THE PRAXIS OF FUELWOOD CONSUMPTION AND THE CHALLENGE OF SUSTAINABLE BIODIVERSITY IN NIGERIA

Musediq Olufemi Lawal, Olawale Olufemi Akinrinde,[1] and Abdulwahab Sulyman[2]

Abstract

Most of Nigeria's rural communities rely heavily on fuelwood collection for their livelihood, which has a vital role in sustaining the people's livelihoods and well-being. The uncontrolled fuelwood collection practice among most rural communities has led to massive degradation of the ecosystems, causing a decline in biodiversity. To interrogate how the unsustainable practice of fuelwood collection and consumption among rural dwellers has contributed to the challenge of sustainable biodiversity in Nigeria, data were elicited through questionnaire survey, in-depth interview method, observation and library search techniques. The Interviews involved sessions conducted with community leaders in the study's area, Borgu Emirate Council, Niger state, Nigeria. The study, however, reveals that most rural communities continue to rely on fuelwood as their primary energy source and commercial enterprise and the government has done little to stem the tide of overexploitation of Nigeria's biodiversity. Whilst highlighting the need for attitudinal change for sustainable environmental resource use among rural communities, the study suggests the provisioning of alternative energy use by the government for rural communities.

Keywords: Biodiversity, Environment, Sustainability, Rural communities, Nigeria

[1] Musediq Olufemi LAWAL and Olawale Olufemi AKINRINDE are of Osun State University, Osogbo, Nigeria flawal2005@gmail.com

[2] Abdulwahab SULYMAN is of Department of Agricultural Extension Management, Federal College of Wildlife Management, New Bussa, Nigeria

Introduction

Biodiversity and ecosystem services provide food, medicines, fish and timber products as well as biomass, energy and water-related services that people need for their livelihoods and well-being. In recent years the links between biodiversity and ecosystem services and the benefits people derive from these have received increasing attention (Convention on Biological Diversity, 2010; The Economics of Ecosystems and Biodiversity 2010; Sutherland *et al.* 2009; United Nations Environment Programme, 2007; Millennium Ecosystem Assessment, 2005). There is growing evidence that biodiversity has a vital role in attaining the Sustainable Development Goals: it contributes to poverty reduction and to sustaining human livelihoods and well-being through, for example, underpinning food security and human health, providing clean air and water, and supporting economic development (Asik Ullah, 2017, UNEP, 2007; MEA, 2005).

Too often, the use and management of these provisioning services have neglected to conserve the ecosystems providing them despite their overexploitation. When biodiversity is not conserved, it results in the degradation of regulating and supporting services that are important for overall system functioning and long-term resilience to change and therefore to human well-being. This has been well demonstrated when considering the effects of expanding agriculture and water management (Butler, 2019, Gordon *et al.* 2010; Falkenmark *et al.* 2007).

Decreases in provisioning services may be a definitive signal that a biophysical threshold has already been passed concerning an ecosystem's ability to provide a service (Win *et al.*, 2018a, Westley *et al.* 2011).

Furthermore, the exploitation of natural resources as a key factor in economic growth and development equally portends serious negative environmental and socioeconomic impacts. This includes the destruction and degradation of old-growth forests, the depletion and pollution of water resources, the decimation of fisheries, and the despoliation of land to extract mineral resources. In addition to the localized negative impact on livelihoods and human security, the

environmentally unsustainable exploitation of natural resources can have significant transboundary impacts that pose threats to regional peace and stability (Zerihun and Tariku, 2021, FAO, 2015, Cronin, 2009). Although overexploitation is often difficult to quantify in terrestrial systems, major exploited groups include plants for timber, food and medicine; mammals for wild meat and recreational hunting; birds for food and the pet trade; and amphibians for traditional medicine and food (Peres 2010; Vorosmarty *et al*. 2010; Vie *et al.* 2009; Kura *et al.* 2004; Dulvy *et al.* 2003). In essence, the overall effect of biodiversity non-conservation is that it negatively impacts sustainable human development.

Given the importance of biodiversity and evidence of its ongoing decline (Win *et al.,* 2018b, Shaheen, 2016, CBD, 2010) the need to chart progress in reducing and, as far as possible, reversing the rate of decline has been variously canvassed. Accordingly, biodiversity conservation efforts must recognize the importance of rural communities for the success of such programs. While many conservation efforts concentrate on resource exploitation by urban industries and conglomerates, the important role of rural communities has largely been given inadequate attention.

