

# Effects of Socio-Economic Characteristics on Use of Forest Resources and Degradation in Southern Ecological Zone of Taraba State, Nigeria

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## Abstract

Tropical deforestation represents a critical socio-ecological crisis, yet its proximate and underlying drivers remain context-specific. This study investigates the complex interplay between socio-economic characteristics and patterns of forest degradation in the Southern Ecological Zone of Taraba State, Nigeria. Employing a mixed-methods sequential explanatory design, we collected household survey data (n=420) across three high-pressure Local Government Areas (LGAs). Data were analyzed using inferential statistics, including Chi-square tests and ANOVA, alongside thematic analysis of qualitative interviews. The findings establish that socio-economic variables—specifically household size, education level, income diversification, and primary occupation—are statistically significant determinants of forest resource dependency and extraction intensity. The primary proximate drivers of deforestation are agricultural expansion and fuelwood harvesting, underpinned by underlying drivers of population pressure, weak institutional enforcement, and poverty-driven livelihood strategies. Degradation rates were heterogeneous, with LGAs exhibiting differing vulnerability based on market access and tenure systems. This degradation has precipitated severe ecological consequences, including altered micro-climatic conditions, accelerated soil erosion, and biodiversity loss, which in turn undermine ecosystem service provisioning. Concurrent socio-economic impacts manifest as scarcity of forest products, increased livelihood vulnerability, and distress migration. We conclude that deforestation in this zone is an anthropogenic, socio-economically mediated process, yet one amenable to targeted intervention. The study recommends an integrated policy framework that couples strengthened forest governance and land-use planning with community-centric reforestation programs and the promotion of alternative energy sources and sustainable livelihood diversification to foster a just forest transition.

**Keywords:** Community-centric, Forest degradation, Livelihood, Socio-ecological and Sustainability.

## Introduction

Forests play a fundamental role in sustaining ecological integrity, supporting rural livelihoods, and driving socio-economic development across Nigeria. They provide essential ecosystem services such as fuelwood, timber, non-timber forest products, soil protection, biodiversity conservation, carbon sequestration, and climate regulation [1]. In the southern ecological zone of Taraba State, these functions are particularly critical, as forests form the backbone of household subsistence and local economic activities. Communities in this zone depend heavily on forest resources for energy, construction materials, grazing, medicinal products, and income generation. The region's Guinea savannah vegetation supports rich biodiversity and offers numerous livelihood opportunities, making forest ecosystems indispensable to social and economic well-being. Despite their importance, forests in Nigeria are rapidly diminishing. The country is ranked among those with the highest annual deforestation rates

globally, with forest loss driven predominantly by human activities [1]. These anthropogenic pressures are strongly shaped by socio-economic characteristics such as income level, household size, education, age, gender, and occupation. Studies across various ecological zones indicate that low-income households, large families, and individuals with limited education rely more heavily on forest resources for survival, leading to increased extraction and depletion [2, 3]. In many rural settings, forests serve as safety nets that compensate for insufficient employment opportunities and inadequate access to modern energy sources. Within Taraba State, forest degradation has become a growing concern as socio-economic pressures drive agricultural expansion, fuelwood gathering, grazing, logging, and settlement development. Earlier research attributes forest decline in the state to poverty, weak policy enforcement, unsustainable livelihood practices, and rising commercial demand for high-value species such as *Pterocarpus erinaceus* [4, 5].

These pressures are compounded by demographic changes and increasing dependence on natural resources for daily survival. However, although evidence suggests that socio-economic characteristics influence forest use, few studies have examined this relationship specifically within the southern ecological zone of Taraba State. Existing research often focuses on isolated drivers, species-specific exploitation, or general deforestation trends without providing a comprehensive analysis of how household socio-economic variables shape forest-use behaviour and contribute to forest degradation at the local scale.

This lack of empirical, context-specific data presents a significant challenge for forest governance and sustainable resource management. Without understanding which socio-economic factors most strongly influence forest exploitation, policymakers and development stakeholders may struggle to design interventions that effectively address the root causes of degradation. Targeted, evidence-based strategies require detailed knowledge of how demographic and economic conditions shape community interactions with forest resources across diverse local settings.

