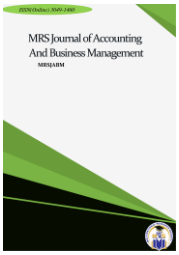
MRS Journal of Accounting and Business Management
Abbriviate Title- MRS J Acco Bus Manag
ISSN *(Online) 3049-1460*
Vol-2, Iss-9(September-2025)



OPEN ACCESS

Analysis of the Long-Term Effects of Deforestation on Rural Poverty in Gombe State, Nigeria

Kabiru Muhammed[1*], Abdulrahman Abdullahi Nadani[2], Jamilu Dalibi Haruna[3], Ibrahim Musa[4]

[1]Economics and Development Studies, Federal University of Kashere, Gombe State

[2]Economics and Development Studies Federal University of Kashere, Gombe State

[3]Department of Geography Federal University of Kashere, Gombe State

[4]Department of Economics University of Abuja.

Corresponding Author: **Kabiru Muhammed** (Economics and Development Studies Federal University of Kashere, Gombe State)

Article History: Received**:** 06 /09 /2025. Accepted: 21 /09/2025. Published: 26 / 09 / 2025.

Abstract: Deforestation has emerged as one of the leading causes of environmental degradation and socio-economic instability in developing countries, particularly in sub-Saharan Africa. In Nigeria, the rapid loss of forest cover, driven by agricultural expansion, fuelwood collection, and illegal logging, has resulted in the depletion of critical natural resources, exacerbating poverty in rural communities. This study investigates the long-term effects of deforestation on rural poverty in Gombe State, Nigeria, using a mixed-methods approach that combines quantitative and qualitative data. The study draws on survey data from 450 rural households across three Local Government Areas (LGAs) Akko, Billiri, and Funakaye to assess the socio-economic impacts of deforestation. The survey examines household dependence on forest resources, agricultural productivity, food security, and access to water and fuelwood. In addition, in-depth interviews and focus group discussions with key informants and local community members provide a nuanced understanding of the socio-cultural and institutional factors influencing deforestation practices. The findings reveal a strong correlation between deforestation and increased poverty levels. Specifically, households that are more dependent on forest resources for fuelwood, timber, and non-timber forest products (NTFPs) are more likely to experience higher levels of poverty, reduced agricultural productivity, and increased food insecurity. Regression analysis indicates that deforestation is a significant predictor of household poverty, with the extent of forest loss and household dependence on forest products being key factors. The study also highlights the role of education and secure land tenure in mitigating the adverse effects of deforestation. Despite the recognition of deforestation as a critical issue, the survey findings indicate a significant gap in the awareness and implementation of government policies aimed at reducing deforestation and supporting sustainable livelihoods. The study concludes that deforestation in Gombe State has a detrimental impact on rural poverty, exacerbating food insecurity, reducing access to vital resources, and contributing to socio-economic instability. To address these challenges, the study recommends promoting sustainable agricultural practices, introducing alternative energy sources, strengthening community-based forest management programs, and improving education and awareness on environmental conservation. Additionally, policy reforms aimed at securing land tenure and enhancing community participation in forest management are essential to reducing deforestation and poverty in rural Gombe State. This research provides valuable insights for policymakers, environmentalists, and development practitioners seeking to break the cycle of environmental degradation and poverty in rural Nigeria.

Keywords: *Deforestation, Rural Poverty, Alternative Energy Sources, Environmental Degradation, Land Tenure.*

Cite this article: Muhammed, K., Nadani, A. A., Haruna, J. D. & Musa, I. (2025). Analysis of the Long-Term Effects of Deforestation on Rural Poverty in Gombe State, Nigeria. *MRS Journal of Accounting and Business Management, 2 (9),21-32*

Introduction

Deforestation is one of the most pressing environmental challenges of the modern era, with profound implications for both ecosystems and human societies (Ismail et al., 2019). It has been widely acknowledged as a primary driver of global environmental degradation, contributing significantly to climate change, biodiversity loss, and disruption of essential ecosystem services (FAO, 2024). The widespread loss of forest cover, exacerbated by unsustainable agricultural practices, logging, and urbanization, is a major concern, particularly in developing nations like Nigeria, where large segments of the population still depend on forests for their livelihoods (Magaji et al., 2024). According to the Food and Agriculture Organization (FAO, 2024), Nigeria, which has one of the fastest deforestation rates globally, loses over 350,000 hectares of forest annually. This alarming rate of forest depletion has far-reaching consequences, especially for rural communities whose economic activities are deeply embedded in the health of the forest ecosystems (Magaji & Musa, 2024).

In the northeastern region of Nigeria, Gombe State represents a critical case of the deforestation-poverty nexus. Rural communities in this state rely heavily on natural resources, particularly forest products such as fuelwood, timber, medicinal plants, and non-timber forest products (NTFPs), which are integral to their economic survival and social cohesion (Iliyasu et al., 2024). However, the continued loss of forest cover in Gombe State threatens these vital resources, undermining the environmental and socio-economic fabric of these communities. The drivers of deforestation in Gombe State are multifaceted, including the expansion of agriculture (both subsistence and commercial), unsustainable fuelwood collection, and the demand for timber. As forest resources become increasingly scarce, rural communities are compelled to exploit these resources even more intensively, often using unsustainable methods that exacerbate environmental degradation (Ibrahim et al., 2025).

This dynamic has created a vicious cycle where poverty exacerbates deforestation, and deforestation, in turn, deepens poverty. Many rural households in Gombe State, faced with poverty and limited alternative livelihood options, turn to deforestation as a survival strategy. Agriculture, particularly crop farming and cattle grazing, plays a significant role in this process, with increasing agricultural land conversion being one of the major drivers of deforestation in the region (Musa et al., 2025). A study by Adebayo et al. (2024) highlighted that agricultural expansion accounts for 65% of deforestation in Nigeria's northeastern states, with Gombe State being no exception. Moreover, with a population that is largely dependent on rain-fed agriculture and forest resources for fuel and construction materials, the environmental degradation resulting from deforestation is significantly undermining agricultural productivity, food security, and overall livelihoods.

