**Evaluate level of charcoal policies compliance in Benue State**

Abstract

This study investigated the awareness and compliance with charcoal policies among key actors in the charcoal value chain (CVC) in Benue State, Nigeria. A multistage sampling technique was used for the selection of 739 respondents made up of Producers, Transporters, Off-taker and Consumers in 7 local government areas and 14 communities. Descriptive statistics and factor analysis were used for data analysis.The results showed a significant lack of awareness among producers (83.87%), off-takers (84.20%), transporters (87.30%), and consumers (81.77%), while regulators demonstrated 100% awareness. The study identified three charcoal policies, including a ban on production, sustainable production, and registration with the State Department of Forestry. However, compliance with these policies was very poor, with majority of actors not registering or paying royalties. The effectiveness of policy compliance was deemed weak or very weak by all actors. The study highlights the need for increased awareness, education, and enforcement of charcoal policies to ensure sustainable charcoal production and mitigate environmental degradation in Benue State.

**Introduction**

African countries confront a critical challenge in the global drive to attain SDG 7 (Branch *et al.*, 2022). This difficulty is how to address wood-fuel's key place in the continent's energy mix and, in particular, the growing reliance on charcoal for cooking (World Bank, 2011, Liyama *et al.,* 2014, Ndegwa *et al.,* 2016, Chiteculo *et al.* 2018, FAO, 2019). In sub-Saharan Africa, charcoal account for up to 90% of household energy use in some towns and cities (Liyama *et al.,* 2014; FAO, 2017). According to estimates, the production of charcoal is growing at a rate of 3% per year as a result of both increased urbanization and growing rural use as people move away from firewood, the other common wood fuel (Liyama *et al.,* 2014; UNEP, 2019; Mwampamba *et al.,* 2023). FAO, (2020) submitted that charcoal is the fastest-growing type of wood energy which grew by 66% between 2000 and 2018. The consumption of charcoal is anticipated to rise further until 2030 as a result of population expansion and existing urbanization trends (Chiteculo *et al.,* 2018; IEA, 2019). Millions of individuals in Africa's informal economy depend on the production, transportation, and sale of charcoal for their livelihoods (Mwampamba *et al*., 2013; Jones *et al.,* 2016). Many African countries are concerned about charcoal production and usage because, it is based on unsustainable practices (FAO, 2019), as the industry is often associated with environmental degradation, deforestation, and social concerns (FAO, 2017; Kiruki *et al*., 2017). To safeguard forests and ensure the ecological and ethical production of charcoal, African governments have responded by establishing laws and policies relating to charcoal production (Zulu, 2009; Doggart and Meshack, 2017; FAO, 2017). However, majority of African nations do not have robust policies and regulatory frameworks that specifically manage their charcoal sector, despite their substantial reliance on charcoal ((Mwampamba *et al.,* 2023). The most charcoal policy tool they often used is straight ban of charcoal production and trading (Neufeldt *et al.,* 2015; Branch *et al.,* 2022). This is the case in Benue State where the policy tool used to regulate charcoal production is straight ban of charcoal production and trading. This absence of articulate policies, have made charcoal industry to remain informal and unregulated especially in Benue State. Similarly, despite the existence of straight ban of charcoal production and trading as charcoal policy in Benue State, widespread charcoal production across the State persists. Ineffective adherence to the Benue State's charcoal policy by key actors in the value chain poses threats to the environment and economy, including deforestation, soil erosion, climate change, adverse effects on livelihoods, and wasteful use of resources. Environmental harm can be reduced when authorities assess policy compliance to see if sustainable methods are being used. Initiatives for replanting, resource protection for forests, and a decrease in illicit logging are all supported by this assessment. Charcoal manufacturers follow rules intended to strike a balance between commercial gains and sustainable resource management, thanks to the process of evaluating policy compliance. A sector's carbon footprint can be lowered by adhering to regulations that support energy efficiency and greener industrial techniques. This complements more general initiatives to mitigate climate change. By preventing exploitation of disadvantaged groups and promoting fair work practices, ensuring policy compliance can result in a more equitable distribution of benefits. Whether producers are profiting from initiatives and assistance programs meant to enhance their livelihoods sustainably will be made clear by policy compliance. The study will help in detecting weaknesses in governance frameworks and policy enforcement. It will show if regulatory frameworks have flaws or whether current regulations are being appropriately applied and enforced. This can help with the formation of governance frameworks, capacity-building programs, and policies that will be more successful.

