

Socioeconomic Effects of Fuelwood Exploitation and Illegal Logging Activities on Forest Sustainability and Biodiversity Conservation in Rural Forestry Communities in Imo State, Nigeria

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ABSTRACT

This study explored the socioeconomic impacts of fuelwood harvesting and illegal logging on forest sustainability and biodiversity conservation in rural forestry communities across Nigeria. It aimed to understand how growing reliance on forest resources for household energy, income, and basic livelihood needs contributes to environmental degradation and the loss of biological diversity. The research focused on identifying key socioeconomic drivers behind fuelwood use and unauthorized logging, analyzing their consequences for forest health, and assessing their effects on biodiversity. Additionally, it examined how these practices influence rural livelihoods and proposed strategies for more sustainable forest management. A descriptive survey approach was employed, with data gathered from 150 participants in rural forestry areas using structured questionnaires, interviews, and direct field observations. The collected data were analyzed using descriptive statistics, including frequency distributions, percentages, and mean scores. Results indicated that poverty, joblessness, heavy reliance on fuelwood for domestic energy, poor forest governance, and insufficient enforcement of environmental regulations were the primary factors driving resource overuse. These activities were found to contribute to deforestation, destruction of wildlife habitats, reduced species diversity, soil erosion, and diminished ability of forests to regenerate. While such practices provided immediate economic gains for local households, they also threatened long-term environmental stability and ecological integrity. The study concluded that unchecked fuelwood extraction and illegal logging severely compromise forest sustainability and biodiversity conservation in Nigeria's rural areas. To address these challenges, it recommended to strengthen enforcement of forestry laws, expanding access to alternative energy sources, supporting community-led forest management initiatives, implement afforestation efforts, and increasing environmental awareness through education.

Keywords: Fuelwoods, illegal logging, forest sustainability, biodiversity conservation, rural communities

Introduction

Forests represent a vital natural resource in Nigeria, delivering significant environmental, economic, and social benefits—particularly to rural populations. These ecosystems play a key role in preserving biodiversity, stabilizing the climate, curbing soil erosion, and sustaining livelihoods through the provision of timber, fuelwood, medicinal plants, and various non-timber forest products. In numerous rural areas, fuelwood remains the primary energy source for households, largely due to poverty, unreliable electricity access, and the high cost of other energy options. As reported by [1], more than 70% of rural households across sub-Saharan Africa rely on fuelwood and charcoal for cooking and heating. This widespread dependence has intensified pressure on forest reserves and fueled the rise of illegal logging in many regions of Nigeria.

Illegal logging involves the unregulated cutting, transport, and trade of timber in breach of forestry laws. It persists across Nigeria due to a combination of factors, including poor forest management, corruption, poverty, joblessness, and growing demand for wood products. Both fuelwood collection and illegal logging are now among the leading causes of deforestation and forest degradation in rural forest-dependent communities. These practices undermine biodiversity by destroying natural habitats, diminishing wildlife numbers, and pushing key plant and animal species toward extinction[2] Biodiversity is crucial for maintaining ecological balance and supporting long-term development, as it underpins essential services like pollination, water filtration, nutrient recycling, and climate control. Yet, the ongoing overuse of forest resources has triggered serious environmental issues such as desertification, declining soil fertility, increased flooding, and the loss of wildlife habitats.

Rural communities that rely on forests face growing socioeconomic challenges as these resources dwindle, reducing their access to essential materials and increasing their exposure to environmental risks [3]. Despite efforts by the Federal Ministry of Environment to introduce forest policies and conservation initiatives, illegal logging and fuelwood extraction continue to rise in many areas. This persistent trend highlights the need for a thorough assessment of how these activities impact both biodiversity and rural livelihoods. Hence, this study aims to analyze the socioeconomic consequences of fuelwood exploitation and illegal logging on biodiversity within rural forestry communities in Nigeria.

Nigeria's forests are being rapidly degraded, primarily due to escalating fuelwood use and illegal logging. Rural households depend heavily on fuelwood, driven by economic hardship, lack of modern energy infrastructure, and inconsistent power supply. Concurrently, illegal logging has grown in response to commercial timber demand and insufficient enforcement of forest regulations. Together, these practices have accelerated deforestation and biodiversity decline in rural forest areas. Forest loss has led to the extinction of important species, disruption of habitats, and broader ecological instability. The decline in biodiversity impairs ecosystem functionality and limits the availability of forest-based resources that sustain rural economies. Moreover, unchecked logging and excessive fuelwood harvesting contribute to climate change, soil erosion, and flooding—issues that undermine agricultural output and threaten food security in rural regions.