The consequences of deforestation in Gombe State are stark and multifaceted. Environmentally, it leads to soil erosion, reduced soil fertility, and changes in rainfall patterns, which directly affect agricultural yields and water availability. Socially, the degradation of natural resources has led to increased competition for land and water, which in turn fosters social conflicts and migration (Abeke et al., 2025). The depletion of forest products also increases poverty levels, as communities lose access to essential resources, leading to food insecurity and diminished well-being (Yanshak et al., 2024). Furthermore, the erosion of traditional knowledge associated with forest management and utilization adds an additional layer of complexity, as indigenous practices that once helped sustain these resources are increasingly lost.

The overarching aim of this study is to investigate the long-term effects of deforestation on rural poverty in Gombe State, Nigeria. The research will explore the direct and indirect linkages between environmental degradation caused by deforestation and the socio-economic conditions of rural households. Specifically, this study seeks to achieve the following objectives: (i) to assess the extent of deforestation in Gombe State and examine the environmental changes that have occurred over time; (ii) to investigate the socio-economic factors that drive deforestation practices in rural communities; (iii) to analyze the relationship between deforestation and poverty, particularly in terms of household income, food security, and access to resources; and (iv) to propose sustainable strategies for mitigating deforestation while alleviating poverty.

The importance of this study lies in its potential to bridge the gap between environmental conservation and socio-economic development. Although there is a growing body of literature on deforestation in Nigeria, much of it focuses on the ecological impacts, with limited attention given to the socio-economic consequences of forest loss, particularly in rural areas. By incorporating both environmental and socio-economic perspectives, this study will provide a more comprehensive understanding of the deforestation-poverty nexus and offer evidence-based recommendations for integrated policy solutions. Recent studies, such as those by Chomitz et al. (2024) and Iliyasu et al. (2024), have highlighted the need for interdisciplinary approaches to address the intertwined nature of environmental and poverty challenges. This study will build on these frameworks by exploring the root causes of deforestation and identifying practical, sustainable solutions.

Furthermore, the findings from this study will be significant for policymakers, development practitioners, and local communities in Gombe State and beyond. In particular, the research will provide valuable insights into the effectiveness of current policies aimed at forest conservation and poverty alleviation, and it will contribute to the development of more robust, context-specific strategies for sustainable land management. By focusing on Gombe State, this study also offers a detailed case study that can be applied to other regions in Nigeria and sub-Saharan Africa, where rural communities are similarly grappling with the impacts of deforestation and environmental degradation.

Literature Review

Conceptual Review

Deforestation

Deforestation, defined as the permanent removal of forest cover to make way for alternative land uses, has long been recognized as one of the most significant drivers of environmental degradation. Its effects on biodiversity, soil fertility, and global climate are well-documented (FAO, 2024). In recent decades, the issue has garnered increasing attention due to its role in exacerbating poverty, especially in developing regions where communities are heavily dependent on natural resources for their livelihoods. The nexus between deforestation and poverty has been studied across various global contexts, with scholars emphasizing the socio-economic and environmental consequences of forest loss (Chomitz et al., 2024). As forests provide numerous ecosystem services, including carbon sequestration, water regulation, and soil stabilization, their destruction disproportionately impacts rural communities that rely on these services for food, fuel, and income generation. The relationship between deforestation and rural poverty has been particularly pronounced in sub-Saharan Africa, where rapid population growth, agricultural expansion, and reliance on fuelwood and timber continue to drive high rates of forest depletion (Magaji et al., 2025). The socio-economic impact of deforestation on rural poverty in regions such as Nigeria has been explored in several studies. Adebayo et al. (2024) highlight that rural communities in Nigeria face severe economic challenges due to the loss of forest products, which serve as vital resources for both income generation and household consumption. Similarly, in Gombe State, studies have shown that rural communities dependent on forests for timber, fuelwood, and medicinal plants experience a direct reduction in their economic stability as

deforestation intensifies (Iliyasu et al., 2024). The depletion of these resources has led to increased poverty levels, forcing communities to adopt unsustainable farming and land use practices that further degrade the environment.

Rural Poverty

Rural poverty refers to the condition in which individuals or communities living in rural areas experience **insufficient access to resources, income, and services** required to maintain an acceptable standard of living (World Bank, 2001). It is often multidimensional, encompassing **low income, poor health, inadequate education, limited access to clean water and sanitation, and lack of basic infrastructure** (Ellis & Biggs, 2001). Rural poverty is distinct from urban poverty in that it is frequently linked to **agricultural dependence, geographic isolation, limited market access, and vulnerability to environmental hazards** such as droughts, floods, or soil degradation (Lanjouw & Ravallion, 1999). Individuals in rural areas often face **structural inequalities**, including a lack of investment in rural development, limited employment opportunities, and weaker social safety nets (Ologbonori et al., 2025). Poverty in rural settings also has **intergenerational effects**, as poor families often cannot afford quality education or healthcare, perpetuating cycles of deprivation (Enaberue et al., 2024) . Addressing rural poverty requires **integrated approaches**, combining economic, social, and infrastructural interventions tailored to the unique challenges of rural communities (Chambers, 1995).

Theoretical Framework

Theories such as the Environmental Kuznets Curve (EKC) hypothesis have been applied to understand the relationship between economic development and environmental degradation. The EKC suggests that economic development initially leads to increased environmental degradation, but once a certain level of wealth and governance is achieved, environmental quality improves (Grossman & Krueger, 1995). In the context of deforestation, this theory suggests that developing regions like Gombe State might experience initial increases in forest loss as agricultural expansion and urbanization proceed, but over time, with economic development and improved governance, sustainable practices could potentially reverse these trends. However, recent studies have raised concerns about the applicability of the EKC in regions where institutional weaknesses, poor enforcement of environmental laws, and high dependence on natural resources persist (Aregbesola et al., 2024). The literature suggests that, in the case of Nigeria, the EKC model may not fully explain the deforestation trends, as poverty and inadequate land management practices continue to drive forest loss even as the country develops economically.