**Study Area**

The study area is Benue State, Nigeria. The State is located within the Middle Belt of Nigeria on Longitude 7o47'E and 100.00’’E and between Latitudes 6025'N and 802510'N and has land mass of 33,955km2 (Hula, and Ukpong, 2013). Benue State share boundary with Taraba State in the Northeast, Nassarawa State in the North. Down south the state shared boundary with Enugu and Ebonyi in the Southwest, Cross River State in the southeast. In the west the state is bounded by Kogi State. The State also have an international Boundary with Cameroon around Kwande Local government axis (Fig. 1). The State has a population of approximately 5 million by 2009 estimate/projection based on a 2.8% growth rate (NPC 2006). Benue State has 23 Local Government areas. The State is located in the southern guinea zone (Hula, 2010). The area is characterized by two distinct seasons; wet and dry season with mean annual rainfall of between 1200mm-2000mm (Hula, and Ukpong, 2013). Average annual temperature ranges between 28oc to 32oc with relative humidity of between 60% and 80%. Benue State is located in the guinea savanna zone of the country (Dagba *et al*., 2016). The vegetation of Benue state is characterized by fewer trees, more shrubs and predominantly tall grasses up to 2m tall (Dagba *et al*., 2016), riparian forests are found in low land areas and river banks. Some of the species found in the area includes: *Khaya senegalensis* *Daniella oliveri*, *Isoberlina doka*, *Parkia biglobosa,* Prosopsis *Africana,* *Vitellaria paradoxa* *Burkea Africana*, *pterocarpus erinaceus*, *Afzelia Africana, Borassus aethiopum, Bombax costatum, Anogeissus leiocarpa Irvingia gabonensis* (Adagba *et al.* 2016; Dagba *et al*., 2016, Shomkegh *et al.,*2016).