While earlier research has explored deforestation and forest degradation in Nigeria, few studies have focused on the combined socioeconomic impacts of fuelwood use and illegal logging on biodiversity in rural communities. There is also a lack of solid empirical data on how these activities influence household income, employment opportunities, environmental health, and overall community well-being. As such, this study is needed to generate actionable insights that can support policymakers, environmental authorities, and local leaders in designing effective and sustainable forest management approaches. The main objective of this study is to examine the socioeconomic effects of fuelwood exploitation and illegal logging on biodiversity in rural forestry communities in Nigeria. The specific objectives are to: a). examine the extent of fuelwood exploitation and illegal logging in rural forestry communities in Nigeria; b). Identify the socioeconomic factors responsible for fuelwood exploitation and illegal logging; c). assess the effects of fuelwood exploitation and illegal logging on biodiversity conservation; d). determine the socioeconomic impacts of forest resource depletion on rural households; and e). Identify strategies for reducing illegal logging and promoting sustainable forest management. This research holds significance as it offers valuable insights into the connection between forest use and biodiversity conservation in Nigeria. Its outcomes will assist government bodies, environmental groups, and policy makers in understanding the primary drivers and impacts of fuelwood harvesting and illegal logging in rural areas. The study also supports the creation of stronger forest conservation strategies and promotes sustainable energy options for rural populations. Furthermore, it aims to raise awareness within local communities about the environmental and socioeconomic effects of overusing forest resources.

From an academic standpoint, the research will provide a useful resource for scholars, students, and researchers engaged in forestry, biodiversity protection, environmental governance, and rural development.

Methodology

The research took place in several rural forestry communities in Imo State—specifically Ejemekwuru, Nekede, Egbema, Umuaka, Orogwe, and Amatta. These locations were chosen due to their close access to forest resources and the widespread presence of fuelwood collection, farming, and unauthorized logging. The areas are largely rural and agriculture-based, with a significant number of households relying on forests for household energy, income, and overall livelihood support. The study employed a descriptive survey design to investigate how fuelwood extraction and illegal logging impact forest sustainability and biodiversity conservation in rural Nigerian forestry communities. This approach was chosen because it allowed the researcher to gather data from a broad population and systematically document existing conditions, as well as local perspectives and experiences regarding the use of forest resources and environmental preservation. The study focused on individuals living in selected rural forestry communities, including residents, fuelwood sellers, local timber operators, forestry officers, farmers, and community leaders. These groups were included due to their direct involvement in or exposure to fuelwood harvesting and illegal logging. A total of 150 participants were chosen for the research using a mix of purposive and simple random sampling methods. The purposive approach helped identify communities where illegal logging and fuelwood extraction were most prevalent, while random sampling within those areas ensured fair representation and minimized selection bias. Data were gathered from both primary and secondary sources. Primary information was collected through structured questionnaires, face-to-face interviews, and on-site observations. Secondary data were drawn from academic textbooks, peer-reviewed journals, government documents, environmental reports, conference proceedings, and pertinent online resources related to forestry, biodiversity, and sustainable environmental practices. Collected data were sorted, coded, and analyzed using descriptive statistics, including frequency tables, percentages, and mean values. Findings were displayed in tabular form and interpreted in light of the study's objectives. This process allowed the researcher to pinpoint key socioeconomic drivers behind forest exploitation and evaluate their impact on forest sustainability and biodiversity preservation.

Results and Discussions

Extent of Fuelwood Exploitation and Illegal Logging in Rural Forestry Communities in Nigeria

Table 1 presents data on fuelwood use and illegal logging in rural forestry communities across Nigeria, based on responses from 150 individuals. Most respondents confirmed that both fuelwood harvesting and unauthorized logging are widespread in their areas. The most commonly reported practice was cutting trees for domestic fuel, cited by 142 participants (94.7%), highlighting the strong reliance of rural households on wood as a primary energy source for cooking and other daily needs. A large majority, (92.0%), also pointed to high dependence on fuelwood for heating and cooking, reinforcing the central role of forest resources in meeting household energy demands.