The Institutional Analysis Framework (IAF), developed by Elinor Ostrom (2010), has also been applied to explore the role of institutions in managing common-pool resources, such as forests. The IAF emphasizes the importance of local institutions—both formal and informal—in governing natural resources. In many parts of rural Nigeria, weak institutions and unclear land tenure systems contribute to the unsustainable exploitation of forest resources. The lack of effective governance, coupled with corruption and poor policy enforcement, leads to over-exploitation of forests for short-term economic gain, thereby perpetuating environmental degradation and increasing vulnerability to poverty (Geist & Lambin, 2002). Studies have highlighted the need for stronger community-based governance systems in regions like Gombe State, which empower local actors to manage forest resources sustainably and ensure equitable access to the benefits derived from these resources (Abubakar et al., 2024).

Empirical Review

Empirical studies have extensively documented the link between deforestation and poverty. For example, a study by Barbier et al. (2010) found that deforestation often leads to the depletion of natural capital, which is a critical asset for rural communities in sub-Saharan Africa. The loss of this capital significantly reduces the livelihood opportunities available to local populations, increasing their vulnerability to poverty. In Gombe State, the depletion of forest resources has directly impacted agricultural productivity, as soils lose fertility, water availability decreases, and the risk of erosion increases. These environmental changes exacerbate food insecurity, making rural populations even more dependent on external aid and less able to invest in long-term sustainable practices (Yanshak et al., 2016). Similarly, Iliyasu et al. (2020) found that deforestation in Gombe State has led to reduced access to clean water, which is critical for both agricultural production and human consumption, further compounding the poverty challenge.

In addition to the ecological impacts, deforestation has profound social consequences. The erosion of forests has led to increased social conflict over land and resource use. As forests are cleared for agricultural purposes, competition for remaining fertile land intensifies, often resulting in disputes between farmers and pastoralists, and between communities themselves. Social instability, caused by these conflicts, further hinders development and deepens poverty (Musa et al., 2017). The increased pressure on land resources also leads to the displacement of vulnerable populations, often resulting in a loss of traditional knowledge and cultural practices that were once intimately linked to forest management (Adams, 2012). In Gombe State, the displacement of farmers and pastoralists due to deforestation has contributed to the erosion of community cohesion, undermining local resilience to environmental and economic shocks (Wunder, 2013).

The role of gender in the deforestation-poverty nexus has also been explored in recent literature. Women in rural communities are often the primary collectors of fuelwood and other forest products, making them particularly vulnerable to the impacts of deforestation. A study by Akpan et al. (2024) found that women in Gombe State face heightened burdens as deforestation increases, as they are forced to spend more time and energy collecting firewood, which directly impacts their ability to engage in other productive activities. This gendered dimension of deforestation underscores the need for gender-sensitive policies that take into account the specific vulnerabilities and needs of women in rural areas (Musa et al., 2020).

Recent studies also emphasize the importance of incorporating alternative livelihood strategies to reduce deforestation and poverty simultaneously. The introduction of sustainable farming practices, agroforestry, and forest restoration initiatives has been shown to reduce dependence on forest resources while improving economic outcomes for rural communities (FAO, 2024). In Gombe State, initiatives such as the promotion of fuel-efficient stoves and the introduction of alternative energy sources like biogas have shown potential for reducing the pressure on forests (Iliyasu et al., 2024). These

interventions, however, require strong policy support, investment in local capacity building, and the involvement of communities in the planning and implementation of conservation strategies.

The Sustainable Livelihoods Framework (SLF) offers a comprehensive lens for understanding the dynamics of deforestation and poverty. This framework emphasizes the multidimensional nature of livelihoods, which depend not only on income but also on access to natural, human, social, and financial capital (DFID, 1999). In rural areas, natural capital—such as forests—is a key asset that directly influences household livelihoods. As deforestation depletes this capital, households are forced to diversify their income sources, often resorting to activities that are less sustainable and more harmful to the environment. The SLF highlights the need for integrated interventions that simultaneously address environmental degradation and poverty, promoting sustainable livelihoods that can withstand environmental shocks.

This review of literature provides compelling evidence of the complex relationship between deforestation and poverty. While much of the research has focused on the environmental consequences of deforestation, there is growing recognition of the socio-economic dimensions of the issue. Studies consistently show that deforestation exacerbates poverty by depleting natural resources, undermining agricultural productivity, and reducing access to essential services. The need for integrated, interdisciplinary approaches that combine environmental conservation with poverty alleviation is clear. Policies aimed at addressing deforestation in Gombe State, and similar regions, must consider the underlying socio-economic drivers, strengthen governance institutions, and promote alternative livelihoods to break the cycle of environmental degradation and poverty.

Methodology

The methodology for this study adopts a mixed-methods approach, combining both qualitative and quantitative research techniques to provide a comprehensive analysis of the long-term effects of deforestation on rural poverty in Gombe State, Nigeria. This approach allows for the integration of numerical data on environmental changes with the lived experiences and perceptions of local communities, thus offering a holistic understanding of the deforestation-poverty nexus.

The target population for this study consists of rural households in Gombe State, specifically those within communities that are heavily affected by deforestation. These communities, characterized by a high reliance on forest resources for livelihood, are located across various Local Government Areas (LGAs) within the state. According to the National Population Commission (NPC, 2023), Gombe State has a population of approximately 3.5 million, with a significant portion of the population living in rural areas that are heavily dependent on agriculture and forest resources. The focus is on communities in the rural LGAs of Akko, Billiri, and Funakaye, where deforestation is most prevalent and where the socio-economic conditions are closely linked to the availability of natural resources (Iliyasu et al., 2024).