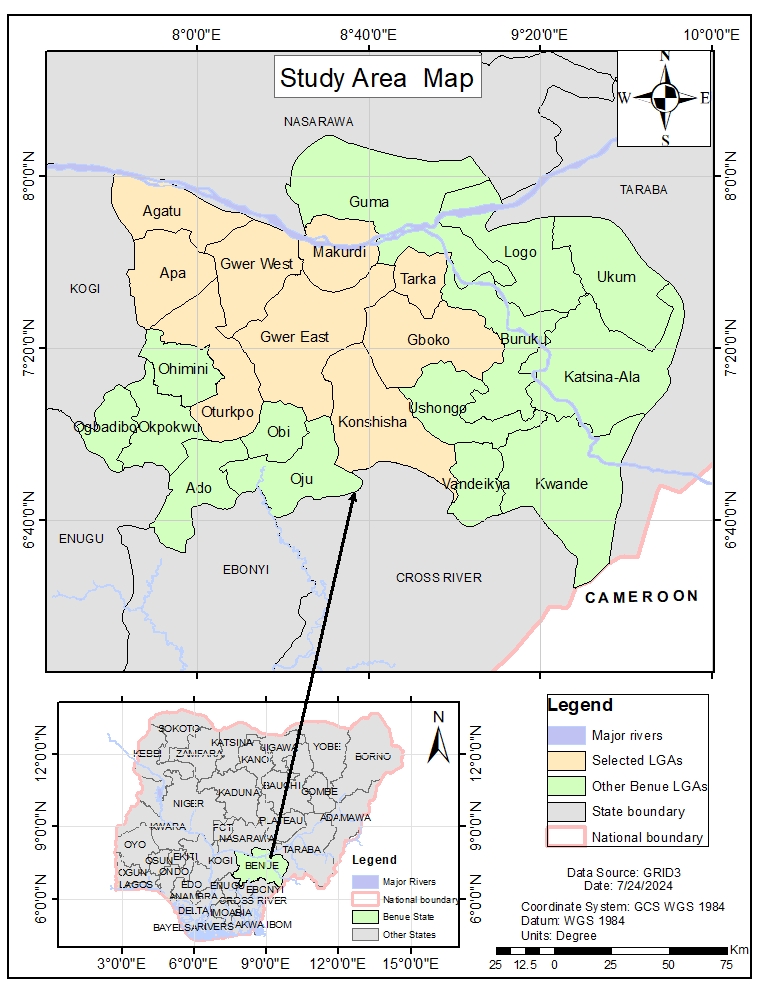


Fig 1. Map of Benue State showing study area

**Source:** Ministry of Lands and Survey Makurdi (2015).

**Population for the Study and Sampling Procedure and Sample Size**

The population for the study was made up of all key players (producers, transporters, intermediary buyers/aggregators, consumers and regulatory bodies) in Charcoal value chain in Benue State. Multi-sampling procedure was used to select from the diverse key actors in charcoal value chain in Benue State. The sampling procedure was based on the outcome of the reconnaissance survey across the State to obtain information about all the actors in the value chain as a guide for sample size selection. The reconnaissance survey was to delineated the charcoal production areas from non-charcoal production areas in an attempt to identify and profile key players in charcoal value chain across the State for the purpose of this study. Seven dominant charcoal production local government areas (LGA) in the State were purposive (Konshisha, Gwer East, Gwer West, Tarka, Apa, Agatu and Otukpo LGAs), using the volume and prominence of charcoal production as indices for the selection. In each of the selected LGA two dominant charcoal production communities were purposive selected to obtain a total of 14 communities. A simple random sampling technique (with the aid of Yamane’s and Bowley’s proportion allocation formulae) was used to select a proportionate sample of 731 across the diverse charcoal value chain actors. A total 157 of charcoal producers were drawn from a pool of producers across the seven selected LGAs in the State using a simple random based on their registers. Selection of charcoal transporters in the State followed the outcome of the reconnaissance survey of the transport system associated with the charcoal value chain. From a pool of charcoal transporters in the seven selected LGAs, a proportionate sample of 63 transporters were selected across the LGAs. Selection of Charcoal marketers was obtained from the registered list of marketers in the selected LGAs. Following the Yamane’s and Bowley’s formulae, a proportionate sample of 114 respondents were. Selection of Charcoal Consumers/Users. The consumption or usage of charcoal from the reconnaissance survey and available statistics (NBS, 2018, NDHS, 2018) attest that, out of the 12.7% of charcoal users, 10.5% are in urban centres and 2.2% for the rural areas. In this regard, the selection of charcoal users include domestic/household, artisans and industrial usage, mostly in the urban areas of the State. Based on this, a purposive sampling of nine local government areas (Gboko, Makurdi, Otukpo, Konshisha, Gwer East, Gwer West, Tarka, Apa and Agatu LGAs) based on the volume of usage and the presence of urban centres in the selected LGAs. Based on the projected population of the selected LGAs, the proportion of charcoal users (12.7%) were earmarked for the purpose of the study. Similarly, the Yamane’s and Bowley’s allocation formulae was applied to select a proportionate sample of 399 respondents.