The most consistent channel through which human activities in rural communities impact biodiversity is uncontrolled fuelwood collection. Reports from the Food and Agriculture Organization (FAO, 1986) reveal that about two million people in rural communities in developing countries depend heavily on biofuel (of which fuelwood is inclusive). The biofuel is used for various purposes which include cooking, heat generation, steam raising, crop drying, and fish as well as meat drying (Olumide and Awolala, 2019, Idris, 2018). The usage is equally prominent in rural industries such as tobacco curing, tea drying, brick and pot burning and bread baking (Fuwape and Onyekwelu, 1995). In Africa, FAO (1986) reported that fuelwood accounts for over 63% of total energy consumed. In Nigeria, over 80% of the population uses fuelwood as a source of energy (Abanikannda and Dantani, 2021, Adesola, 1986).

Despite this, the demand for fuelwood was noted to have been on the increase both in the rural and urban areas of developing countries due to the increase in population and the high cost of conventional fuel such as kerosene and cooking gas. This study responds to this phenomenon by examining natural resource use within rural communities. This is done by examining the rate and pattern of fuelwood consumption in the Borgu Emirate of Niger State. This is to uncover how rural activities have negatively impacted the environment and the corrective steps that are needed.

Methodology

Data for this study therefore were collected through the use of questionnaires (Quantitative), In-depth Interviews, Observation and Library Search for information on existing literature (Qualitative). Key Informant Interviews involved sessions conducted with community leaders in the study setting. These people were included because of their roles in their respective communities. There are 33 Districts within the Borgu Emirate Council of Niger State. For easier accessibility to data, the available 33 districts of Borgu Emirate were clustered into urban and rural. From each of the clusters, 5 districts were sampled making 10 districts altogether. The sampled districts include *Babanna, Kabe, Konkoso, Littenswa, Lumma* (Rural) and *Bussa, Wawa, Fakun, Koro, Nassarawa* (Urban). In each of these districts, 4 traditional quarters were sampled. The quarters were identified by the names of their progenitors. Out of each of these quarters, 5 households were randomly selected from which a respondent was chosen. The head of the household was given the privilege of being the main respondent in line with the existing patriarchal family system that gives priority and respect to male heads of household. Where a head of household was absent, the wife was selected; where the household was polygamous, the most senior wife was considered. Willingness to take part in the study was used in picking replacements in households where qualified persons refused to take part. A total of 200 respondents took part in the questionnaire survey, while 5 major fuelwood sellers and 5 community leaders were randomly selected

from 5 districts across the Emirate as key informants for the in-depth interviews.

The data generated for the study after the administration of questionnaires was analyzed making use of simple percentages to express the findings. Content analysis was employed for the in-depth interviews and documented information from the observations. This involved the direct extraction of information provided in the in-depth interviews and observation to support data from the questionnaires. The Likert Scale was used to analyze attitudinal variables.

Data Presentation and General Discussion of Findings

The socio-demographic characteristics of the respondents revealed that the female gender formed the majority (52%) of the respondents in the study area; this was followed by the male gender (48%). The majority of the respondents (48%) that took part in this study fall within the age category of 31 – 50 years, followed by those within the age group of 51 – 70 years (28%), those who are less than 30 years of age (20%) and people who were more than 71 years of age (4%). In line with the data from the study, the population of the respondents with primary school certificates constituted 14%. This was followed by those who passed through secondary school education (15%), post-secondary school educational qualifications (15%) that comprised of National Diploma, Higher National Diploma and University degree), Qur'anic education (12%) was classified as 'others' and finally, those with no formal education (44%) formed the majority. The marital status of the respondents shows as follows: unmarried respondents constituted 10%; divorced respondents (9%), widowed 8% while married respondents constituted 73%. The Muslims constituted 80% of the study population, while the Christians carried the remaining 20%. This is not surprising since the study is predominantly Muslim-populated. The student population constituted 8%; this was followed by the farmers/fishers (44%), fuelwood sellers (38%) and civil servants (10%). The data from the field equally revealed that more than two-thirds of the respondents (80%) have been residing in the study areas for up to 30 years and above. The remaining respondents have 5%

residency experience in the study areas, while 12% moved to the areas after they retired from formal employment. This last category did not signify the years involved however, those that did are very substantial in magnitude, which justified their involvement in this study as appropriate.