Additionally, 136 respondents (90.7%) observed a noticeable decline in forest cover due to overharvesting, while 131 (87.3%) reported a rise in charcoal production in rural regions, indicating growing commercial pressure on forest ecosystems. Environmental impacts were also evident: 128 respondents (85.3%) noted shrinking wildlife habitats as a result of deforestation, underscoring the adverse effects of logging and fuelwood collection on biodiversity. The commercial dimension of fuelwood use was highlighted by 126 respondents (84.0%), who identified the harvesting of wood for sale in urban markets, showing that this activity serves not only household needs but also provides income. Moreover, 121 respondents (80.7%) attributed illegal logging to inadequate enforcement of forestry laws, while 119 (79.3%) raised concerns about the unlawful cutting of valuable timber species. A further 117 respondents (78.0%) noted that unemployed youth are increasingly involved in logging, suggesting that economic hardship and lack of job opportunities play a significant role in driving forest resource exploitation. We examine the pattern and extent of forest utilization by rural communities in Nigeria with a primary focus on the use of forest resources for fuelwood for domestic use and the derivation of timber for commercial purposes. The study discusses the various effects of the high dependency on forest resources for fuelwood and timber, resulting from the increased population growth rate, persistent poverty levels, and poor forest governance, and their impacts on the local ecology. The study also highlights the various causes of the increased rate of logging activities in Nigeria's forest reserves, which include informal trade, weak law enforcement, and weak forest management, resulting in the depletion of forest resources [4,5]. Evidence from the study reveals that fuelwood remains the primary source of energy in most rural households in Nigeria, with over seventy percent of households relying on it as the primary source of energy for cooking and heating purposes due to its relative affordability compared to other energy sources. This high degree of reliance on fuelwood has resulted in increased deforestation rates and the illegal logging of trees in forest reserves throughout Nigeria, especially in the northern and southern parts of the country. Illegal logging activities pose a significant threat to the forest reserves in Nigeria, hinder reforestation efforts, and cause adverse environmental effects such as loss of forest biodiversity and increased soil erosion rates [6,7].

Table 1: Extent of Fuelwood Exploitation and Illegal Logging in Rural Forestry Communities in Nigeria

S/N	Extent of Fuelwood Exploitation and Illegal Logging Activities	Frequency	Percentage
1	Frequent cutting of trees for household fuelwood	142	94.7
2	High dependence on fuelwood for cooking and heating	138	92.0
3	Commercial harvesting of fuelwood for urban markets	126	84.0
4	Illegal felling of economic timber species	119	79.3
5	Encroachment into forest reserves for logging activities	113	75.3
6	Increase in charcoal production activities	131	87.3
7	Unregulated timber transportation from rural forests	108	72.0
8	Declining forest cover due to excessive tree harvesting	136	90.7
9	Weak enforcement of forestry regulations	121	80.7
10	Increased participation of unemployed youths in logging activities	117	78.0
11	Use of crude and destructive logging methods	110	73.3
12	Reduction in wildlife habitats due to deforestation	128	85.3

Socioeconomic Factors Responsible for Fuelwood Exploitation and Illegal Logging in Rural Forestry Communities in Nigeria

Table 2 outlines the socioeconomic drivers behind fuelwood use and illegal logging in rural Nigerian forest communities, based on responses from 150 individuals. The results highlight a range of economic and social factors that play a key role in the unsustainable use of forest resources. A large majority—145 respondents (96.7%)—cited poverty and low household income as a primary reason, indicating that many people rely on forests for basic survival and income due to limited financial alternatives. Closely following, (95.3%) pointed to unreliable electricity supply in rural areas, which forces households to depend on fuelwood as a primary energy source. Additionally, (94.0%) emphasized the absence of affordable alternative energy options, while 138 (92.0%) noted the high local demand for fuelwood and charcoal, underscoring how domestic energy needs continue to strain forest reserves. Further, (89.3%) linked the problem to widespread unemployment among rural youth, and 132 (88.0%) highlighted the general dependence on forest resources for daily livelihoods, suggesting that limited job prospects push individuals toward logging and wood harvesting. Market incentives also play a significant role, with 129 respondents (86.0%) identifying commercial demand for timber as a driver of illegal logging. Weak enforcement of forestry regulations was acknowledged by 126 respondents (84.0%), pointing to governance gaps that enable unauthorized resource extraction. Other notable factors include the scarcity of non-forestry employment opportunities (82.7%), rising population and associated energy demands (81.3%), low levels of education and environmental awareness (78.7%), and corruption within forestry agencies (77.3%).