Yamane’s formula for determining sample size is expressed as:

Where:

n= Sample Size

N= Population of the study

e= Margin of error (5%)

The Bowley’s proportion allocation formula is expressed as:

Where:

ni = Sample size for the ith stratum

n= Total sample size

Ni= Population for the ith stratum

N= Total population

**Method of Data Collection**

Data for the study were collected using different sets of questionnaires, designed with respect to each of the key player in the charcoal value chain - Charcoal Producers, Charcoal Transporters, Charcoal intermediary buyers/aggregators, Charcoal consumers. The study used interview schedule method where distinctive questionnaires were administered to the proposed 739 respondents across the diverse value chain actors. Data for the study were analysed using descriptive statistics and A Five-point Likert scale rating format. Data analysis were performed basically with the use of two analytical software: The Statistical Package for Social Sciences (IBM SPSS) Statistics 23® and FAO Value Chain Analysis Tool (FAO VCA-Tool) version 3.2. A Five-point Likert scale rating format was used to determine the perception of policy makers on the natural resources depletion due to activities of charcoal actors for positive contribution during policy dialogue (objective six). The weighting scale was derived from the following values with respect to perception of policy makers on the natural resources depletion due to activities of charcoal actors for positive contribution during policy dialogue; seriously Agree (SA) = 5, Agree (A) = 4, Undecided (UD) = 3, Disagree (D) = 2, Seriously Disagree (SD) =1.

The Likert rating Mean Score (MS) of the perception in knowledge and awareness of policy implication of charcoal exploration on environment will be expressed as:

Where:

= the mean score of a five-point Likert scale,

= Summation of the five-point rating scale and

n = Number of points

The Likert Weighted Mean Score (WMS) of perception of knowledge and awareness will be expressed as:

……………………………………………………………………(Eq.11)

Where:

f = frequency of respondent

x = Likert scale point

N= Total Number of respondents

Using the interval scale of 0.05, the Upper Limit (UL) cut-off will be MS+0.05 (3.0+0.05 = 3.05). The Lower Limit (LL) cut-off will be MS - 0.05 (3.0-0.05 = 2.95). Based on these two extreme limits, any variable with WMS below 2.95 (WMS<2.95) will be considered ‘Disagree’. Variable with MWS between 2.95 and 3.05, ‘Undecided’ and any variable with MWS greater than or equal to 3.05 (MWS≥3.05), ‘Agree’.

**Result**

**Awareness of charcoal policies in Benue State**

It was established from the result of the study as shown in Table 1 that 83.87% of producers were not aware of charcoal policies in Benue State, while 16.03% were aware, Off-takers, 84.20% were not aware while 15.80% were said to be aware. Additionally, 87.30% of transporters were not aware of any charcoal policies while 12.70%)were aware of the policies on charcoal in Benue State. Similarly, 81.77% of consumers of charcoal in Benue State not aware of any charcoal policy while 18.23% were aware of the policies on charcoal in Benue State. However, 100% of the regulators were aware of policies on charcoal in Benue State.

**Charcoal policies in Benue State**

The result on charcoal policies as presented in Table 1 revealed that, three charcoal policies were listed by key actors in CVC in Benue State. It was shown that 84.00% of producers who were aware of charcoal policy in Benue State said that the policy they knew was Ban on production, 100% of Transporters were also aware of the ban. Also 77.03% of consumers were aware of the ban, equally, 75.00% of regulators were aware of the ban on charcoal production in Benue State. However, 61.11% of off-takers said they were aware of Sustainable production

**Those responsible for Policies enforcement in Benue State**

The result shows that, producers 75.76% Transporters 68.25% consumers 83.52% regulators 100% and off-takers 86.87% agreed that regulators were the enforcers (Table 1).