Table 1: Attitudinal Disposition to Fuelwood Consumption

Attitudinal Statements	*Results (Mean)*
Fuel wood is a God-given endowment that is freely available to the people	3.00
Without fuel wood, many people especially the poor wouldn't have survived the harsh economic reality of the society	2.44
The sustenance of society depends greatly on the availability and accessibility of the fuel wood	1.84
I don't believe in other sources of energy for domestic service most especially in cooking but fuel wood	1.76
I have heard from the elites that food prepared through fuelwood usually retains its nutritional value while others do not	2.06
Fuel wood is the main source of energy supply (especially at the domestic level) that I have grown up to know	2.16
Everybody in this community depends on fuel wood as a source of energy thereby showing its importance	2.06
The regularity of fuel wood utilisation also manifests	2.24

through the high visibility of commercial fuel wood sellers in the community	
There is nothing we can do without fuel wood	1.52

Source: Field Survey, 2023

Table 1 revealed the attitudinal disposition of the study population to fuelwood, its usage and related information. According to the data presented in the table, fuel wood was affirmed by the respondents as a God-given endowment that is freely available to the people. It was also confirmed that many people especially the poor wouldn't have survived the harsh economic reality in the society without fuelwood. Other affirmations showed that food prepared through fuelwood usually retains its nutritional value while others do not; that fuelwood was the main source of energy supply, especially at the domestic level; that everybody in the community depends on fuelwood as a source of energy thereby showing its importance and that the regularity of fuel wood utilisation also manifests through high visibility of commercial fuel wood sellers in the community. On the other hand, the population disagreed with the position that there was nothing people could do without fuel wood; and that the sustenance of the society depends greatly on the availability and accessibility to the fuel wood. The result further disagreed with the position of people not believing in other sources of energy for domestic service most especially in cooking but fuel wood.

The perception of the participants in the in-depth interview about fuelwood and other issues surrounding it was showcased by the participants.

In the words of one of them,
"fuel wood is not new to us in this community; we referred to it as '*Itace*' which is a Hausa word that is literarily translated as sticks.

Everybody relies on fuelwood which we also call firewood. There is nothing we are doing within this area without the support of firewood. Right from the time everybody wakes up in the morning till the time when the person goes to bed at night, we make use of fuelwood or firewood in one way or another other (In-depth Interview, Community Leader, Wawa, Borgu Emirate, Niger State)."

Another submission revealed that:
"We cook food with firewood; during the harmattan period the rate of usage becomes more pronounced because we have to heat water for the children to bath, and for us to cook or warm the previously cooked food. We use firewood to make a fire to preserve our food items; we use it to keep the house warm against cold weather. Some people make charcoal out of them (firewood) for commercial purposes. The firewood most often is tied together and stacked by the roadside or side of the house for would-be buyers to see and patronize for sale (In-depth Interview, Traditional Chief/Lumma, Borgu Emirate, Niger State)."

Table 2: Rate and Pattern of Usage of Fuelwood

Statement	**N = 200**	
	Yes (%)	**No (%)**
I rely on fuelwood for domestic consumption	92.0	08.0
Fuelwood has been serving as the source of livelihood for the marketers and their families	59.0	41. 0
Everybody depends on fuelwood in my area hence the availability of people selling fuelwood on a retail basis	55.0	45.0

Every small-scale business such as Dried Fish Enterprise, Local Cheese, and Food vendors depends on fuelwood hence its status as a popular and most used source of energy	90.5	09.5
At every social event like naming, marriage and other festivities, we depend on fuelwood	67.0	33.0
The use of charcoal or animal dung is limited to the domestic front while firewood is common during social festivities or small-scale industrial activities	61.0	39.0
Kerosene is not common in this area; it is an elite source of energy due to its prohibitive tendency	91.0	09.0
Kerosene is available at every filling station, and private Vendors' places but its usage is limited to those who can afford it	56.0	44.0

Source: Field Survey, 2023

The majority of the respondents (92%) rely on fuelwood for domestic power consumption; it was further shown that fuelwood has consistently served as a source of livelihood for fuelwood marketers and their families (59%). The manifestation of the importance of fuelwood was the dependence on the availability of people selling it on a retail basis in the study areas (55%).