In rural forestry communities in Nigeria, the use of fuelwood for cooking and illegal logging activities is mainly determined by various socioeconomic factors. Poverty is the primary cause of fuelwood use and illegal logging in these communities. This is because poor households cannot afford to buy energy from other sources; instead, they rely on fuelwood as it is cheap and easily available. Over 70% of rural households in Nigeria use firewood for their energy needs due to its affordability and availability [7]. The rising population and the increasing demand for energy are putting a great strain on the forest. Rural communities are cutting down trees at an alarming rate to meet their personal needs and generate income from selling the logs. Fuelwood is the mainstay of energy in the northern part of the country, and its trade has significantly become a vital source of income for many families.

Poverty, unemployment, and low-income brackets compel many community members to seek alternative sources of income, such as logging activities. Lack of proper governance and control of forest activities has led to rampant illegal logging activities in the region. Illegal logging is rampant in Nigeria because of poor enforcement of existing policies and extreme poverty among the citizens. Fuelwood use is also determined by the level of education, family size, occupation, and gender of the individual. Most people resort to using fuelwood because it is cheap and easily available. A study performed in Imo State, Nigeria, shows that family size, occupation, and education level are significant determinants of firewood use, with larger families, farmers, and less-educated individuals being more likely to use firewood in their daily lives [8].

It is evident from the above factors that poverty, energy crises, unemployment, and poor governance are the leading forces that determine forest resources use and depletion of forest reserves in rural Nigeria, which has caused environmental degradation.

Table 2: Socioeconomic Factors Responsible for Fuelwood Exploitation and Illegal Logging in Rural Forestry Communities in Nigeria

S/N	Socioeconomic Factors	*Frequency	Percentage
1	Poverty and low household income	145	96.7
2	Lack of affordable alternative energy sources	141	94.0
3	High unemployment rate among rural youths	134	89.3
4	High demand for fuelwood and charcoal	138	92.0
5	Commercial demand for timber products	129	86.0
6	Inadequate electricity supply in rural areas	143	95.3
7	Weak enforcement of forestry laws and regulations	126	84.0
8	Population growth and increased household energy demand	122	81.3
9	Illiteracy and low environmental awareness	118	78.7
10	Corruption among forestry officials	116	77.3
11	Dependence on forest resources for livelihood	132	88.0
12	Lack of employment opportunities outside forestry activities	124	82.7

*Multiple responses

Effects of Fuelwood Exploitation and Illegal Logging Activities on Forest Sustainability and Biodiversity Conservation

Table 3 summarizes responses from 150 participants regarding the impacts of fuelwood harvesting and illegal logging on forest sustainability and biodiversity. The results indicate that unchecked exploitation of forests leads to significant environmental and ecological damage in the region. The most commonly reported consequence was the loss of wildlife habitats, cited by 142 respondents (94.7%), highlighting how these activities are severely undermining habitat integrity and endangering numerous animal species. A large majority, 139 respondents (92.7%), also linked these practices to declining plant biodiversity, pointing to overharvesting as a key factor reducing the diversity of native flora. Additionally, 135 participants (90.0%) noted that fuelwood collection is depleting economically important tree species, particularly those valued for timber and medicinal use. Soil erosion and land degradation were identified by 131 respondents (87.3%) as major outcomes of deforestation, resulting from the removal of protective tree cover. The data further show that 127 respondents (84.7%) believe illegal logging impairs the forest's natural regeneration, limiting its ability to recover after disturbance. A similar proportion, 123 respondents (82.0%), indicated that such activities disrupt ecosystem balance, interfering with the complex relationships among plants, animals, and microorganisms. Declining wildlife populations were observed by 120 respondents (80.0%), while 117 (78.0%) expressed concern that ongoing habitat destruction raises the risk of species extinction. These trends suggest a growing threat to both plant and animal survival. Moreover, 113 respondents (75.3%) reported diminishing availability of medicinal plants, signaling a decline in species traditionally used in local remedies. Deforestation and desertification were attributed to these practices by 110 respondents (73.3%), reflecting shrinking forest areas. Climatic changes at the local level were noted by 106 participants (70.7%), while 101 (67.3%) associated the loss of vegetation with increased flooding and environmental risks. Concerns about the long-term implications were articulated by 98 respondents (65.3%), stating that excessive harvesting of forest resources destroys the forest for future generations.

The destruction of wildlife habitats was the concern of 95 respondents (63.3%). Besides, 91 respondents (60.7%) were equally concerned that the trees could no longer serve their intended purposes, such as storing carbon, leading to ecological imbalance. Indeed, the respondents' concerns showed that fuelwood and illegal logging of trees pose a significant threat to forests, resulting in the destruction of habitats, biodiversity loss, and environmental degradation, among other effects.