In response to this gap, the present study seeks to analyse the effects of socio-economic characteristics on the use of forest resources and the extent of forest degradation in the southern ecological zone of Taraba State. Specifically, the study aims to describe the socio-economic profiles of forest-dependent households; assess their primary forest-resource uses; examine how socio-economic factors influence the causes and patterns of forest degradation; analyse the relationship between socio-economic variables and the frequency of forest visitation and extraction; and provide policy-relevant recommendations for sustainable forest management. By addressing these objectives, the study contributes valuable insights into the human dimensions of forest degradation and supports the development of socially inclusive, ecologically sound conservation strategies suited to the needs and circumstances of communities within Taraba State.

### **Theoretical Framework**

This study is guided by the Sustainable Livelihoods Framework (SLF), a comprehensive analytical model originally conceptualised by Chambers and Conway [6] and later formalised by the United Kingdom Department for International Development [7]. Chambers and Conway introduced the foundational idea that a livelihood comprises the capabilities, assets, and activities required for a means of living, while emphasising that a livelihood is sustainable when it can cope with and recover from stresses and shocks without undermining the natural resource base. DFID subsequently developed these ideas into a more structured framework that identifies five categories of livelihood assets: human, social, natural, physical, and financial, and situates them within a vulnerability context shaped by social, economic, ecological, and institutional factors. Together, these contributions form a unified theory explaining how rural households structure their survival strategies in relation to available resources and constraints,

especially in environments where natural resources play central economic and social roles.

The principal proposition of the Sustainable Livelihoods Framework is that households adopt livelihood strategies based on the quality and accessibility of the assets at their disposal. In contexts where financial and physical capital are limited, as is common in many rural areas of Nigeria, natural capital such as forests becomes a primary source of sustenance. The framework proposes that socio-economic variables including income level, education, household size, gender, and occupation strongly influence the degree to which individuals depend on natural resources for their livelihoods. It further posits that vulnerability factors such as climate variability, market instability, poverty, seasonal fluctuations, and weak governance intensify reliance on natural capital. The SLF also asserts that institutional and policy structures shape access to assets and mediate livelihood outcomes; where forest governance is weak or land-use policies are poorly enforced, households are more likely to adopt extraction-based livelihood strategies that accelerate forest degradation. Thus, the framework offers a dynamic pathway linking socio-economic attributes to patterns of natural resource utilisation and environmental change.

The Sustainable Livelihoods Framework is particularly relevant to the present study because it offers a coherent and empirically grounded basis for understanding how socio-economic characteristics shape forest-resource use in the southern ecological zone of Taraba State. The region is marked by widespread reliance on forest resources for energy, income, grazing, and subsistence activities. Many households face persistent economic hardship, limited employment opportunities, low educational attainment, and inadequate access to modern energy sources. These constraints directly align with SLF propositions indicating that when human, financial, and physical assets are limited, dependence on natural capital increases. Furthermore, the study examines relationships between socio-economic characteristics such as age, gender, education, income, and household size and their influence on forest use variables. The SLF explicitly identifies as determinants of livelihood strategy formulation. The framework also provides conceptual clarity for interpreting findings related to forest degradation, as it emphasises how weak governance, poverty, and resource dependence generate pressures that lead to unsustainable exploitation. Consequently, SLF helps situate the statistical relationships observed in this study within a broader theoretical understanding of rural livelihood dynamics.

Despite its many strengths, the Sustainable Livelihoods Framework has several limitations that shape its application to this study. One constraint is its limited attention to political economy and power relations. While the framework acknowledges institutional influences, it does not fully account for issues such as elite capture of forest resources, land tenure conflicts, or political interference, all of which are relevant in parts of rural Nigeria. Additionally, SLF tends to assume rational decision-making based on available assets, yet forest use is sometimes shaped

by cultural norms, historical ties to land, or communal expectations that go beyond asset-based logic. Another limitation relates to ecological feedbacks: although SLF recognises vulnerability and environmental shocks, it does not explicitly model ecological thresholds or non-linear feedback loops associated with degradation, such as biodiversity collapse or soil nutrient depletion. Finally, the framework can be data-intensive, requiring detailed information on each livelihood asset category data that may not always be readily available in rural survey settings. Despite these limitations, the SLF remains the most appropriate theoretical foundation for this study because it offers a robust and holistic lens through which the socio-economic determinants of forest-resource dependence and degradation can be systematically analysed.

