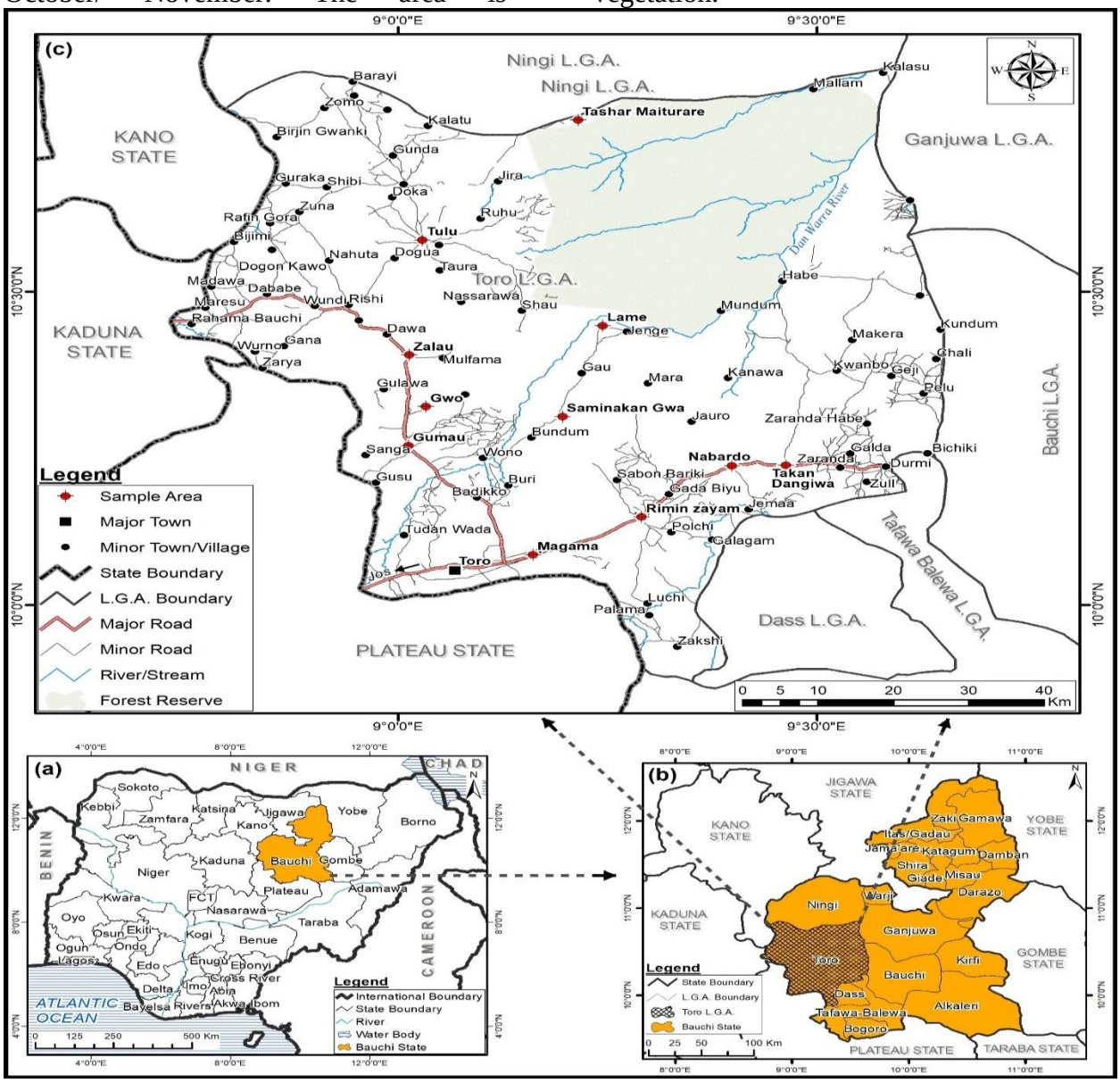

Figure 1: Study Area
Source: Map Gallery, Geography Department, ABU Zaria

3. Research Method

This research was basically field survey. Using Interview Survey and Focus Group Discussion (FGD). The population thus comprised charcoal producers, charcoal transporters, charcoal sellers (wholesalers and retailers) and charcoal users. Multistage Sampling techniques was used. Firstly, the research purposively sampled eighteen (18) villages which are charcoal producing communities, theses villages are: Tulu, Zalau, Gumau, Saminakan Gwa, Leme, Kobi, Mahanga, Rimin Zayan, Nabardo, Takan Dangiwa, Kwagga, Magama, Danbore, Filin Kokawa, Fanshanu, Tashan Maiturare, Tashan Rinji, Bukka.

Secondly, snowball sampling techniques was used to reach charcoal producers and identify charcoal producing communities in parts of Toro Local Government Areas of Bauchi State, Nigeria.