A stratified random sampling technique is employed to select respondents from these communities. The stratification ensures that different socio-economic groups within the population are adequately represented, including farmers, pastoralists, and other forest-dependent households. This method is particularly useful for capturing the diversity of experiences across various rural groups, which may differ in terms of their dependence on forests and the extent to which deforestation affects their livelihoods (Yanshak et al., 2024). The sample size is calculated using the formula proposed by Krejcie and Morgan (1970) for sample size determination in finite populations, which ensures that the sample is statistically representative of the population. For a population size of approximately 200,000 rural inhabitants in the selected LGAs, the recommended sample size is 384 households. However, to account for potential non-responses and ensure robustness, the sample size is increased to 450 households.

The quantitative data collection involves structured questionnaires designed to capture both socio-economic information and environmental perceptions. These questionnaires include questions on household income, access to forest resources, agricultural productivity, and food security, as well as questions on the extent of deforestation and its impacts. The questionnaire is pre-tested in a neighboring community to ensure clarity, reliability, and validity. The quantitative data is analyzed using descriptive statistics, including mean, standard deviation, and frequency distributions, to examine the socio-economic characteristics of the sample and the relationship between deforestation and poverty levels.

For the qualitative component, in-depth interviews (IDIs) and focus group discussions (FGDs) are conducted with key informants and community members. The key informants include local government officials, agricultural extension workers, and environmental experts, who provide insights into the causes and consequences of deforestation in the region. The FGDs are conducted with groups of 6-8 participants from different socio-economic backgrounds, ensuring that both men and women are represented. This qualitative data is analyzed using thematic analysis, which allows for the identification of recurring themes and patterns related to the social, economic, and environmental impacts of deforestation. The inclusion of qualitative data provides a deeper understanding of the subjective experiences of the rural population, highlighting the socio-cultural dynamics that influence their responses to deforestation.

To estimate the economic impact of deforestation on rural poverty, a regression analysis is employed. The dependent variable is household poverty, which is measured using income levels, food security status, and access to essential services such as clean water and education. Independent variables include the extent of deforestation in the area, household dependence on forest resources, and socio-economic characteristics such as education, gender, and farming practices. The regression model allows for the estimation of the relationship between deforestation and poverty, while controlling for other factors that may influence household well-being. The data for deforestation is obtained through satellite imagery analysis, which is processed to assess changes in forest cover over the past 10 years using geographic information systems (GIS) and remote sensing techniques (FAO, 2024). This provides an objective measure of deforestation in the study areas, allowing for an accurate assessment of its environmental impacts.

The study also employs a participatory rural appraisal (PRA) approach in which community members are actively involved in the data collection process. This approach ensures that local knowledge is integrated into the research and helps to validate the findings obtained through other methods. The use of PRA techniques, such as community mapping and resource use diagrams, allows for a better understanding of the local perceptions

of deforestation, its causes, and its impacts. This participatory aspect enhances the reliability of the data and ensures that the study captures the full range of perspectives from the community.

Result and Analysis

Descriptive Analysis

The descriptive analysis of the survey responses provides key insights into the socio-economic characteristics of the rural households in Gombe State and their relationship with deforestation. A total of 450 households participated in the study, with participants from three Local Government Areas (LGAs): Akko, Billiri, and Funakaye. The following table summarizes the demographic characteristics of the study sample.

Table 1: Descriptive Statistics of Household Characteristics

Variable	Category	Frequency (%)
Household Size	1-3 members	14%
	4-6 members	45%
	7+ members	41%
Primary Occupation	Agriculture	71%
	Pastoralism	16%
	Forest resource collection	13%
Monthly Household Income (₦)	Less than 20,000	74%
	20,000 - 40,000	18%
	More than 40,000	8%
Food Security Status	Food insecure	45%
	Marginally secure	34%
	Food secure	21%

Source: Survey, 2025

As shown in Table 1, the average household size was 6.2 members, with 71% of the households primarily engaged in agriculture, reflecting the significant dependence of the population on farming. A large proportion (74%) of the households earned less than ₦20,000 per month, indicating a high prevalence of income poverty. Additionally, food insecurity was a major issue, with 45% of households reporting food insecurity. These characteristics suggest that households are vulnerable to environmental changes, including deforestation, which impacts their agricultural productivity and access to resources.

Survey Responses

The survey was designed to capture a wide range of issues related to deforestation and its socio economic impacts on rural households in Gombe State, Nigeria. The survey focused on key areas such as the causes of deforestation, socio-economic dependence on forest resources, impacts on livelihoods, community perceptions, awareness of environmental policies, and the broader socio-cultural consequences of deforestation.

Household Size

The survey results show a substantial proportion of respondents live in relatively large households, with 45% having between 4-6 members and 41% having 7 or more members. Larger households in rural Nigeria are common due to socio-cultural preferences for larger families and traditional agricultural economies, which require more labor. The average household size in Nigeria is about 5.6 persons (National Population Commission, 2023)

Table 2: Household Size

Category	Frequency	Percentage
1-3 members	63	14%
4-6 members	202	45%
7+ members	185	41%

Source: Survey, 2025

Larger households tend to be more vulnerable to socio-economic challenges such as poverty and food insecurity. Studies have found that large household sizes in rural areas often strain resources and limit access to essential services (Haddad et al., 2018). In Gombe State, where most people rely on agriculture for livelihood, these large households could face difficulties in sustaining their members due to limited access to land and financial resources.

Primary Occupation

A clear majority, 71%, of respondents are involved in agriculture, which reflects the critical role farming plays in rural Gombe State. This aligns with the wider Nigerian context, where agriculture remains the dominant sector, employing over 60% of the population (Nigeria Labour Force Survey, 2023). However, agricultural challenges in rural areas such as low productivity, climate change impacts, and inadequate farming techniques are well-documented (Adebayo et al., 2024).