Fuelwood and illegal logging of trees have become substantial environmental issues affecting forest ecosystems, especially in developing countries like Nigeria. Most of the rural inhabitants rely on forest products like wood as the primary cooking fuel due to limited access to clean energy. As a result, excessive tree cutting for fuel and illegal logging activities of timber have caused environmental damage and destroyed forest ecosystems [8]. Such illegal activities threaten the forest's ability to contribute to national development and provide essential services like clean air, water, and medicines. Habitat destruction by illegal logging and fuelwood poses a significant risk to the forest's biodiversity and threatens some species' survival. The activities have led to the destruction of forest resources and hindered their ability to adapt to the changing environment. For instance, most tree species that have significant economic value are endangered as a result of the unceasing cutting of trees [9]. Moreover, illegal logging and excessive tree cutting have caused environmental degradation, which has led to desertification, climate change, and ecological imbalance. Similarly, environmental degradation has affected people's ability to obtain a reasonable yield from the forests, especially in the rural areas.

The uncontrolled use of forest resources like illegal logging and excessive harvesting of trees without planting new ones is a critical threat to achieving sustainability. It will be challenging to achieve sustainability using the current rate of biomass consumption for energy production because it reduces the forest's ability to capture atmospheric carbon. As a result, the planet will continue to experience an increase in temperatures [10]. Therefore, measures to control forest resources' unsustainable use and promote afforestation and reforestation programs should be prioritized. Besides that, promoting the use of alternative sources of energy like gas instead of fuelwood should be increased.

Table 3: Effects of Fuelwood Exploitation and Illegal Logging Activities on Forest Sustainability and Biodiversity Conservation

S/N	Effects on Forest Sustainability and Biodiversity Conservation	Frequency	Percentage
1	Destruction of wildlife habitats	142	94.7
2	Reduction in biodiversity of plant species	139	92.7
3	Loss of economically valuable tree species	135	90.0
4	Increased soil erosion and land degradation	131	87.3
5	Decline in forest regeneration capacity	127	84.7
6	Disruption of ecosystem balance	123	82.0
7	Reduction in wildlife population	120	80.0
8	Increased risk of species extinction	117	78.0
9	Reduction in medicinal plant resources	113	75.3
10	Increased desertification and deforestation	110	73.3
11	Alteration of local climate conditions	106	70.7
12	Increased flooding and environmental hazards	101	67.3
13	Reduction in forest resources for future generations	98	65.3
14	Displacement and migration of wildlife species	95	63.3
15	Decline in carbon sequestration capacity of forests	91	60.7

Socioeconomic Impacts of Forest Resource Depletion on Rural Households in Nigeria

Table 4 outlines the socioeconomic effects of forest resource depletion on rural households in Nigeria, based on responses from 150 participants using a four-point Likert scale. A mean score of 2.50 served as the threshold for determining agreement; any item scoring above this value was considered to reflect respondents' consensus. All listed statements received mean scores exceeding 2.50, indicating widespread agreement that deforestation significantly affects rural communities. The statement "Rural households now travel longer distances to obtain fuelwood" had the highest mean at 3.34 (standard deviation: 0.81), highlighting increased difficulty in accessing fuelwood and a greater burden on women and children, who typically collect it. Similarly, the statement "Decreased forest cover has increased exposure to flooding and erosion" scored 3.31 (SD: 0.81), showing strong recognition of the environmental risks linked to forest loss. Other key findings include mean scores of 3.29 for both "Scarcity of fuelwood has increased household energy costs" and "Reduction in forest resources has lowered the standard of living of rural people," underscoring the economic strain caused by diminishing forest resources. Respondents also agreed that access to medicinal plants has declined (mean: 3.25), rural poverty has worsened (mean: 3.23), and food insecurity has grown (mean: 3.23), emphasizing forests' vital role in health, nutrition, and income. Additionally, reduced employment opportunities, lower agricultural yields, and rising conflicts over natural resources each scored 3.19, suggesting that ongoing deforestation undermines both livelihoods and social cohesion in rural areas. The lowest mean, 3.13, was recorded for "Deforestation has caused migration of rural people to urban areas." While this was the least emphasized impact, it still surpassed the 2.50 threshold, confirming that environmental degradation is seen as a contributing factor to rural-urban migration. Standard deviations ranged between 0.80 and 0.85, indicating consistent responses with limited variation among participants.