It was further shown that the owners of small-scale businesses such as those involved in Dried Fish Enterprise, Local Cheese, and Food vendors depend on fuelwood hence its status as a popular and most used source of energy (90.5%). The pattern of its usage also comes in the form of the prevalence of its usage at every social event like naming and marriage ceremonies and other festivities (67%). Data further showed that the use of *charcoal* or *animal dung* was limited to

the domestic front while firewood was common during social festivities or small-scale industrial activities (61%). Kerosene was regarded as the exclusive preserve of the elite in the rural areas because of its high price (91%) in the rural area while in the urban areas, kerosene was perceived as a commodity made available at every filling station and private vendor place through its usage is limited to those who could afford it (56%).

Table 3: Other Sources of Energy and the Perceived Importance of Fuelwood

Other Sources of Energy			Perceived Importance of Fuelwood		
Response	**Frequency**	**Percentage**	**Response**	**Frequency**	**Percentage**
Fuelwood	114	57.0	Source of employment	36	18.0
Charcoal	10	5.0	Making of Charcoal	20	10.0
Animal Dung	20	10.0	Heating of the House	10	5.0
Agricultural Residues	24	12.0	Ash from it is used for soap-making	14	7.0
Kerosene	32	16.0	Cooking	120	60.0
Total	200	100.0	Total	200	100.0

Source: Field Survey, 2023

Various ways by which fuelwood is being utilized were enumerated by the respondents. These are shown in figure 7. According to this, fuelwood served as a source of employment (18%).

This refers to those that gather fuelwood and offer it for sale to people within the community. People also convert the fuelwood into charcoal (10%), heating the house (5%) and cooking (67%). Other sources of energy known to the respondents according to Figure 8 include fuelwood (57%), charcoal (5%), animal dung (10%), kerosene (16%) and agricultural residue (12%).

The respondents who participated in in-depth interviews corroborated the discourse by revealing the types of energy they have previously used. In the words of one of them,

"There is no source of energy I've not used for cooking. This covered energy sources like firewood, charcoal, animal dung, and farm residue.

Out of these, only charcoal is not readily available, the remaining sources are constantly within reach hence the reliance on their usage. However, the firewood remains my preference any day due to its affordability (In-depth Interview, Community Leader/Lumma, Borgu Emirate, Niger State)."

Fuelwood still ranked the highest preference among the respondents (51%), this was followed by agricultural residue (18%), charcoal (16%), animal dung (10%) and kerosene (5%).

The implication of this is that the people are exclusively limiting the exploits to the environmental resources they could lay their hands on freely within their immediate places of residence. Interestingly, the patterns of energy sources used by the respondent are a reflection of their area of residence.

For example, fossil fuel (cooking gas and kerosene) and electricity are constantly mentioned as part of the energy being used in the urban setting of this study. On the other hand, the respondents who are residents of rural areas rely on biomass (fuel wood and charcoal, agricultural residues, and animal dung) energy sources. Clarification about this was stressed further with the assertion from one of the participants:

> "I prefer kerosene or cooking gas to firewood in the absence of electricity; with the availability of electricity, I don't always have anything to do with other sources of energy. This does not mean I've not used other sources of energy like firewood and farm residue before, but as one progressed economically, the choice of energy source equally changes for the better (In-depth Interview, Community Leader, Koro, Borgu Emirate, Niger State)."

In another words,
it was revealed that electricity is currently my preference, but I can still manage charcoal which makes cooking neater and more economical even more than kerosene which is always sold at prohibitive prices. One can easily control the rate of usage of charcoal and the hazard involved (In-depth Interview, Community Leader/Dogongari (Rafi District), Borgu Emirate, Niger State).