Table 1: **Charcoal Production and Marking Policies in Benue State**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Production policy and Sustainability** | **Producers** | | **Off-takers** | | **Transporters** | | **Consumer** | | **Regulators** | |
| Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| Awareness of charcoal policy | | | | | | | | | | |
| **Yes** | 25 | 16.03 | 18 | 15.80 | 8 | 12.70 | 74 | 18.23 | 8 | 100.00 |
| **No** | 131 | 83.97 | 96 | 84.20 | 55 | 87.30 | 332 | 81.77 |  |  |
| **Charcoal policies** | | | | | | | | | | |
| Ban on Production | 21 | 84.00 | - | - | 8 | 100.00 | 57 | 77.03 | 6 | 75.00 |
| Market regulation | 1 | 4.00 | 7 | 38.89 |  |  | 2 | 2.70 | 1 | 12.50 |
| Sustainable production | 3 | 12.00 | 11 | 61.11 |  |  | 15 | 20.27 | 1 | 12.50 |
| **Policy enforcement** | | | | | | | | | | |
| DFO | 50 | 75.76 | 26 | 86.87 | 43 | 68.25 | 76 | 83.52 | 8 | 100.00 |
| Police | 4 | 6.06 | 1 | 3.33 | 14 | 22.22 | 2 | 2.20 | - | - |
| Traditional rulers | 12 | 18.18 | 3 | 10.00 | 6 | 9.52 | 13 | 14.28 | - | - |

Source: Field Work 2023

**Level of Charcoal Policies Compliance in Benue State**

The consensus among the key actors in CVC in Benue State on the level of charcoal policy compliance, Producers WMS=1.52, Off-takers WMS=1.39, Transporters WMS=1.20, Consumers WMS=1.23 and Regulators/DFOs WMS=1.25 they all agreed that the level of charcoal policies compliance in Benue State was very poor (Table 2).

**Table 2: Level of Charcoal Policy Compliance in Benue State**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Wholly | Partially | Not at All | N | WS | WMS | Decision |
| Producers | 1 (3) | 11(22) | 13 (13) | 25 | 38 | 1.25 | Poor Level of Compliance |
| Off Taker | 0 (0) | 7 (14) | 11(11) | 18 | 25 | 1.39 | Poor Level of Compliance |
| Transporters | 0 (0) | 3(6) | 12(12) | 15 | 18 | 1.20 | Poor Level of Compliance |
| Consumers | 1(3) | 17(34) | 56(56) | 74 | 93 | 1.23 | Poor Level of Compliance |
| DFOs | 0 (0) | 2(4) | 6(6) | 8 | 10 | 1.25 | Poor Level of Compliance |

Note: N= Number of Respondents, WS= Weighted Score, WMS= Weighted Mean Score

**Performance of Policies Compliance in Benue State**

The result on performance of policies compliance in Benue State indicates that, all key actors in CVC in Benue State, Producers WMS=2.08, Off-takers WMS=2.52, Transporters WMS=2.27 and Consumers WMS=2.24 agreed that the performance charcoal policy in Benue State was poor. However, Regulators/DFOs WMS=1.87 reported that the performance of charcoal policies in Benue State were very poor (Table 3).

**Table 3: Performance of Charcoal Policy Compliance in Benue State**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Very Effective | Effective | UD | Weak | Very Weak | N | WS | WMS | Decision |
| Producers | 0 (0) | 3(12) | 0 (0)) | 18(36) | 4(4) | 25 | 52 | 2.08 | Weak |
| Off Taker | 0 (0) | 1 (4) | 5(15) | 7(14) | 5 (5) | 18 | 38 | 2.52 | Weak |
| Transporters | 0 (0) | 0 (0) | 6(18) | 7(14) | 2(2) | 15 | 34 | 2.27 | Weak |
| Consumers | 0 (0) | 1(4) | 29(87) | 28(56) | 16(16) | 74 | 163 | 2.47 | Weak |
| DFOs | 0 (0) | 1(4) | 1(3) | 2(4) | 4(4) | 8 | 15 | 1.88 | Very Weak |

Note: N= Number of Respondents, WS= Weighted Score, WMS= Weighted Mean Score

**Effectiveness of Charcoal Policies Compliance in Benue State**

The result on effectiveness of policy compliance in Benue State indicates that, Producers WMS=1.80, Off-takers WMS=1.72 and Transporters WMS=1.67 were of the opinion that the policies were very weak. Equally, Consumers WMS=2.38 and Regulators/DFOs WMS=2.12 agreed that the charcoal policies in Benue State were weak (Table 4)

