



Perception of the Impact of Fuel Wood and Charcoal Productions on the Environment: A Case Study of Toro L.G.A of Bauchi State, Nigeria

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ABSTRACT: Wood biomass felling for fuel negatively impacted on the structuring and functioning of ecosystem worldwide. Consequently, increasing soil erosion, reduction in soil moisture, content, fertility, and decline vegetation cover. The study area comprised four districts: Leme, Rimi, Jama'a and Tilden Fulani in Toro LGA, Bauchi State, purposively chosen because of their high fuel wood activity. Charcoal producers were sampled, using stratified sampling methods while traditional leadership and the department of Forestry officials were purposefully sampled for their involvement in fuelwood and forest management of the area. Fifty (50) fuel wood and charcoal producers were chosen per district. A total of two hundred (200) sampled respondents and four each of the traditional leaders and forestry officials in the four districts were investigated. Apparent collapse of traditional governance system correlated with fuelwood exploitation (especially for charcoal production) and remained a threat to sustainability of forest and forest products management. Poverty was the main driver to resource destruction, as only 34% were employed. 67%, 71% and 59% indicated impact on environment, temperature, and erosion due to charcoal production. Charcoal producers obtained the trees and logs for charcoal production from the natural forest and 88% of them use life trees, cutting above 40cm above the ground level. This method of harvesting from the forest inhibits replenishment commensurate with the rate of extraction. The study showed that poverty, unemployment, ignorance and lack of education have great and direct negative impact on the environment as global warming, ozone layer depletion and climate change are evident.

DOI: <https://dx.doi.org/10.4314/jasem.v26i10.7>

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Cite this paper as: CHOMINI, E. A; HENRY, M. U; DASPAN, A. J; AGBAJE, I. O; AMEH, M. A; OSASEBOR, F. O; VIHI, S. K; CHOMINI, M. S. (2022). Perception of the Impact of Fuel Wood and Charcoal Productions on the Environment: A Case Study of Toro L.G.A of Bauchi State, Nigeria. *J. Appl. Sci. Environ. Manage.* 26 (10) 1665-1668

Keywords: Biomass; Fuel Wood; Charcoal; Productions; Environment

Perception, according to Rudell (2007), is a particular way of understanding or thinking about a thing; it can be understood in various ways such as the ability to notice something by seeing, hearing, smelling: the ability to understand and make good judgment about something. Hornby (2010), perception is the way one notices things especially with the senses. It is also the ability to understand the true nature of something. The rural people have turned increased attention to the use of charcoal because of its availability, cheapness, easy storage, less smoke, high temperature output and portability over other domestic fuels. This attention on charcoal as fuel has led to the illegal felling of trees from forest areas and home environments, leading to the destruction of common natural capital. The most visible results of this actions are; desertification, soil erosion and general environmental degradations (Obua

et al., 2010). The unsustainable level of production of fuel wood in Nigeria is likely to continue for sometimes so long as the energy crisis facing the country remains unresolved. The country still witness erratic supply of petroleum products (kerosene and gas), and when in supply, the prices are beyond the reach of the ordinary people. The world's forests are fast disappearing than they are being replaced. Nigeria has the highest rate of deforestation as a result of logging, subsistent agriculture and collection of wood for Fuel (FAO, 2013). Deforestation has wiped out nearly 90% of Africa's forest and 81% of Nigeria's forest disappeared within 15 years. The environmental challenges caused by these actions are enormous. When trees are cut down and not replanted, there will be high concentration of carbon dioxide in the atmosphere which results to global warming, the

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world’s environmental challenge today. The charcoal and fuel wood production in the rural areas of Nigeria especially in Bauchi State is on a daily increase due to high cost of electricity, kerosene and gas and as a result, there is high dependence on natural wood land and forest resources for fuel and an a source of income. These coupled with open access, weak management regimes and lack of coordination between local traditional governance, the forests are over exploited leading to deforestation related problems. Global warming and food insecurity as animals are also at risk with high level of poverty, illiteracy and unemployment, sustainable use becomes a dilemma (Ado and Darazo, 2016). Some of the concerns raised include what are the socioeconomic characteristics of those involved in the fuel wood/charcoal production? What are the perceptions of the people on the impact of charcoal/fuel wood production on the environment? These have engendered the need to assess the perception of the impact of charcoal/Fuel wood production method on the environment, identify the implications of charcoal/fuel wood production methods on the environment as well as examine the perception of the respondents on the implication of charcoal production on the environment to examine the educational and employment status of respondents.

MATERIALS AND METHODS

Study Area: Toro is one of the twenty local government areas of Bauchi State, lying on the South Senatorial Districts of Bauchi State in Nigeria, it is located at Latitude 5°40’ and 7°40’N and longitude 5°00’ and 6°30’E. It has an area of 6,932km² with total population of 350,404, (N.P.C, 2006). The local government area is located in the Guinea savanna vegetation zone (BSOD, 2013). The predominant tribes are ‘Jarawa, Fulani and Ribina”. Human activities include: farming, hunting, civil service, business, etc.