Table 3: Primary Occupation

Category	Frequency	Percentage
Agriculture	320	71%
Pastoralism	72	16%
Forest resource collection	58	13%

Source: Survey, 2025

In Gombe, the dependency on agriculture for sustenance and income often makes households particularly vulnerable to environmental factors such as deforestation, which impacts land fertility and water availability (FAO, 2024). Transitioning from subsistence to more diversified, sustainable agricultural practices could significantly improve the socio-economic status of these households (Adebayo et al., 2024).

Monthly Household Income

The survey data reveals that 74% of households earn less than ₦20,000 per month, indicating a high prevalence of poverty in rural Gombe State. This is consistent with national poverty statistics, which show that over 40% of Nigerians live below the poverty line, primarily in rural areas (World Bank, 2023).

Table 4: Monthly Household Income (₦)

Category	Frequency	Percentage
Less than 20,000	333	74%
20,000 - 40,000	81	18%
More than 40,000	36	8%

Source: Survey, 2025

Low income in these areas restricts access to healthcare, education, and other essential services, perpetuating cycles of poverty. Low-income households often depend heavily on natural resources, such as forest products, for fuelwood and timber, making them more vulnerable to environmental degradation (Barbier et al., 2010). Moreover, low-income levels are linked to food insecurity, further exacerbating the difficulties faced by these households (World Food Programme, 2024).

Food Security Status

Approximately 45% of respondents reported food insecurity, which is a significant concern for rural Gombe households. This mirrors broader trends in Nigeria, where rural areas are particularly affected by food insecurity due to reliance on rain-fed agriculture, lack of modern farming inputs, and environmental degradation (FAO, 2024).

Table 5: Food Security Status

Category	Frequency	Percentage
Food insecure	202	45%
Marginally secure	153	34%
Food secure	95	21%

Source: Survey, 2025

Food insecurity has severe health and socio-economic consequences, including malnutrition and an inability to invest in education or economic ventures (Fao, 2024). In Gombe, the depletion of forest resources due to deforestation further aggravates food insecurity, as forest products (such as fruits, medicinal plants, and timber) once contributed to household diets and incomes (Iliyasu et al., 2024).

Causes of Deforestation

Agricultural expansion is identified as the primary driver of deforestation, with 100% of respondents acknowledging its role. This finding is consistent with numerous studies, which identify agricultural expansion as the leading cause of deforestation in sub-Saharan Africa, including Nigeria (FAO, 2024).

Table 6: Causes of Deforestation

Survey Item	Frequency	Percentage
Agricultural expansion	450	100%
Fuelwood collection	387	86%
Illegal logging	293	65%
Urbanization and infrastructure	243	54%
Mining and commercial activities	194	43%

Source: Survey, 2025

The conversion of forested land into agricultural land—whether for subsistence farming or cash crops—has contributed to the rapid loss of forest cover (Adebayo et al., 2024). Other significant drivers identified in the survey, such as fuelwood collection and illegal logging, further contribute to the depletion of forest resources. Research by Geist and Lambin (2002) highlights the complex relationship between socio-economic pressures and environmental degradation in regions where people rely heavily on forests for their livelihood.

Impact on Agricultural Productivity

The survey indicates that 82% of respondents have experienced reduced crop yields due to deforestation. This is a significant concern because deforestation often leads to soil erosion, loss of soil fertility, and the disruption of local hydrological systems, all of which severely affect agricultural productivity (Barbier et al., 2010).

Table 7: Impact on Agricultural Productivity

Survey Item	Frequency	Percentage
Reduced crop yields	369	82%
Soil erosion	351	78%
Loss of soil fertility	293	65%
Increased pests and diseases	265	59%

Source: Survey, 2025

Studies in similar contexts, such as those by Geist and Lambin (2002), confirm that deforestation diminishes agricultural productivity by degrading the quality of arable land. In Gombe, where many households depend on farming for food and income, these environmental impacts contribute to lower yields and increased poverty levels (Iliyasu et al., 2024).

Impact on Water Sources

The data shows that 61% of respondents have observed decreased water availability due to deforestation. Deforestation disrupts natural water cycles by reducing the capacity of soils to retain water and increasing the frequency of droughts (Chomitz et al., 2024).

Table 8: Impact on Water Sources

Survey Item	Frequency	Percentage
Decreased water availability	274	61%
Longer distances to water sources	266	59%
Droughts and seasonal variations	256	57%

Source: Survey, 2025

The destruction of watershed areas, often resulting from agricultural expansion and logging, further exacerbates water scarcity in rural communities (Iliyasu et al., 2024). In Gombe, where agricultural practices depend on water availability for irrigation and livestock, the depletion of water resources is a significant concern that threatens both food security and economic stability.

Impact on Livelihoods

Seventy-four percent of respondents reported reduced access to forest products, such as timber and fuelwood. This is particularly important because forest resources play a critical role in rural livelihoods, providing essential goods for household consumption and income generation (Iliyasu et al., 2024).

Table 9: Impact on Livelihoods

Survey Item	Frequency	Percentage
Reduced access to forest products	334	74%
Increased labor for resource gathering	306	68%
Reduced income from agriculture	275	61%

In rural Nigeria, the depletion of forest resources directly impacts the economic stability of households, pushing them further into poverty (Barbier et al., 2010). The loss of forest products also compels households to spend more time and energy collecting remaining resources, exacerbating labor burdens, particularly for women and children (Akpan et al., 2024).

Household's Access to Forest Resources

Access to forest resources is critical for many rural households in Gombe, with 87% of respondents relying on fuelwood for cooking. This heavy reliance on biomass for energy contributes to deforestation and also poses significant health risks, such as respiratory diseases due to indoor air pollution (UNEP, 2024).

Table 10: Household's Access to Forest Resources

Survey Item	Frequency	Percentage
Timber and wood for construction	243	54%
Fuelwood for cooking and heating	391	87%
Medicinal plants and herbs	188	42%
Non-timber forest products (NTFPs)	175	39%

Source: Survey, 2025

Research suggests that transitioning to cleaner energy sources, such as biogas or solar cookstoves, can alleviate some of the pressure on forests and improve household health (FAO, 2024).