Forest resources are one of the most critical sources of livelihood for many rural households in Nigeria. These resources include fuelwood, food, medicine, and timber for construction. The forest has been threatened by deforestation, overexploitation, and illegal extraction of forest products. These factors have led to forest degradation that has caused adverse effects on rural households [11]. One of the most significant impacts of the degradation of forest resources is poverty. Most households depend on forest resources to provide a steady income. These people rely on wood fuel, charcoal, and non-timber forest products as sources of income. The depletion of these resources has caused hardship and poverty in many households. Many people are forced to travel long distances to collect firewood and other forest products such as food and medicinal herbs [12].

The degradation of forest resources has caused adverse effects on the food security of rural households. The removal of the forest canopy leads to nutrient exhaustion, reduced and uneven distribution of rainfall, and loss of valuable flora and fauna. These effects of forest degradation lead to low crop yields and poor food security. The inability to produce enough food leads to malnutrition and poverty [13]. The reduced availability of fuelwood affects the ability of rural households to cook food, therefore, leading to poor nutritional levels. Degradation of the forest has also caused adverse effects on the traditional way of life of the people.

The forest provides essential resources such as medicine and food to the community. The removal of these resources brings about adverse effects to the households that depended on the forest as a source of livelihood. Studies show that the forest provides either a primary or secondary livelihood option for many rural households [14]. Forest degradation threatens the survival of many communities. The adverse effects of forest degradation on rural households can be resolved by implementing strategies such as managing the forest sustainably, planting new trees, and creating awareness. Governments should formulate policies that help promote alternative sources of energy and create awareness of the need to save the forest. Policies that enable rural households to participate in income-generating activities reduce poverty levels and encourage people to partake in saving the forest instead of exploiting it.

Table 4: Socioeconomic Impacts of Forest Resource Depletion on Rural Households

S/N	Socioeconomic Impacts of Forest Resource Depletion	Mean	SD	Decision
1	Forest depletion has reduced household income from forest products	3.24	0.84	Agree
2	Scarcity of fuelwood has increased household energy costs	3.29	0.82	Agree
3	Forest resource depletion has increased rural poverty levels	3.23	0.83	Agree
4	Depletion of forests has reduced employment opportunities in rural areas	3.19	0.81	Agree
5	Rural households now travel longer distances to obtain fuelwood	3.34	0.81	Agree
6	Forest depletion has negatively affected agricultural productivity	3.19	0.85	Agree
7	Loss of forest resources has reduced access to medicinal plants	3.25	0.82	Agree
8	Decreased forest cover has increased exposure to flooding and erosion	3.31	0.81	Agree
9	Forest depletion has contributed to food insecurity among rural households	3.23	0.84	Agree
10	Reduction in forest resources has lowered the standard of living of rural people	3.29	0.80	Agree
11	Deforestation has caused migration of rural people to urban areas	3.13	0.84	Agree
12	Forest depletion has increased conflicts over scarce natural resources	3.19	0.85	Agree

Strategies for Reducing Illegal Logging and Promoting Sustainable Forest Management in Rural Forestry Communities in Nigeria

Table 5 outlines strategies for curbing illegal logging and advancing sustainable forest management in rural forestry communities across Nigeria, based on input from 150 respondents. Results show strong backing for a range of policy, environmental, and socioeconomic interventions designed to protect forest resources and biodiversity. A significant majority—142 respondents (94.7%)—viewed stronger enforcement of forestry laws as crucial, highlighting that inconsistent implementation currently enables illegal exploitation and that more rigorous oversight could substantially reduce such activities. Similarly, 140 participants (93.3%) emphasized the importance of afforestation and reforestation efforts, reflecting broad recognition of tree planting as vital for rehabilitating degraded areas and supporting ecological balance. Additionally, 138 respondents (92.0%) pointed to affordable alternative energy sources as a key measure, suggesting that reducing reliance on fuelwood through accessible, cleaner energy options could ease pressure on forests. The data also reveal that 136 respondents (90.7%) favor imposing strict penalties on those involved in illegal logging, while 134 (89.3%) support public awareness and environmental education initiatives, underscoring the need for both deterrents and informed public engagement to encourage responsible forest use.