**Table 4: Effectiveness of Charcoal Policy Compliance in Benue State**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | Very Effective | Effective | UD | Weak | Very Weak | N | WS | WMS | Decision |
| Producers | 0 (0) | 1(8) | 3 (9)) | 11(22) | 10(10) | 25 | 45 | 1.80 | Very Weak |
| Off Taker | 0 (0) | 0 (0) | 2(6) | 9(18) | 7 (7) | 18 | 31 | 1.72 | Very Weak |
| Transporters | 0 (0) | 0 (0) | 0 (0) | 10(20) | 5(5) | 15 | 25 | 1.67 | Very Weak |
| Consumers | 0 (0) | 0 (0) | 34(102) | 23(46) | 17(17) | 74 | 165 | 2.23 | Weak |
| DFOs | 0 (0) | 1(4) | 1(3) | 4(8) | 2(2) | 8 | 17 | 2.12 | Weak |

Note: N= Number of Respondents, WS= Weighted Score, WMS= Weighted Mean Score

**Charcoal Business Registration**

In Benue State charcoal production was carried out both officially and unofficially by the actors involved in CVC as majority 94. 23% of the charcoal producers in Benue State did not register with State Department of forestry (Table 5). Similarly, 83.33% of Off-taker also did not register. Furthermore, 84.13% of transporters were not registered. Regulators 100% agreed that the three key actor in CVC in Benue State do not register with them.

**4.6.2. Payment of Royalty**

It was established from the study that, 67.31% of producers did not pay any kind of royalty to government or community. Furthermore, 57.89% of Off-takers said they did not pay royalty while 42.11% agreed that they paid some kind of royalty. Additionally, 61.90% of transporters did not pay royalty while only 38.10% did pay, however, 100% of regulators stated that actors in CVC in Benue State did not pay royalty (Table 5).

Three kinds of royalty were listed by respondents, they were Permit, license, tax and levies. For those producers who said the normally paid royalty, especially permit, 100% of these producers stated that they pay N 1000/ tree stand. Both producers and off-takers who agreed that they paid royalty, all of them said they paid N6000 to collect licenses for operation per year. For taxes and levies it was recorded that only Off-takers and transporters that pay for them. Majority 63.16% of those Off-takers who reported to be paying royalty, reported that they paid N200 per each bag of charcoal purchased, while 36.84% said they paid N500 per each bag of charcoal. In the same vain 66.67% of transporters they paid N 200/bag of charcoal conveyed while 33.33% said they paid N 500/bag.

Table 5: **Charcoal Business Registration and Royalty payment**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Production policy and Sustainability** | | **Producers** | | **Off-takers** | | **Transporters** | | **Consumer** | | **Regulators** | |
| Freq | % | Freq | % | Freq | % | Freq | % | Freq | % |
| **Registration of Charcoal Business** | | | | | | | | | | | |
| Yes | | 9 | 5.77 | 19 | 16.67 | 10 | 15.87 | - | - | 0 | 0 |
| No | | 147 | 94.23 | 95 | 83.33 | 53 | 84.13 | - | - | 8 | 100 |
| **Amount paid for Registration of Charcoal Business (N) per year** | | | | | | | | | | | |
| ≥ N 3000 | |  |  |  |  |  | - | - | - | - | - |
| N 6000 | | 9 | 100 | 19 | 100 |  | - | - | - | - | - |
| N 10000 | | - | - | - | - | - | - | - | - | - | - |
| Payment of Royalty | | - | - | - | - | - | - | - | - | - | - |
| Yes | | 51 | 32.69 | 48 | 42.11 | 24 | 38.10 |  |  |  | 0 |
| No | | 105 | 67.31 | 66 | 57.89 | 39 | 61.90 |  |  | 8 | 100 |
| **Kind of royalty paid and Amount paid** | | | | | | | | | | | |
| Permit | N1000/ tree | 9 | 100 | - | - | - | - | - | - | - | - |
| N2000/tree |  |  | - | - | - | - | - | - | - | - |
| License | N6000/year | 9 | 100 | 19 | 100 | - | - | - | - | - | - |
| N 10000 |  |  |  |  |  |  |  |  |  |  |
| Tax and levies | N 200/bag |  |  | 12 | 63.16 | 16 | 66.67 |  |  |  |  |
|  | N 500/bag |  |  | 7 | 36.84 | 8 | 33.33 |  |  |  |  |