Lastly, availability sampling was used to conduct Semi-Structured and key informant Interviews with the charcoal retailers and transporters, and forestry department respectively, while Focus Group Discussion (FGD) was conducted with the charcoal producers.

To assess the impacts of charcoal production and marketing on environment, questions were developed around the issue central to the (impact of charcoal production and marketing). These questions were asked through semi-structure interview and focus group discussion during the course of data collection. The discussion during interview and focus group discussion were audio recorded using smart (android) Tecno-droidpad (Model-P904) with 7.0 version of operating system. Observational notes and relevant photographs were taken as well.

The Mode of analysing data from interview and focus group in this research was tape-based analysis, wherein the researcher listens to the audio of focus group and interview then creates an abridged transcript. This transcript is usually much shorter than the full transcript in a transcript-based analysis. Notwithstanding, this type of analysis is helpful because the researcher can focus on the research question and only transcribe the portions that assist in better understanding of the phenomenon of interest. Constant comparison analysis developed by Glaser and Strauss (Glaser, 1992) and micro-interlocutor analysis were used in this research. Constant comparison analysis, also known as the method of constant comparison as Leech and Onwuegbuzie (2008) have discussed can also be used to analyse many types of data, including focus group data, especially when there are multiple focus groups within the same study. Thus, emergent-systematic design was adopted since the study involved multiple focus groups and interviews that have many themes (Onwuegbuzie, Dickinson, Leech and Zoran, 2009).

4. Result and Discussions

4.1 Types and Preferred Species for Charcoal Production

Most of the participants reveal that the types of tree species used in charcoal production are: *Pterocarpus erinaceus* (Madobiya), *Khaya senegalensis* (Madaci), *Isoberlinia doka* (Doka), *Prosopis Africana* (Kirya), *Erythrophleum suaveonlens* (Gwaska), *Parkia biglobosa* (Dorawa) and *Anogeissus leiocarpus* (Marke). But overwhelming majority of the participants stated that *Anogeissus leiocarpus* (Marke) is the ‘’best and most preferred species for good and quality charcoal because of its high flammability which make them to absorb little or no water and produce less smoke during usage’’. Majority of the participants reveal that charcoal produce with *Erythrophleum suaveonlens* (Gwaska) and *Prosopis Africana* (Kirya) are not good for cooking due to their hard nature, they are mostly use by irons smelters (Makera). This result shows that there is a tendency of depleting the valuable indigenous tree species and extinction of animals in the charcoal producing communities.

4.2 Charcoal Production Method

The survey shows that charcoal production in all production sites is the same, using traditional earth-pit kiln by mounting the wood on earth and stacked compactly in a pit covered with soils and leaves to reduce air flow and prevent complete burning (Plate 1). It reveal that the capacity of production depends on the quantity of wood load into a kiln which lead to determination of time taken to produce a single run, the other factor that determine the time taken per run is type of species use in charcoal production (Figure 2). This result is in agreement with the findings of FAO (2010b) which stated that in most of the developing world, charcoal makers use traditional means or build temporary earthen kilns for each batch.

The participants revealed that charcoal production and marketing in rural areas of Toro Local Government Area employ and generate income to many people. The stakeholder’s participation start from wood producers for charcoal, charcoal producer, charcoal transporters, charcoal wholesalers, charcoal retailers and consumers who are households and small and micro scale informal business. This findings is in line with the result of (Gbadegesin and Olorunfemi, 2011) which stated that, small scale business enterprise in the informal sector depend overwhelmingly on the use of the charcoal and firewood.

Plate 1. Traditional Earth kiln for Charcoal Production in Kogga (Toro L.G.A of Bauchi State)
Source: Field Work, 2017.

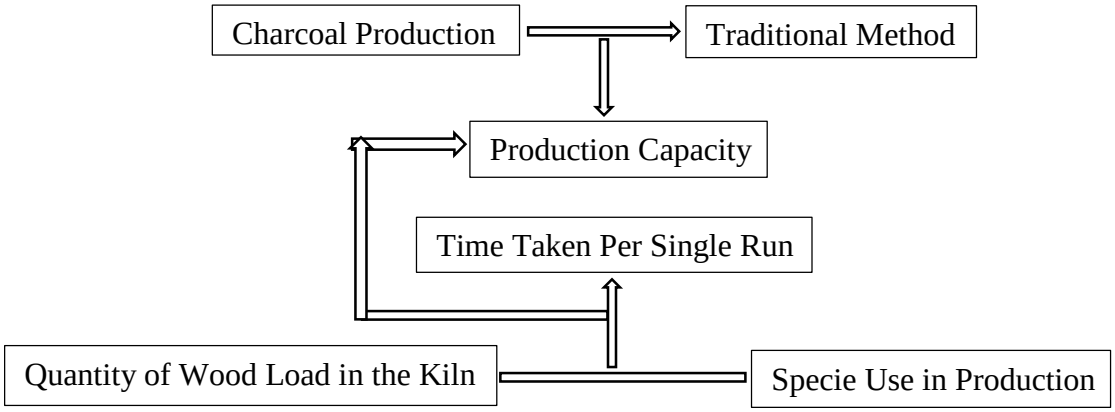

Figure 2. Charcoal Production Method/Process in Toro Local Government Area
Source: Field Work, 2017