### Description of the Study Area

The study was conducted in the Southern Ecological Zone of Taraba State, Nigeria, a region of profound ecological significance and acute socio-environmental pressure. Geographically, the zone spans approximately between latitudes 6°30' N and 8°00' N and longitudes 10°00' E and 11°45' E [8] (fig. 1). It is a critical transition zone, encompassing the rugged terrain of the Mambilla Plateau escarpment (reaching elevations over 1,800 meters) in the south-east and descending into the undulating plains and valleys of the Southern Guinea Savanna [9]. This topographical variation creates a mosaic of microclimates and vegetation types, ranging from montane grasslands and fragmented gallery forests on the plateau to dense, dry deciduous forests and woodlands in the lower altitudes. The zone is a vital watershed, with major river systems, including the headwaters of the River Benue and its tributaries like the Donga and Taraba rivers, originating from its highlands, making it indispensable for regional hydrology and agriculture [10].

Biophysically, the area falls within the Guinea-Congolian/Sudanian regional transition zone, recognized as a biodiversity hotspot harboring significant endemic and endangered flora and fauna [11]. Key forest reserves, including parts of the Gashaka-Gumti National Park (GGNP), Nigeria's largest national park and the Ngel-Nyaki Forest Reserve, are situated here. These reserves are sanctuaries for species such as the Nigeria-Cameroon chimpanzee (*Pan troglodytes ellioti*), the African forest elephant (*Loxodonta cyclotis*), and numerous endemic bird species [12]. However, remote sensing analyses indicate accelerating land cover change, with substantial conversion of closed-canopy forest to open woodland, shrubland, and farmland, primarily driven by anthropogenic activities [13].

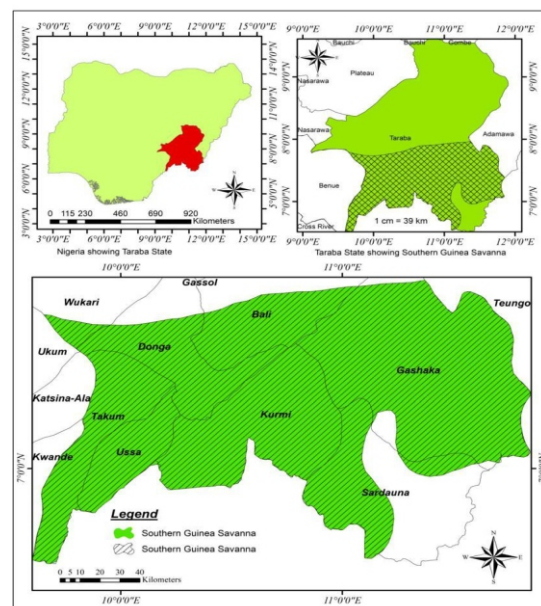


Fig. 1 Map of the Study Area

Socio-economically, the zone is characterized by a diverse ethnic composition, including the Fulani, Mambilla, Kuteb, Jukun, and Chamba peoples, each with distinct cultural practices and traditional resource governance systems. The population is predominantly rural, with livelihoods deeply anchored in rain-fed subsistence agriculture (cultivating maize, sorghum, rice, and cassava), livestock rearing (particularly Fulani pastoralism), and an extensive dependence on forest resources for fuelwood, timber, non-timber forest products (NTFPs), and medicinal plants [14]. This dependency exists within a context of pronounced poverty, limited infrastructure, and weak formal institutional presence, factors that intensify pressure on the natural resource base. Land tenure is often governed by a complex interplay of customary and statutory systems, leading to tenure insecurities that can discourage long-term conservation investments [15]. The selection of the Southern Ecological Zone as the study area is thus deliberate and critical. It represents a quintessential socio-ecological system under stress, where globally important biodiversity coincides with high human dependency, creating a dynamic and contested landscape. The zone encapsulates the core tension between conservation imperatives and livelihood needs, making it an ideal laboratory for investigating the precise mechanisms through which socio-economic characteristics mediate forest resource use and perceptions of environmental degradation.