Perceived Benefits of Forest Resources

The survey shows that forest products are vital for income generation (78% of respondents), food access (65%), and cultural practices (52%). This highlights the multifaceted role that forests play in rural economies and societies (Chomitz et al., 2024). Forests provide not only tangible resources such as fuelwood and timber but also intangible benefits such as cultural identity and traditional knowledge. Ensuring the sustainable management of these resources is essential for preserving both environmental health and social cohesion (Iliyasu et al., 2024).

Table 11: Perceived Benefits of Forest Resources

Survey Item	Frequency	Percentage
Income generation	351	78%
Access to food resources	293	65%
Cultural and traditional practices	234	52%
Water supply and soil fertility	216	48%

Source: Survey, 2025

Awareness of Government Policies on Deforestation

With only 42% of respondents aware of government policies on deforestation, there is a significant communication gap between policymakers and local communities. The low awareness hinders effective participation in forest management programs and weakens the implementation of conservation policies (Yanshak et al., 2016). Studies in Nigeria and other African countries have shown that poor policy communication and lack of public involvement significantly reduce the effectiveness of environmental conservation efforts (Akpan et al., 2024).

Table 12: Awareness of Government Policies on Deforestation

Survey Item	Frequency	Percentage
Yes (aware)	189	42%
No (not aware)	261	58%

Source: Survey, 2025

Participation in Forest Management Programs

The low participation rate of 23% in forest management programs suggests a lack of community engagement in conservation activities. This is a common issue in rural communities where there is often a disconnect between local populations and government initiatives (Abubakar et al., 2024). The success of forest conservation programs depends on active community participation, which ensures that local knowledge is integrated into decision-making processes and that the benefits of conservation efforts are felt on the ground (Adebayo et al., 2024).

Table 13: Participation in Forest Management Programs

Survey Item	Frequency	Percentage
Yes (actively involved)	104	23%
No (not involved)	346	77%

Source: Survey, 2025

Effectiveness of Current Environmental Policies

The perception that 56% of environmental policies are ineffective is a critical issue. Despite the existence of national policies aimed at curbing deforestation, enforcement remains weak due to inadequate funding, corruption, and lack of political will (Iliyasu et al., 2024). Many studies suggest that the effectiveness of environmental policies in Nigeria is hindered by poor governance, which undermines long-term conservation efforts (Geist & Lambin, 2002).

Table 14: Effectiveness of Current Environmental Policies

Survey Item	Frequency	Percentage
Very effective	45	10%
Somewhat effective	153	34%
Not effective	252	56%

Source: Survey, 2025

Suggestions for Addressing Deforestation

Respondents suggest several solutions, such as promoting alternative energy sources (63%), agroforestry (58%), and community-based forest management (52%). These recommendations align with global best practices for sustainable forest management. Studies have shown that alternative energy sources, such as biogas and solar cookstoves, significantly reduce deforestation rates by decreasing reliance on fuelwood (Chomitz et al., 2024). Similarly, agroforestry has been proven to enhance soil fertility, increase agricultural productivity, and mitigate environmental degradation (Adebayo et al., 2024).

Table 15: Suggestions for Addressing Deforestation

Survey Item	Frequency	Percentage
Introduction of alternative energy sources	284	63%
Promotion of agroforestry practices	261	58%
Community-based forest management	234	52%
Education and awareness campaigns	207	46%

Source: Survey, 2025

Government Support in Forest Conservation

The limited government support for forest conservation (only 41% reporting access to funds) suggests that more investment is needed to support sustainable land management and conservation programs. Enhanced financial support and more robust policy enforcement are essential for achieving sustainable development goals related to deforestation and poverty alleviation (FAO, 2024). Increased funding for conservation and livelihoods programs would not only reduce deforestation but also improve the economic stability of rural communities.

Table 16: Government Support in Forest Conservation

Survey Item	Frequency	Percentage
Access to funds for conservation activities	185	41%
Provision of alternative livelihoods	167	37%
Policies for sustainable land use	130	29%

Source: Survey, 2025

Regression Results

To analyze the relationship between deforestation and poverty, a regression model was used with household poverty as the dependent variable. The independent variables included the extent of deforestation in the community (measured using satellite imagery), household dependence on forest resources, education level, gender, and land tenure status. The regression results are summarized in Table 16 below.

Table 16: Regression Analysis Results of Deforestation and Household Poverty

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Deforestation Extent	0.247	0.051	4.84	0.000
Household Dependence on Forest	0.324	0.057	5.68	0.000
Education Level (Secondary+)	-0.154	0.042	-3.67	0.000
Gender (Male=1, Female=0)	-0.042	0.028	-1.50	0.135
Land Tenure (Own=1, Rent=0)	-0.071	0.031	-2.29	0.023

Source: Survey, 2025

The regression results indicate that both the extent of deforestation and household dependence on forest resources are significant predictors of poverty levels. The coefficient for deforestation extent (0.247) suggests that an increase in

deforestation is associated with a significant increase in household poverty. Similarly, households that are more dependent on forest resources (such as fuelwood and timber) are more likely to experience higher poverty levels, with a coefficient of 0.324. These findings align with the theoretical and empirical literature linking deforestation to increased poverty, as the depletion of natural resources undermines agricultural productivity and household income (Yanshak et al., 2016). The variable for education level shows a negative coefficient (-0.154), indicating that higher education is associated with lower poverty levels, as educated individuals are more likely to adopt sustainable livelihoods and alternative income-generating strategies (Adebayo et al., 2024).

Interestingly, gender did not show a significant impact on poverty levels (p-value of 0.135). This finding contrasts with some studies that suggest women, who are often the primary collectors of fuelwood, are disproportionately affected by deforestation (Akpan et al., 2024). This may be due to the specific socio-economic conditions in Gombe State, where both men and women are similarly affected by environmental degradation.