Charcoal production process in all sites of production show monopoly with no division of labour, some participants reveal that they involved their children. It reveal that most of the people producing charcoal are youth struggling to improve their livelihood and that of their family, overwhelming majority of charcoal producers are farmers taken charcoal production as seasonal job. This result differs with the findings of (Sepp, 2014) which revealed that, there are generally two types of charcoal producers: the independent /occasional farm producers who are members of a community in which charcoal production takes place, and the employed producers who are outsiders of this community, on the other. There is a distinction to be made between permanent producers and farmers who occasionally produce charcoal among community based producers. Community based producers sell their goods to wholesalers, transporters on the roadside or directly to retailers. Employed producers outside of a

community are contracted by wholesalers in exchange for monthly payments or for produced charcoal.

4.3 Environmental Impacts of Charcoal Production

Overwhelming majority of the participants noted that charcoal production involved ''felling of trees which lead to deforestation'', preference for a specific species is one of the key known factor of destroying the vegetation and lead to the disappearance of some species as reported by some charcoal transporters/traders that ''charcoal produce from the area is mostly made with *parkia biglobosa* (dorawa) due to scarce of other species''. Some participants also notice ''increase in erosion'' as result of deforestation. Many participants reveal that ''forest depletion has been the reason for animal reduction or even loss of animal in the forest''. Some participants admitted that they are aware of campaigns done by government and other agencies on environmental sustainability, but they said that they had no option and their life is more important than the life of trees, this shows the existence of tragedy of the common theory. It also reveals that charcoal marketing on the other hand ''generate waste to the environment'', this waste is inform of dust that always darken the charcoal business surrounding (Table 1).

Table 1. Impacts of Charcoal Production on Livelihoods

S/N	Impacts	Charcoal Production	Charcoal Marketing
1	Deforestation	• Animal Loss/Reduction	
2	Economic	• Job Creation • Alternative Source of Income	• Job Creation • Income Generation
3	Social	• Improve Livelihood • Energy Provision • Health Problem	• Improve Livelihood • Energy Provision • Health Problem

Source: Field Work, 2017

4.4 Socio-Economic Impacts of Charcoal Production

All participants agree that charcoal production and marketing ''create job and in turn generate income'' to many people starting from wood producer to the charcoal trader and sometime even to consumers that use charcoal for economic activities. Many charcoal producers take charcoal making as alternative source of income (seasonal job) during dry season when they are off farm,

while few of them do it throughout the year (Table 1).

Charcoal production and marketing support and improve the livelihood of charcoal producers, charcoal traders and other stakeholders benefiting from charcoal activities. Overwhelming majority of the participants reveal that ‘’charcoal production and marketing support their livelihood by providing needs for them and their families’’. The most important aspect of charcoal is provision of energy to both rural and urban settings. Most transporters and traders reveal that ‘’monies generated from charcoal business is use for food provision in their houses, paying school fees and settling health issues if arise’’. Some participants reveal the negative health impacts of charcoal production and marketing, charcoal burning give rise to ‘’eye irritation’’ especially when burning some specific specie that are toxic in nature, when packaging charcoal after production or measuring in a charcoal business place, it produces ‘’black dusty waste that can cause asthma and darken the surrounding’’ (Table 1). This result is in agreement with the work of Stephen (2011) which stated that wood land resources are experiencing extensive degradation through unsustainable method of charcoal production, which translate into income earning to the stakeholders in charcoal producing communities. The findings also affirm the work of zulu and Richardson (2013) which identifies human health as social impact of production and trade. Many participants reveal that ‘’forest depletion has been the reason for animal reduction or even loss of animal in the forest’’.

5. Conclusion

The method of charcoal production in Toro Local Government Area and its other sources of charcoal is traditional, conveying many health and environmental problems. Charcoal utilization by residents of Toro Local Government Area is increasing thereby impacting on forest resources in the places where they are felled.

6. Recommendations

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

i. Drastic measures on finding alternative clean energy is needed to forested deforestation and forest degradation in the areas.

ii. There is need for improving living standards of people in the area of charcoal production, so as to deviate the mind of producers into another business opportunity in order to reduce the menace of charcoal activities in the area.

iii. There is need for providing modern ways of charcoal production, through metal and building blocks kiln.

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