### Methodology

This study employed a mixed-methods sequential explanatory design, integrating quantitative surveys with qualitative inquiry to provide a robust, multi-layered analysis of socio-economic drivers of forest resource use. The sequential approach, where quantitative data collection and analysis inform subsequent qualitative probing, is recognized as a powerful strategy for exploring complex socio-ecological phenomena where statistical relationships require contextual explanation [16].

This design allows for the generalization of patterns from a representative sample while capturing the nuanced lived experiences and local rationalities that underpin those patterns, thereby addressing both the "what" and the "why" of forest dependency and degradation perceptions.

A cross-sectional research design was implemented to collect data at a single point in time, providing a snapshot of relationships between socio-economic variables and forest use behaviors. To ensure the findings were representative of the diverse communities within the ecological zone, a multi-stage sampling technique was employed. This technique is particularly effective in heterogeneous populations where no single sampling frame exists, as it allows for progressive clustering from larger administrative units to individual households [17]. In the first stage, three Local Government Areas (LGAs) were purposively selected based on predefined criteria of forest cover and documented resource dependency, a method appropriate for ensuring the study context is information-rich. Subsequently, four communities were randomly selected from each LGA to minimize selection bias. The final stage involved household selection, where the sample size was determined using Cochran's formula for finite populations, a statistically rigorous method for calculating a representative sample when population parameters are estimated [18]. This yielded a target of 420 households, selected via systematic random sampling within each community to ensure every household had a known, equal probability of selection. For the qualitative component, participants for Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) were purposively sampled to capture maximum variation in perspectives, including differences in gender, age, livelihood, and institutional role, thereby enriching the explanatory power of the qualitative data [19].

Data collection utilized a triangulated approach with three primary instruments, enhancing validity through methodological convergence. The cornerstone was a structured household questionnaire, administered face-to-face. Its design was informed by established socio-ecological survey toolkits, such as the Center for International Forestry Research's (CIFOR) standard modules for assessing forest dependency, which have been validated across multiple tropical country contexts [20]. The questionnaire comprised modules on demographics, a detailed asset inventory for wealth ranking, livelihood activities, forest product use (with short recall periods to reduce measurement error), and perceptions of environmental change. For the asset-based wealth index, the methodology aligned with the Demographic and Health Surveys (DHS) program, which uses principal component analysis on durable goods and housing characteristics to create a relative socioeconomic status proxy, a technique proven reliable in settings where accurate income data is difficult to obtain [21]. Qualitative data were gathered through FGDs and KIIs. FGDs, conducted in single-gender groups of eight, utilized a semi-structured guide to explore community norms, historical changes, and conflict over resources; the group dynamic is effective for eliciting shared cultural

understandings and consensus views [22]. KIIs, conducted with policymakers, forestry officials, and community leaders, provided expert insight into institutional frameworks and management challenges, offering a macro-perspective to complement household-level data [23]. All qualitative sessions were audio-recorded, transcribed verbatim, and, where necessary, translated, with rigorous notes taken to capture non-verbal cues.