Sources: Field Work 2023

**Discussion**

**Awareness of Charcoal Policy in Benue State**

There was poor understating of charcoal policy in Benue State by CVC actors. This agrees with the fact that charcoal continue to be carried out in an informal way in most African countries (Obiri *et al.,* 2014, Jones, 2016, van T Veen *et al.,* 2022). This may be due to poor attention given to charcoal sector in Nigeria, despite its enormous contributions to the energy and financial needs of millions of people both in rural and urban centers. This is evidenced in negligence of charcoal policy in the recent Nigerian National Forest Policy of 2020. The policy only briefly talks about fuel wood without anything, not even the name of charcoal mentioned. This agree with the submission by Zulu (2010) and Bekele and Kemal (2022) that over the years’ charcoal has remained ignored by policy makers in sub-Saharan Africa. Since government has not given the needed attention to the charcoal sector, as many of the regulators prefer charcoal to be informal and this is working in favour of CVC actors, since they are not paying any formal royalty(Jones, 2016, Yeboah-Assiamah *et al.,* 2017). This is another source of revenue leak for the State government. This could be linked to the corruption that has eaten deep in every sector in Nigeria.

**Charcoal Policy in Benue State**

Like many other parts of Africa, charcoal policy in Benue State was ban on production this agreed with the submission by Zulu (2010) Doggart *et al.* (2020) that, charcoal ban on production and consumption was the policy tool used by many countries in Africa. Even though some of the CVC actors were aware of the ban they still operate freely since, even regulators turn a blind eye on the operation of CVC actors in Benue State allowing them to carried out their businesses as if there were no regulation.

**Those Responsible for Policy Enforcement in Benue State**

The enforcement of Forestry laws and policies including charcoal policy in Benue State is responsibility of Department of Forestry in the Ministry of Environment and Water Resources. However, other security agencies like the police try to enforce the ban but end up in their packet. This is in line with the submission that, fraud happens once regulations, laws and rules are not obeyed, as well as those on forest use, that can result in forest degradation and deforestation in many countries (van - Veen *et al.,* 2022).

**Level of Charcoal Policy Compliance in Benue State**

The consensus among the key actors in CVC in Benue State on the level of charcoal policy compliance was very poor. This confirmed submission by other scholars (Girard, 2002, Maes and Verbist, 2012) that charcoal ban in several nations have had partial accomplishment. Zulu (2010) believed that ban on charcoal production have largely pushed charcoal business more into informal means of operating. This is consistent with the conclusion of Aderogba and Adeniyi (2019), they said that in the absence of proper enforcement of charcoal laws by charcoal actors often operate unchallenged.

**Performance of Policies Compliance in Benue State**

Charcoal value chain actors in Benue State were of the opinion that, the performance of charcoal ban policy compliance in Benue State was poor. This means that the policy is not recognized and obeyed by the actors. This is evidenced by the high volume of charcoal that is produced in the state and displaced on the streets and roads all over the state indicating that the policy is not in force.

**Effectiveness of Charcoal Policies Compliance in Benue State**

It was clear from the response of the respondents that the policy was very weak, hence not effective in regulating charcoal production in Benue State. The effectiveness of charcoal policy depends on the political well of the government. Politician do not want to get involved in issues that will make them unpopular since they cannot provide other alternative sources of energy. Other sources available are well beyond the reach of many families (Doggart *et al*., 2022*)*. Enforcing ban on charcoal means you do not want them to live, hence they will go against such government.