Table 4: Reasons for the Preference of Energy Source(s)

Responses	Frequency	Percentage
Easily available	120	60.0
Socially and economically rewarding	28	14.0
I have been in use since I was born and I don't imagine myself doing otherwise	16	8.0
More reliable than other source of energy	36	18.0
Total	200	100.0

Source: Field Survey, 2023

Individual respondents expressed their minds about the reasons for the preference of their energy source. The reasons cut across the easier availability (60%), social and economic rewards in the usage (14%), some believe that they have been using fuelwood since they were born hence their adaptation to its usage (8%), others saw fuelwood as being

more reliable than other sources of energy (18%) thereby making the reliance on it as a matter of duty (see table 4). These were supplemented by the data from in-depth interviews:

> "Most of the residents here are not financially buoyant. We have been forgotten by the government in terms of infrastructural provision and accessibility to socio-economic utilities. As a result of this, we largely rely on the resources within the environment. In short, the availability, accessibility and affordability of these environmental resources being adopted as sources of energy inform their preference (In-depth Interview, Community Development Official (Male) Agwara LGA, Borgu Emirate, Niger State)."

On the implications of the consumption of fuelwood on their social and economic livelihood, 52% of the respondents affirmed the existence of such implications while 48% did not. Such implications according to the respondents who believed in their existence mentioned issues like poverty (25%), avenues for securing 'food' for their sustenance (18%), improvement in their livelihood (22%) and sources of income (35%). This was corroborated by the respondents who took part in in-depth interviews:

> "Without these resources how can we survive the harsh economic reality in the country? The classification of these resources as gifts of nature bestowed on the people for successful livelihood is not a misnomer. The reality of this is that social life becomes more bearable with these God-endowed natural energy sources and at the same time succour against financial embarrassment one would have found himself in the absence of these sources of energy (In-depth Interview, Community Leader/Shagunu (Shagunu District), Borgu Emirate, Niger State)."

On the institutional efforts geared towards the regulation of environmental resources utilization and consumption, some of the respondents acknowledged that they know a department charged with the responsibility of advising people against uncontrolled utilisation of fuel wood (32%); on the other hand, the majority declined the knowledge of such department (68%). They further affirmed that the department through their officials has approached them on the need to regulate or discontinue reliance on fuel wood before. The rate of presence of such officials within their community was rated and presented in Table 5 below.

Table 5: Regularity of the presence of officials of such department if any

Responses	Frequency	Percentage
Monthly basis	04	02.0
Three monthly basis	02	01.0
Annually	18	09.0
Once in a while	40	20.0
Not Applicable	136	68.0
Total	200	100.0

Source: Field Survey, 2023

According to the table, the rate of the presence of these officials in the course of educating people on sustainable utilization of forest resources includes monthly basis (2%), three monthly bases (1%), annually (9%), once in a while (20%), while the rest classified as 'not applicable' (68%) have nothing to say about this.

These officials were identified as coming from the Nigeria Conservation Fund (NCF), Global Environmental Facilities (GEF), and the National Park Service. Efforts made to understand whether the

missions of these officials were justified through compliance on the part of the respondents revealed several results. For example, none of the respondents was ready to comply with the directives of these officials. Further probing revealed that the respondents acknowledged the reasonability of the advocacy for forest resources conservation. Based on this, only 16% agreed to comply with the need for conservation 'if they could help it' while the remaining 84% were not ready to comply at all. However, the reasons for refusal to comply with the directives of these officials centrally rest on the 'absence of alternative' sources of energy to meet their daily domestic and general needs.

Similar reports from the participants in the in-depth interview sessions affirmed the above. At the same time, the activities of these organizations through their representatives who have been visiting the study settings were further stressed. According to a respondent,

> "the representatives of these institutions have been discussing with us on the need to embark on conservation of plants and animals; they rendered extension services on life supporting activities that will make our areas of residence worthy of living and so on (In-depth Interview, The Traditional Chief/ Malale Community, Borgu Emirate, Niger State)."

Another submission on the activities of these agencies revealed the following:

> "In one of their outings, the representatives of these bodies discussed with us the need for environmental protection programmes for the community sharing boundary/or close to the Parks; basic conservation education was given to us and incentives to discourage environmental degradation were also given to selected members of the societies (In-depth Interview, Community Leader (Male), Guffanti Community, Borgu Emirate, Niger State)."