The analysis followed a sequential process corresponding to the mixed-methods design. Quantitative data from the household surveys were cleaned, coded, and analyzed using IBM SPSS Statistics (Version 28) and STATA 17. Descriptive statistics summarized the sample characteristics. A critical step was the construction of a household wealth index using Principal Component Analysis (PCA), a data reduction technique widely used in development economics to derive a single continuous measure of wealth from multiple correlated asset variables [24]. Households were then categorized into wealth tertiles for comparative analysis. To test the core hypotheses, inferential statistics were applied. Multiple linear regression modeled the effect of independent socio-economic variables (e.g., wealth index, household size, education) on the continuous dependent variable of forest income share. Binary logistic regression was used to identify factors increasing the odds of a household perceiving severe degradation. Assumptions for all parametric tests (linearity, normality, homoscedasticity) were checked and appropriate transformations applied where necessary. Qualitative data from transcripts were analyzed using reflexive thematic analysis, a method that moves beyond simple categorization to interpret patterns of shared meaning and experience across the dataset [25]. This involved an iterative process of familiarization, systematic coding, theme development, and refinement using NVivo 12 software to manage the data. Finally, integration occurred at the interpretation stage: quantitative results identified significant statistical relationships (e.g., a negative correlation between education and fuelwood use), while qualitative themes (e.g., narratives on educated youth migrating or using alternative energy) provided the contextual narrative to explain and give meaning to those correlations, fulfilling the explanatory purpose of the sequential design.

Ethical rigor was maintained throughout the research process, guided by the principles of respect for persons, beneficence, and justice. Before commencement, ethical approval was secured from a constituted institutional review board. The principle of informed consent was paramount; all participants received a detailed explanation of the study's purpose, procedures, risks, and benefits in their preferred language, and provided written or thumb-printed consent, with particular care taken for participants with low literacy [26]. Community entry protocols were strictly observed, beginning with engagements and permissions from traditional and formal community leaders to ensure cultural respect and legitimacy. Anonymity and confidentiality were guaranteed; all data were de-identified, using codes

instead of names, and stored on password-protected devices. Participants were explicitly informed of their right to withdraw at any time without penalty. The research design incorporated beneficence by ensuring the interview process itself was not harmful and by planning to disseminate findings back to the communities and relevant state agencies in accessible formats, thereby contributing knowledge that could inform future local development and conservation planning.

**Results and Discussion**

**Socio-Economic Characteristics of Respondents**

Results of the study revealed that the majority of respondents were 21–30 years (43.1%) and 31–40 years (41.3%) (Table 1). It also shows that over 84% of respondents are within the economically active population (young and middle-aged adults). In addition, the result displayed that only 0.4% were above 50, indicating minimal participation of elderly individuals. This result clearly implies that young people are the major users of forest resources and are more likely to contribute to forest exploitation due to livelihood needs.

The result on the Gender Distribution showed that 56.5% were female and 43.5% male. This Indicates that women dominate forest-related activities in the study area and they depend strongly on forests for income, fuelwood, and household needs. It was also observed that based on the marital status of the respondents revealed that majority of them were married (53.7%), followed by single (21.5%) and divorced (17.4%). This showed that married individuals likely have bigger households and higher resource needs and that household pressure may increase dependence on forests.

Results on the household Size showed that most households had 5–10 members (37.4%) and 11–15 members (28.8%). In addition, large household sizes increase forest product consumption which implies that larger families intensify forest exploitation (fuelwood, grazing, farmland expansion). The Educational level of the respondents on the other hand showed that, majority had non-formal education (38.2%) and secondary education (35.8%) and only 16.4% had tertiary education. This implies that the low educational attainment may limit awareness of sustainable forest practices.

In the case of occupational level of the respondents, it was observed that major occupations of the respondents are Trading (43.2%), Farming (36.2%) and Civil service (18.3%). With this, Agriculture and petty trading dominate, activities commonly associated with forest clearing and resource extraction.

It was also observed that the majority of the respondents earned between ₦50,000–100,000 (50.1%) and <₦50,000 (33.9%) while 0.3% earned above ₦300,000. This implies that the high lower income levels in the area may push households to rely heavily on forests for income and livelihood. Results on the type of dwelling showed that most respondents lived in houses without wood (49.2%), followed by houses built with wood (32.4%). This entails that significant number of respondents still rely on wood for construction, indirectly influencing deforestation.