Community involvement emerged as another critical factor, with 131 respondents (87.3%) affirming that including local populations in forest management enhances sustainability. Equally, 129 respondents (86.0%) saw job creation for rural youth as a way to reduce dependence on illegal logging. Other widely supported measures include increased funding for forestry agencies (128 respondents, 85.3%), establishing local forest monitoring units (126, or 84.0%), and introducing alternative livelihood programs (124, or 82.7%), all aimed at improving governance and providing long-term income sources. Furthermore, 122 respondents (81.3%) advocated for sustainable harvesting techniques, and 120 (80.0%) recommended using modern technology—such as satellite imaging, drones, and GIS—for monitoring forests, indicating that technological tools can play a key role in detecting and preventing unauthorized activities. Overall, the results suggest that tackling illegal logging and achieving sustainable forest management in these communities depend on a multifaceted approach combining law enforcement, education, energy alternatives, community engagement, economic opportunities, and reforestation. Illegal logging and unsustainable forest exploitation have created environmental challenges in Nigeria, especially in forest resources. The issue causes adverse environmental effects to the forest and its inhabitants. It has also resulted in the loss of arable land, biodiversity, and poor climate, and the Nigerian government is considering interventions to control the environmental degradation caused by illegal logging [14, 15]. This paper discusses methods used to control environmental degradation brought about by illegal logging in Nigeria.

There is a need to strengthen forest protection and enforcement policies in Nigeria. The policies should include enhanced monitoring and patrolling of forest areas while also imposing hefty fines on those found guilty of engaging in illegal logging activities. In addition, forests in Nigeria have faced challenges with weak anti-illegal logging law enforcement policies, which have resulted in corruption in the sector [16]. As a result, local communities ought to be involved in surveillance activities to help with monitoring and reporting on illegal logging activities. Participatory forest management will also help in controlling the effects of illegal logging. Local communities ought to take part in decision-making processes regarding the management of the forest. This will promote sustainable forest management practices in rural areas. Forest resources will be utilized appropriately when local communities are involved in forest resource use decisions and benefit-sharing mechanisms. In addition, local communities will profit from the forest resources and, therefore, develop an economic incentive to conserve and utilize the forest resources sustainably [10]. Restoration of degraded forest lands and forests is necessary to help promote forest conservation practices and sustainable forest resource management. Restoration activities such as afforestation, reforestation, and planting indigenous tree species will help improve the forest cover in Nigeria. Governments, communities, the private sector, and NGOs can collaborate in planting trees in villages and schools and encouraging people to plant their trees. Moreover, promoting integrated land-use management techniques such as selective logging and harvesting, and encouraging the establishment of forest plantations will help promote forest conservation practices in Nigeria [9].

The promotion of alternative energy sources will help reduce the demand for woodfuel, thus reducing the pressure to exploit forest resources for fuel in Nigeria.

Alternative energy sources such as liquefied petroleum gas, biogas, solar energy, and improved cookstoves should be promoted and supported in forest communities. Similarly, alternative sources of income such as beekeeping, agroforestry, and subsistence farming should be encouraged to reduce people's dependence on forest resources[17]. Environmental education will also play a critical role in promoting environmental conservation and controlling environmental degradation in Nigeria. Environmental education can help create environmental awareness among rural communities regarding the effects of illegal logging and forest degradation. Environmental education can be conducted in schools and through the local media. Everyone in society must be taught the importance of conserving the environment. Awareness campaigns help people understand their role in promoting environmental conservation, thereby reducing the amount of forest resources they use. It is only through the combined efforts of the government, local communities, and organizations that forest conservation and sustainable management can be achieved in forest communities.

Table 5: Strategies for Reducing Illegal Logging and Promoting Sustainable Forest Management in Rural Forestry Communities in Nigeria

S/N	Strategies for Reducing Illegal Logging and Promoting Sustainable Forest Management	Frequency	Percentage
1	Strengthening enforcement of forestry laws and regulations	142	94.7
2	Provision of affordable alternative energy sources	138	92.0
3	Public awareness and environmental education campaigns	134	89.3
4	Afforestation and reforestation programmes	140	93.3
5	Community participation in forest management	131	87.3
6	Creation of employment opportunities for rural youths	129	86.0
7	Establishment of community forest guards and monitoring teams	126	84.0
8	Promotion of sustainable harvesting practices	122	81.3
9	Provision of alternative livelihood programmes	124	82.7
10	Strict penalties for illegal logging offenders	136	90.7
11	Improved funding and support for forestry agencies	128	85.3
12	Use of modern technology for forest monitoring and surveillance	120	80.0

Source: Field Survey, 2026.