Sampling Methods: Appropriate sampling method is critical in a research process. Charcoal producers were sampled using stratified sampling method. This sampling strategy is based on existing knowledge about the respondents and the anticipated relevance of their response to the problem being investigated. Fifty charcoal producers within the four districts (Leme, Rimi, Jama’a and Tilden Fulani) of the study area were chosen for the study. In addition to the household respondents, one key respondent representing each traditional leader and department of forestry officials were chosen. This gives a total of two hundred (200) sampled respondents and four each of the traditional leaders and forestry officials in the four districts (Wakili *et al.*, 2020).

RESULTS AND DISCUSSION

Implication on the environment: The socio-economic structure of a community has direct implications on natural resource utilization. Poor households are more

dependent on the locally available natural resource for domestic use and generation of household income. In this study, 34% of the respondents were unemployed while 58% were informally employed. Only 3% of the respondents had formal employment. A number of studies have shown that such high unemployment level is positively correlated to high fuel wood exploitation for various uses including charcoal production. Poor people often desperate for survival use the most readily available resource for survival and are more likely to engage in unsustainable fuel wood exploitation for various practices. A study by Tee *et al* (2009), showed that massive and excessive fuel wood harvesting leads to soil erosion, desertification, decrease in water quality, global warning, ozone layer depletion, floods etc to mention but a few. This study therefore confirmed that charcoal production methods have both direct and indirect implications on the environment.

Table 1: Employment Status of Respondents

Employment	Frequency	Percentage
Civil Servants	6	3
Unemployed	68	34
Farming	116	58
Full time charcoal producers	10	5
Total	200	100

Source: Author field survey, 2021

Table 2: Perception on the impact of charcoal production on the environment.

Perception	Frequency	Percentage (%)
Weather is dry	116	77.43
Tree Felling is affect the environment	101	67
Increase in erosion	89	59
Increase in temperature	107	71
No animals in the bush again	120	71
No impact	5	3.3

Source: Author field survey, 2021; (Note: Total not 200 because of multiple response).

Table 3: Educational status of the respondents

Education	Frequency	Percentage (%)
Secondary	2	1
Primary	45	22.5
No Formal Education	153	76.5
Total	200	100

Source: Author Field Survey, 2021

Of the 200 respondents that were interviewed on table 1, six of them are in the employment of the state civil service either as casual or at the lowest cadre of employment. 68(34%) of them are unemployed while 116(58%) of them are in to full time farming. The reason for large population in farming is that farmers concentrate more on charcoal production as secondary occupation during dry or off season when they cannot cultivate crops. 10(5.0%) of them are charcoal producers and merging together with the farmers brings the total number of those who rely heavily on forest and forest products to 126 making 63% of the population dependent on the forest and its products. In their opinion, Wakili *et al* (2020), reported that the methods of charcoal production adopted depends on the season of the year. On the perception of the respondents on the impact of fuel wood and charcoal

activities on the environment, Table 2 shows that 116(77.43%) of the respondents agreed that the weather of the area where the activities are carried out gets drier each day, above 101(67%) of the respondents agreed that tree felling is affecting their environment negatively. The implication of this is that there will be high concentration of carbon in the atmosphere because trees that would absorb these carbons are chopped down on daily basis hence the challenge of global warming. Another impact is increase in the erosion process in the area due to absence of trees that are supposed to curb the washing away of the topmost soils. 107(71%) of the respondents indicated that during the process of burning of trees a lot of smoke in form of carbon monoxide is released into the atmosphere and this increases the temperature of the environment leading to greenhouse effect therefore climate change. Furthermore 120(71%) of the respondents agreed that there were no more animals in the bush (affected areas) because of habitat destructions, the implication of this is food insecurity. However, only 5 indicated that there is no impact on the environment. On Table 3, 153(76.5%) of them had no formal education. This is an indication that the fuel wood/charcoal producers are illiterates but in an economic active age. This shows that illiteracy and ignorance is a big issue to contend with in the rural areas as regards the sustainable use of natural resources. This results corroborated the finding of Wakili *et al.* (2020), who reported that active participants of the target population were not opportune to attend formal education, grew up to see opportunity in the charcoal business as a means of livelihood. The finding supports the claim that charcoal and fuel wood production causes severe environmental degradation and deforestation (Ottu Danquah, 2010). Interventions by these producers to sustain the forest are limited in the area. The research identified that about 88% of them believe that trees regenerate naturally after harvesting. As a result of this they did not see the need to make any conscious attempts to sustain the tree population through replanting after cutting them down. The only forest sustainability measure adopted by the people is agro forestry. However, the particular trees species used for this intervention is the mango plants which unfortunately are not used for charcoal production. The research sees this situation as a threat to natural forest as trees are being exploited without commensurable replacement. Lack of natural resource management responsibility among the local authorities has led to one of the causes of unregulated fuel wood exploitation in the ward. However, collaborative planning between the local authorities would help in setting up processes that will breed integration in natural resource management.

Conclusion: Poor natural resource management, poverty, unemployment have been attributed to account for unregulated fuel wood exploitation in the

four studied districts of Toro LGA of Bauchi State. However, collaborative planning between the local authorities would help in setting up strategies that could breed participatory approach to sustainable forest resource management.

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