On the issue of compliance with the directives and the activities of these representatives, it was revealed:

> "We would have loved to comply with their directives but most often there is no follow-up on most of their activities. As a result of this people always revert to what they have been advised against. To cap it all, there is hardly continuity in terms of the visitation by these officials. The visitation is not regular, when they eventually come it is always new faces that had to start afresh rather than continuing from where they stopped or engage in appraisal of the previous activities. There is h or appraise coming to these areas, every time new officials are being sent (In-depth Interview, Community Leader (Female), Babanna Community, Borgu Emirate, Niger State)."

Table 6: Reasons for Non-Compliance

Responses	**Frequency**	**Percentage**
Fuelwood remained the most accessible of all sources of energy	64	32.0
Fuelwood has no serious financial implications	88	44.0
Kerosene remains unaffordable	28	14.0
Non-availability of alternative sources of energy	08	4.0
Absence of no visible income to procure such alternatives in case they were made available	12	6.0
Total	200	100.0

Source: Field Survey, 2023

Some (32%) of the respondents were of the view that fuelwood remained the most accessible of all sources of energy. It was averred that fuelwood has no serious financial implications (44%) and that kerosene remains unaffordable (14%). Other reasons for noncompliance were centered on the non-availability of alternative sources of energy (4%), and the absence of no visible income to procure such alternatives in case they were made available (6%). Interestingly, only 12% of the respondents agreed to comply with these directives should alternative sources of energy be provided by the government and other stakeholders. The remaining 88% were neither willing nor ready to comply with the directives. The reasons provided for readiness not to comply with the rational use of forest resources were itemized in Table 6.

Table 6: Non-readiness to make use of alternative energy sources and Negative effects of Unregulated fuelwood on Climatic Conditions

Non-readiness for Alternative Energy Usage			**Negative Effects of Unregulated Fuelwood**		
Response	**Frequency**	**Percentage**	**Response**	**Frequency**	**Percentage**
Fuelwood is the most reliable in terms of available and quality	08	4.0	No belief in this position	96	48.0
Uncertainty about the availability of alternatives from the	80	40.0	Sin and injustice caused the unfavourable climatic	72	36.0

governme nt			condition		
Accustome d to fuelwood consumpti on	112	56.0	It is God's way of showing His Invincibilit y	32	16.0
Total	200	100.0	Total	200	100.0

Source: Field Survey, 2023

According to the data provided in respect of the above, 56% of the study population was already accustomed to the consumption of fuelwood. Other arguments were based on the absence of a guarantee that support from the government or stakeholders for an alternative source of energy will be sustainable (40%) and that fuelwood as a source of energy for domestic service remains the most reliable in terms of availability and quality outcome (4%), especially in food preparation.

Inference into the data collected from this study on the theory of Scientists (Environmentalists) that unregulated usage of the environment and its resources like fuel wood consumption causes unfavourable and inconsistent climatic conditions showed reactions with social and cultural colouration.

According to a respondent:
"it is sin and injustice in the course of governance that caused the unfavourable and inconsistent climatic condition, and not mere use of resources within the environment (36%); others were of the view that inconsistent climatic condition is God's ways of making people appreciate His presence and what He is capable of doing (16%), while 48% has no iota of belief about such scientific 'jargon'. Inference into this was further given by one of the participants in qualitative (in-depth) studies thus, frustration has made people not believe that

available fuelwood may be exhausted if care is not taken to regulate the usage. In a similar vein, it is very difficult for them to see any correlation between unregulated usage of environment and its resources like fuel wood consumption and inconsistent climatic condition (In-depth Interview, Traditional Chief/Konkoso Community, Borgu Emirate, Niger State)."

Fuelwood constitutes the major forest product from savanna vegetation as it accounts for a larger part of the household energy needs, most especially in rural areas. It is therefore not surprising that the majority of the study population depends on it for their sustenance. The previous studies (Temu, 2002, Fuwape, 1985, Nigeria, 1981) showed that over 90% of the people of Africa depend either on firewood or charcoal for cooking and heating, while approximately 80% of Nigeria's population of more than 100 million depends on fuelwood for cooking. This thus affirmed the rate of reliance on fuelwood as a domestic source of energy in developing societies. The findings of this study also revealed that the residents of the rural area make fuelwood gathering their major occupation.