Conclusion

The research on the socioeconomic impacts of fuelwood use and illegal logging in rural Nigerian forest communities highlights how heavy reliance on forest resources has played a major role in environmental decline and weakening forest sustainability. Due to poverty, lack of employment, and limited access to alternative energy, rural households depend extensively on fuelwood and timber for cooking, heating, income, and daily survival. This unchecked resource extraction, however, has intensified deforestation, destroyed habitats, reduced biodiversity, and degraded soil, endangering the ecological stability and long-term health of forest ecosystems. The results also show that unsustainable logging and fuelwood collection carry high social and economic costs for these communities. These include shrinking household incomes, dwindling availability of forest goods, worsening poverty, food shortages, and diminished access to traditional medicinal plants. Women and children are disproportionately affected, as they must travel farther and spend more time gathering fuelwood as forests shrink. Moreover, biodiversity suffers as numerous plant and animal species lose their habitats and face increasing risks of extinction. The study concludes that sustainable forest management is crucial to safeguarding both natural resources and rural livelihoods.

Key steps include stronger enforcement of forestry laws, involving local communities in conservation efforts, expanding tree planting initiatives, providing environmental education, and encouraging the use of alternative energy sources like gas and solar power. Long-term forest sustainability and biodiversity protection will require coordinated action among government bodies, local populations, and environmental groups to meet current needs without compromising future generations.

References

1. Food and Agriculture Organization. (2020). *Global forest resources assessment 2020: Main report*. FAO.
2. Akindele, S. O., & Popoola, L. (2018). Forest resource exploitation and biodiversity conservation in Nigeria. *Journal of Forestry Research and Management*, 15(2), 45–58.
3. Ojo, L. O. (2019). Deforestation and environmental sustainability in rural Nigeria. *International Journal of Environmental Studies*, 76(4), 611–623.
4. Muhammad, A., Melemi, A., & Musa, B. (2023). Economic analysis of fuelwood consumption in Yobe State, Nigeria. *Innovare Journal of Social Sciences*, 11(5), 15–22.
5. Ikuomola, A. D., Okunola, R. A., & Akindutire, A. F. (2016). Criminality: Illegal logging of woods in Nigeria's South-West forest belt. *African Journal of Criminology and Justice Studies*, 9(1), 132–145.
6. Ogunkunle, A. T. J., & Oladele, F. A. (2004). Ethnobotanical study of fuelwood and timber wood consumption and replenishment in Ogbomoso, Oyo State, Nigeria. *Environmental Monitoring and Assessment*, 91(1–3), 223–236.
7. Dabo, A. A., Shehu, A., Shehu, A. U., & Abdulmumin, L. (2016). *An explanation of the factors responsible for fuelwood consumption in Zaria and its region, Kaduna State, Nigeria. Savanna: A Journal of the Environmental and Social Sciences*, 22(2), 45–53.
8. Egwuonwu, H. A., & Nweke, A. P. (2018). Influence of socio-economic factors of rural households on fuelwood consumption in Orlu Agricultural Zone of Imo State, Nigeria. *Journal of Energy Research and Reviews*, 2(1), 1–6.
9. United Nations Environment Programme. (2021). *Making peace with nature: A scientific blueprint to tackle the climate, biodiversity and pollution emergencies*. UNEP.
10. World Bank. (2020). *Forests for climate and biodiversity conservation*. World Bank Publications.
11. Adedigba, B. K., Oyetayo, O., Olaitan, A. A., & Olukemi, A. D. (2025). *Assessing the impact of forest proximity on household economic well-being in rural Nigeria*. Dynamics of Rural Society Journal, 3(2).
12. Fonta, W. M., Ichoku, H. E., & Ayuk, E. (2011). *The distributional impacts of forest income on household welfare in rural Nigeria*. Journal of Economics and Sustainable Development, 2(2).
13. Olawuyi, E. B., Odeyale, O. C., & Agboola, F. O. (2020). *Impact assessment of deforestation on rural households' livelihoods in Olokemeji Forest Reserve of Ogun State, Nigeria*. FUOYE Journal of Agriculture and Human Ecology, 3(1).
14. Food and Agriculture Organization. (2022). *The state of the world's forests 2022: Forest pathways for green recovery and building inclusive, resilient and sustainable economies*. FAO.
15. Amusa, T. A., Ahamefule, B. A., & Iwezor-Magnus, D. N. (2023). *Binary estimation of factors influencing rural households' involvement in forest products harvesting in Abia State, Nigeria*. Ife Journal of Agriculture.
16. Ogunjinmi, A. A., Umunnah, J. O., & Aiyeloja, A. A. (2013). *Socio-economic and environmental impacts of forest exploitation in Nigeria*. International Journal of Biodiversity and Conservation, 5(3), 148–154.
17. Arowosoge, O. G. E., & Popoola, L. (2010). *Economic analysis of wood fuel production and consumption in Nigeria*. Journal of Agriculture and Social Research, 10(1), 1–8.