**Charcoal Business Registration**

In Benue State charcoal production is carried out both officially and unofficially by the actors involved. This is because CVC actors in Benue State do not register their operation with relevant government agencies like board of Internal Revenue and Forestry Department of Ministry of Water Resources. This confirms the opinion that charcoal production in Africa is done in an informal way (Obiri *et al.,* 2014, Kazimoto, 2015, Jones, 2017). According to Schuure *et al*. (2013) the majority of people involved in charcoal business are doing it in an unofficial way, which means they are not registered and do not pay royalties to the government. Due to royalty avoidance, this results in a large loss of government revenue, and the annual production of charcoal is not well documented (Nyamoga and Solberg, 2019, Marandu, 2021). However, Marandu (2021) feels that, in addition to establishing their charcoal businesses, CVC actors must pay government fees.

**5.5.2. Payment of Royalty**

It was established from the study that, producers in Benue state did not any form formal royalty to government or community. Even though Forestry law of Benue Sate as gazetted in 2015 listed all royalties and fees to be pay be all the actors. This poor payment of charcoal royalties and levies by charcoal value chain actors was reported by other scholars (Obri *et al.,* 2014; Ndegwa *et al.* 2021; Marandu; 2021; Mensah *et al.,* 2024). This implied government is losing a lot of revenue in the charcoal sector.

**Conclusion**

The study reveals a significant lack of awareness and poor compliance with charcoal policies among key actors in the charcoal value chain in Benue State, Nigeria. The majority of producers, off-takers, transporters, and consumers are unaware of charcoal policies, while regulators are fully aware. The study highlights the need for increased awareness, education, and enforcement of charcoal policies to ensure sustainable charcoal production and mitigate environmental degradation. The findings suggest that the current charcoal production practices in Benue State are unsustainable, with significant environmental implications. Therefore, there is a need for stakeholders to collaborate and develop effective strategies for sustainable charcoal production and environmental conservation in the region. This can be achieved by:Increasing awareness and education on charcoal policies among key actors**,** strengthening policy enforcement and compliance monitoring**,** encouraging registration and royalty payment among actorsand promoting sustainable charcoal production practices. By addressing these gaps, the study contributes to the development of effective strategies for sustainable charcoal production and environmental conservation in Benue State, Nigeria.

References

Liyama, M., Neufeldt, H., Dobie, P., Njenga, M., Ndegwa, G., & Jamnadass, R. (2014). The potential of agroforestry in the provision of sustainable woodfuel in sub-Saharan Africa. *Current Opinion in Environmental Sustainability*, *6*, 138-147.

Chiteculo, V., Lojka, B., Surový, P., Verner, V., Panagiotidis, D., & Woitsch, J. (2018). Value chain of charcoal production and implications for forest degradation: Case study of Bié Province, Angola. *Environments*, *5*(11), 113.

Mwampamba, T. H., Herzog, S., Pelletier, J., Kachaka, E. Y., Agyei, F., Aniston, A., ... & Ramilanajoroharivelo, M. (2023). Are policies in Africa conducive to sustainability interventions in the charcoal sector?.

Chiteculo, V., Lojka, B., Surový, P., Verner, V., Panagiotidis, D., & Woitsch, J. (2018). Value chain of charcoal production and implications for forest degradation: Case study of Bié Province, Angola. *Environments*, *5*(11), 113.

Kiruki, H. M., van der Zanden, E. H., Malek, Ž., & Verburg, P. H. (2017). Land cover change and woodland degradation in a charcoal producing semi‐arid area in Kenya. *Land degradation & development*, *28*(2), 472-481.

Neufeldt, H., Fuller, J., & Langford, K. (2015). From transition fuel to viable energy source: improving sustainability in the sub-Saharan charcoal sector.

Hula, M. A. (2010). Population dynamics and vegetation change in Benue State, Nigeria. *Journal of Environmental Issues and Agriculture in Developing Countries*, *2*(1), 53-69.

Hula, M., & Ukpong, I. (2013). Analysis of Vegetation Change in Benue State Using Remotely Sensed Data and Geographical Information System. *Nigerian Geographical Journal*, *9*(1), 122-135.