People also derived energy from agricultural residues hence the revelation which is a pointer to the position of Osakwe *et al.* (1988) that dry wood is collected during land preparation for farming as well as during off-season periods when live plants (trees cultivation and industrial farm-holding expansion) result in the destruction of fresh vegetation and provision of fuelwood for commercial purpose. Poverty was identified from the survey to play a significant role in the energy consumption of the communities under the survey. As the people are poor they are pauperized. Not only this, the increase in population and the high price of kerosene make a tremendous contribution to the rapid rate at which the woody plants are cut to provide fuelwood. This situation has not made them comfortable to subscribe for better alternatives than the most available even if in the long run the most available will not benefit them (Lawal and Irhue, 2019).

The fact that the majority of the poor in Nigeria live in rural areas is not in doubt in this study; Popoola and Akinwumi (2001)

equally asserted that the poor living in rural areas are roughly twice that of the urban poor as a result of which fuelwood became preferable to the consumers due to its low price. As a result of the convenience, affordability and availability, the consumers largely collect fuelwood freely from forest areas and farms in Nigeria while effort in collection was the only cost to such users.

This current situation of things in terms of fuelwood consumption therefore confirmed the prediction of more than one decade ago by UNDP (2002), Kituyi (2002) and FAO (2001) that the majority of African households will continue to depend on traditional fuel to meet their daily energy needs for many decades to come.

The manifestation of this is that the teeming population looks to forestry to meet their increasingly diverse and several needs from the dwindling forest resources basically because of the vicious cycle of poverty. Every attempt at putting pressure on the land and forest with the slight excuse of poverty will continue to render them degraded. Also, the growing population in the country coupled with the limited resources will continue the unsustainable harvest of forest resources and make the destruction of the environment a recurring phenomenon. This therefore makes the need for action to stem this tide a priority.

Conclusion

This study has highlighted the critical role of fuelwood as a major forest product in savanna vegetation, particularly in rural areas, where it constitutes a significant portion of household energy needs. The findings reveal that a vast majority of the population in Africa, including Nigeria, heavily relies on firewood or charcoal for cooking and heating, perpetuating the prevalent dependence on fuelwood in developing societies.

This study also indicates that fuelwood gathering has become the primary occupation for residents in rural areas. Agricultural residues also contribute to the energy supply, especially during land preparation and off-season periods when live plants are cleared for

farming and industrial purposes, leading to deforestation for commercial fuelwood demand.

Poverty emerges as a key factor driving the high consumption of fuelwood. The poor economic conditions, coupled with an increasing population and high kerosene prices, push communities to resort to fuelwood due to its affordability and availability. However, this unsustainable reliance on fuelwood contributes to the degradation of forest resources and the environment, forming a vicious cycle of poverty and environmental decline.

This study has further shown that the rural population's dependence on traditional fuel sources, like fuelwood, is likely to persist for many decades. The continuous pressure on forest resources due to population growth and limited alternatives for energy will exacerbate environmental degradation.

Given the apparent link between poverty, population growth, and forest resource depletion, urgent action is required to address these challenges. Promoting alternative sources of energy, sustainable forest management practices, and income diversification are essential steps to break the cycle of poverty and protect the environment. Government policies and interventions aimed at improving livelihoods, conserving forests, and implementing sustainable practices will be crucial to securing a more balanced and sustainable future for rural communities and their environment.

Recommendations

- Emphasis needs to be put on finding alternative sources of energy, sustainable farming practices, diversification of income, sources and promoting rural development for the youth and marginalized members of the communities.
- Forestry education and extension should be directed at institutional strengthening at the local level to enable communities to actively participate in decision-making processes aimed at conserving the forest and improving the livelihood of rural communities.

The conventional poverty-environment argument is that poorer families are more likely to clear the forest either to grow crops or to cut wood because they have shorter time horizons.

- It is argued that poverty and underdevelopment lead to environmental degradation. In this regard, there should be an alternative government policy to stop such progress.
- Effective ways to address the daily needs of the communities must be identified and implemented.
- There is an increasing realization that the forest not only provides multiple benefits to mankind but also helps in conserving the environment thereby creating global concern for their protection and preservation.
- Human resources being the greatest asset that needs development should also be accorded adequate priority so also is the attitudinal change towards unsustainable use of environmental resources like biomass (firewood, charcoal and others).

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