*Table 1. Socio-Economic Characteristics of the Respondents*

		Frequency	Percent	Cumulative Percent
Age	10-20 years	129	12.5	12.5
	21-30 years	444	43.1	55.6
	31-40 years	426	41.3	96.9
	41-50 years	28	2.7	99.6
	51 and above years	4	.4	100.0
	Total	1031	100.0	
Gender	Male	448	43.5	43.5
	Female	583	56.5	100.0
	Total	1031	100.0	
Marital status	Single	222	21.5	21.5
	Married	554	53.7	75.3
	Divorce	179	17.4	92.6
	Widow	76	7.4	100.0
	Total	1031	100.0	
Household size	Less Than 5	273	26.5	26.5
	5-10	386	37.4	63.9
	11-15	297	28.8	92.7
	16-20	66	6.4	99.1
	21 and Above	9	.9	100.0
	Total	1031	100.0	
Level of education	Non-formal Education	394	38.2	38.2
	Primary	99	9.6	47.8
	Secondary	369	35.8	83.6
	Tertiary	169	16.4	100.0
	Total	1031	100.0	
Occupation	Farming	373	36.2	36.2
	Trading	445	43.2	79.3
	Civil Servant	189	18.3	97.7
	Artisan	20	1.9	99.6
	Others	4	.4	100.0
	Total	1031	100.0	
Monthly income	<₦50,000	349	33.9	33.9
	₦50,000-100,000	517	50.1	84.0
	₦101,000-200,000	148	14.4	98.4
	₦201-300,000	14	1.4	99.7
	₦301,000 and Above	3	.3	100.0
	Total	1031	100.0	
Type of dwelling	House with Wood	334	32.4	32.4
	House without wood	507	49.2	81.6
	House with wood and Grass	174	16.9	98.4
	Hut with Wood and Grass	3	.3	98.7
	Others with wood	13	1.3	100.0
	Total	1031	100.0	

**Effects of Socio-Economic Characteristics on Causes of Forest Degradation**

Across all variables (age, gender, marital status, household size, education, occupation, and income), the p-values are <0.000 for all tests, indicating statistically significant relationships (Table 2). This denotes that socio-economic characteristics of the respondents significantly influence the perceived causes of forest degradation, such as: logging, agricultural expansion, overgrazing and fuelwood collection. It also suggests that different demographic groups contribute differently to forest decline: Younger respondents link degradation to agricultural expansion and overgrazing and Low-income groups attribute it more to fuelwood collection.

Table 2. Effects of Socio-Economic Characteristics of Respondents on the Causes of Forest Degradation