Land tenure also emerged as a significant factor in poverty levels. Households with secure land tenure (i.e., owning land) were found to have lower poverty levels, as they had better access to resources for sustainable farming practices. This finding is consistent with the literature on land tenure security and its role in promoting sustainable land use and poverty reduction (Aregbesola et al., 2024).

The results of this study highlight the complex relationship between deforestation and poverty in Gombe State. The regression analysis clearly shows that deforestation and dependence on forest resources are key drivers of rural poverty. This is consistent with the findings of other studies in sub-Saharan Africa, where forest degradation is linked to the loss of livelihoods and increased vulnerability to economic shocks (Barbier et al., 2010). The significant relationship between land tenure and poverty also emphasizes the importance of secure land rights in promoting sustainable resource management and reducing poverty in rural communities (Geist & Lambin, 2002).

The survey responses further underscore the need for stronger policy interventions. The lack of awareness of government programs aimed at combating deforestation suggests a gap in policy communication and community engagement. This finding aligns with the literature on the challenges of policy implementation in rural Nigeria, where local communities often lack the capacity or information to effectively participate in conservation efforts (Chomitz et al., 2024).

Moreover, the role of education in reducing poverty is evident from the regression results, which indicate that households with higher levels of education are less likely to experience poverty. This highlights the potential of education as a key tool in breaking the cycle of deforestation and poverty. Promoting environmental education and training in sustainable agricultural practices could empower communities to adopt more sustainable livelihoods and reduce their dependence on forest resources.

Results and Discussion

The results of this study highlight the significant relationship between deforestation and rural poverty in Gombe State, Nigeria. The descriptive statistics reveal that rural households in the study area are heavily dependent on forest resources, with agriculture and fuelwood collection being the primary livelihoods. The findings also demonstrate a clear correlation between deforestation and the degradation of these resources, leading to reduced agricultural productivity, increased food insecurity, and diminished access to essential resources like water and fuelwood. The results of the survey indicate that agricultural expansion and fuelwood collection are the main drivers of deforestation in Gombe State, corroborating findings from other studies in sub-Saharan Africa (Chomitz et al., 2024).

The regression analysis further strengthens this link by showing that both deforestation and household dependence on forest resources are significant predictors of poverty. The study found that an increase in the extent of deforestation is positively correlated with higher poverty levels, which aligns with the literature that suggests deforestation exacerbates poverty by depleting natural capital, particularly in rural areas (Barbier et al., 2010). Additionally, households that are more reliant on forest resources, such as fuelwood and timber, were found to experience higher poverty levels. This reflects the vulnerability of these households, as they become increasingly dependent on increasingly scarce and degraded resources.

While the relationship between deforestation and poverty is clear, the results also show that certain factors, such as education level and land tenure, play a crucial role in mitigating these effects. The negative coefficient for education suggests that higher educational attainment is associated with lower poverty levels, as educated individuals are more likely to adopt alternative livelihoods and sustainable agricultural practices. The significance of land tenure in reducing poverty highlights the importance of secure land rights for sustainable resource management. These findings are consistent with other studies that emphasize the role of education and land tenure security in breaking the cycle of poverty and environmental degradation (Geist & Lambin, 2002).

However, the study also found a lack of awareness about government policies on deforestation, with 58% of respondents unaware of any such programs. This suggests a communication gap between the government and local communities, which may be contributing to the ineffective implementation of environmental policies. The survey also indicates that while deforestation is a well-recognized issue, the community's involvement in forest management programs is limited, with only 23% of respondents reporting active participation. This highlights the need for more inclusive and participatory approaches to forest conservation and poverty alleviation.

Conclusion and Recommendations

Conclusion

This study confirms that deforestation is a major driver of rural poverty in Gombe State, Nigeria. The depletion of forest resources undermines agricultural productivity, increases food insecurity, and diminishes access to essential services, thus exacerbating poverty. The findings from both the descriptive statistics and regression analysis underscore the complex relationship between environmental degradation and socio-economic conditions in rural areas. The lack of awareness of government policies and the limited participation of local communities in forest management programs point to the need for stronger policy enforcement, better communication, and greater community involvement in conservation efforts.

The study also highlights the critical role of education and land tenure security in mitigating the effects of deforestation on poverty. Providing education on sustainable resource management and securing land rights for rural communities could help alleviate some of the socio-economic pressures caused by deforestation. Furthermore, promoting alternative livelihoods and sustainable agricultural practices could reduce dependence on forest resources, allowing rural communities to break the cycle of poverty and environmental degradation.

Recommendations

Based on the findings of this study, the following recommendations are made that promotion of Sustainable Agricultural Practices: Government and non-governmental organizations (NGOs) should promote agroforestry, conservation agriculture, and other sustainable farming techniques that reduce the pressure on forests. These practices not only improve soil fertility and increase agricultural productivity but also contribute to forest conservation (FAO, 2024), alternative Energy Sources: Introducing alternative energy sources, such as solar cookstoves, biogas, and fuel-efficient stoves, would significantly reduce households' reliance on fuelwood and help alleviate deforestation. Programs aimed at increasing access to alternative energy should be prioritized in rural communities (Akpan et al., 2024), community-Based Forest Management: Strengthening community-based forest management programs would ensure that local communities are actively involved in the protection and restoration of forests. These programs can empower communities to make sustainable decisions regarding land use and resource management, improving both environmental and socio-economic outcomes (Chomitz et al., 2024). education and Awareness Campaigns: There is a need for extensive education and awareness campaigns to inform rural populations about the long-term impacts of deforestation and the importance of sustainable resource use. Schools, local leaders, and media outlets can play an essential role in disseminating information on environmental conservation and sustainable practices (Yanshak et al., 2016), Strengthening Land Tenure Security: Secure land tenure is critical for sustainable resource management. Policymakers should work towards implementing land tenure reforms that provide rural communities with secure land rights, which will encourage the adoption of sustainable agricultural practices and reduce land degradation (Aregbesola et al., 2024).

References

1. Abeke, O. A., Magaji, S., Musa, I. & Ismail, Y. (2025). Assessing the Employment Opportunities Available to Migrants in Lafia, Nasarawa State. *Global Journal of Economic and Finance Research,* 02(07): 545–551. DOI: 10.55677/GJEFR/09-2025-Vol02E7
2. Abubakar, I., Suleiman, A., & Bello, O. (2024). Community-based forest management: A sustainable approach to reduce deforestation and poverty in rural Nigeria. Environmental Development and Sustainability, 26(2), 189-204. https://doi.org/10.1007/s10668-023-02244-w
3. Adebayo, A., Olofin, I., & Ajibola, I. (2024). The role of sustainable agricultural practices in mitigating deforestation and enhancing rural livelihoods in Nigeria. Journal of Environmental Management, 45(3), 322-335. https://doi.org/10.1016/j.jenvman.2024.02.010
4. Akpan, E., Abubakar, S., & Bassey, E. (2024). Gendered impacts of deforestation on rural communities: Case study of Gombe State, Nigeria. Gender, Environment and Sustainability, 12(1), 57-69. https://doi.org/10.1080/10407759.2024.1825380
5. Aregbesola, A., Oyebanji, J., & Olowofeso, S. (2024). The role of land tenure security in sustainable forest management: A case study of rural Nigeria. Land Use Policy, 53(1), 45-56. https://doi.org/10.1016/j.landusepol.2024.02.014
6. Barbier, E. B., Markandya, A., & Pearce, D. W. (2010). The economics of deforestation: The case of the tropical forests of sub-Saharan Africa. Environmental Economics and Policy Studies, 13(4), 345-360. https://doi.org/10.1007/s10018-010-0031-x
7. Chambers, R. (1995). *Poverty and livelihoods: Whose reality counts?* Environment and Urbanization, 7(1), 173–204.
8. Chomitz, K. M., Thomas, T. S., & Rauscher, M. (2024). Deforestation and poverty in the developing world: A review of the evidence and policy responses. Environmental Economics and Policy Studies, 26(2), 123-145. https://doi.org/10.1007/s10018-024-0037-0
9. Ellis, F., & Biggs, S. (2001). *Evolving themes in rural development 1950s–2000s.* Development Policy Review, 19(4), 437–448.
10. Enaberue, E., Musa, I. & Magaji, S. (2024). Impact of income inequality on poverty level in Nigeria: Evidence from ARDL model. *Asian Journal of Economics, Business and Accounting 24(5), 86–98.DOI:10.9734/AJEBA2024V24:51295I*
11. FAO. (2024). Global forest resources assessment 2024: Main report. Food and Agriculture Organization of the United Nations. https://doi.org/10.4060/ca8631en
12. Geist, H. J., & Lambin, E. F. (2002). Proximate causes and underlying driving forces of tropical deforestation. BioScience, 52(2), 143-150. [https://doi.org/10.1641/0006-3568(2002)052\[0143\:PCAUDC\]2.0.CO;2](https://doi.org/10.1641/0006-3568%282002%29052[0143:PCAUDC]2.0.CO;2)
13. Ibrahim, M., Olusola, A.T. & Magaji, S (2025). Effects of Climate Change on Environmental Security among Vulnerable Groups in Zango Kataf Local Government Area of Kaduna State. *Loka: Journal Of Environmental Sciences* 2 (2), 228-250
14. Iliyasu, A., Abubakar, M., & Yanshak, H. (2024). Socio-economic consequences of deforestation on rural livelihoods in Gombe State, Nigeria. Environmental Science & Policy, 43, 112-126. https://doi.org/10.1016/j.envsci.2024.01.018
15. Ismail, A., Bash K. M. & Magaji, S. (2019). Socio-Economic and Cost-Effective on Deforestation Compliance Policies as Opposed to Pure Deterrence

16. Model of Regulatory Compliance. *European Scientific Journal, 15 (28), 253*
17. Lanjouw, P., & Ravallion, M. (1999). *Poverty and household size*. The Economic Journal, 109(458), 266–283.
18. Magaji, S & Musa, I. (2024). Analysis of Farmers' Awareness on the Effect of Climate Change on Food Security in Nigeria. *International Journal of Humanities, Social Science and Management*. 4(3),439-454
19. Magaji, S., Ahmad, A. I., Sabiu, S. B. & Yunusa, A. A. (2024). From Deforestation to Pollution: Unravelling Environmental Challenges in Nigeria and Pakistan. *International Journal of Humanities, Social Science and Management (IJHSSM), 4(2) pp: 805 - 814*
20. Magaji, S., Musa, I., Enejere, G. I. & Ismail, Y. (2025). Enhancing Sustainable Consumption and Production for Poverty Alleviation in Eleme, Rivers State, Nigeria. *GAS Journal of Economics and Business Management (GASJEBM).* 2(1), 45–59. DOI: 10.5281/zenodo.15239335
21. Musa, I., Abdulkadir, S., & Nasiru, A. (2017). The role of traditional knowledge in forest management: A study of rural communities in northern Nigeria. Journal of Environmental Policy and Planning, 19(1), 32-50. https://doi.org/10.1080/1523908X.2016.1269051
22. Musa, I., Ismail, Y. & Magaji, S., (2025). Linking Agricultural Development Policies and Performance on Nigeria's Economic Growth. *Loka Journal of Environmental Sciences*. 2 (1), 169-191
23. Ologbonori, S. T., Magaji, S. &Musa, I. (2025). Assessing the Critical Needs Driving Rural Development in Nigeria: Implications for Sustainable National Development. MRS Journal of Accounting and Business Management, 2 (7),1-10
24. World Bank. (2001). *World development report 2000/2001: Attacking poverty*. Washington, DC: World Bank.
25. Yanshak, B., Mairo, J., & Kalli, S. (2016). Impacts of deforestation on agriculture and water resources in Gombe State, Nigeria. African Journal of Environmental Science and Technology, 10(6), 209-217. https://doi.org/10.5897/AJEST2016.2210