			What are the main causes of forest degradation in your area					Total	Chi Square Test		
			Logging	Agriculture Expansion	Over grazing	Fuelwood Collection	Others		Value	df	Asymp. Sig. (2-sided)
Age	10-20 years	Count	21	43	32	31	2	129	149.732 <sup>a</sup>	16	.000
		%	17.5%	8.6%	9.0%	63.3%	22.2%	12.5%			
	21-30 years	Count	47	220	172	4	1	444			
		%	39.2%	44.1%	48.6%	8.2%	11.1%	43.1%			
	31-40 years	Count	44	218	146	13	5	426			
		%	36.7%	43.7%	41.2%	26.5%	55.6%	41.3%			
	41-50 years	Count	7	15	4	1	1	28			
		%	5.8%	3.0%	1.1%	2.0%	11.1%	2.7%			
	51 and above years	Count	1	3	0	0	0	4			
		%	.8%	.6%	0.0%	0.0%	0.0%	.4%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Gender	Male	Count	49	245	125	25	4	448	17.504 <sup>a</sup>	4	.002
		%	40.8%	49.1%	35.3%	51.0%	44.4%	43.5%			
	Female	Count	71	254	229	24	5	583			
		%	59.2%	50.9%	64.7%	49.0%	55.6%	56.5%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Marital status	Single	Count	24	95	73	28	2	222	54.240 <sup>a</sup>	12	.000
		%	20.0%	19.0%	20.6%	57.1%	22.2%	21.5%			
	Married	Count	67	290	176	17	4	554			
		%	55.8%	58.1%	49.7%	34.7%	44.4%	53.7%			
	Divorce	Count	25	81	69	3	1	179			
		%	20.8%	16.2%	19.5%	6.1%	11.1%	17.4%			
	Widow	Count	4	33	36	1	2	76			
		%	3.3%	6.6%	10.2%	2.0%	22.2%	7.4%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Household size	Less Than 5	Count	24	138	94	14	3	273	52.661 <sup>a</sup>	16	.000
		%	20.0%	27.7%	26.6%	28.6%	33.3%	26.5%			
	5-10	Count	37	178	160	7	4	386			
		%	30.8%	35.7%	45.2%	14.3%	44.4%	37.4%			
	11-15	Count	44	134	94	23	2	297			
		%	36.7%	26.9%	26.6%	46.9%	22.2%	28.8%			
	16-20	Count	13	44	5	4	0	66			
		%	10.8%	8.8%	1.4%	8.2%	0.0%	6.4%			
	21 and Above	Count	2	5	1	1	0	9			
		%	1.7%	1.0%	.3%	2.0%	0.0%	.9%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Level of education	Non-formal Education	Count	31	185	157	17	4	394	150.661 <sup>a</sup>	12	.000
		%	25.8%	37.1%	44.4%	34.7%	44.4%	38.2%			
	Primary	Count	27	41	7	22	2	99			
		%	22.5%	8.2%	2.0%	44.9%	22.2%	9.6%			
	Secondary	Count	28	186	147	6	2	369			
		%	23.3%	37.3%	41.5%	12.2%	22.2%	35.8%			
	Tertiary	Count	34	87	43	4	1	169			
		%	28.3%	17.4%	12.1%	8.2%	11.1%	16.4%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Occupation	Farming	Count	22	185	146	17	3	373	117.056 <sup>a</sup>	16	.000
		%	18.3%	37.1%	41.2%	34.7%	33.3%	36.2%			
	Trading	Count	42	189	186	25	3	445			
		%	35.0%	37.9%	52.5%	51.0%	33.3%	43.2%			
	Civil Servant	Count	48	109	22	7	3	189			
		%	40.0%	21.8%	6.2%	14.3%	33.3%	18.3%			
	Artisan	Count	8	12	0	0	0	20			
		%	6.7%	2.4%	0.0%	0.0%	0.0%	1.9%			
	Others	Count	0	4	0	0	0	4			
		%	0.0%	.8%	0.0%	0.0%	0.0%	.4%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Monthly income	<N50,000	Count	21	155	142	30	1	349	140.049 <sup>a</sup>	16	.000
		%	17.5%	31.1%	40.1%	61.2%	11.1%	33.9%			
	N50,000-100,000	Count	64	235	199	13	6	517			
		%	53.3%	47.1%	56.2%	26.5%	66.7%	50.1%			
	N101,000-200,000	Count	31	99	13	5	0	148			
		%	25.8%	19.8%	3.7%	10.2%	0.0%	14.4%			
	N201-300,000	Count	3	9	0	1	1	14			
		%	2.5%	1.8%	0.0%	2.0%	11.1%	1.4%			
	N301,000 and Above	Count	1	1	0	0	1	3			
		%	.8%	.2%	0.0%	0.0%	11.1%	.3%			
Total		Count	120	499	354	49	9	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

**Effects of Socio-Economic Characteristics on Uses of Forest Resources**

Results on the effects of socio-economic characteristics on uses of forest resources show that, all the Chi-square tests show  $p < 0.05$ , meaning a significant relationships/effect exist between socio-economic characteristics and uses of forest resources (Table 3). This implies that forest uses such as fuelwood, timber, NTFPs, grazing and hunting vary based on Age, Gender, Marital status, Household size, Education, Occupation and Income. Following the result presented it clearly showed that women collect more fuelwood and NTFPs, younger males engage more in timber harvesting and grazing and higher-income respondents use forests less frequently.

Table 3. Effects of Socio-Economic Characteristics of Respondents on the Uses of Forest Resources

			How do you use the forest					Total	Value	df	Asymp. Sig. (2-sided)
			Fuelwood collection	Timber Harvesting	Non-timber Forest Products (NTFPs)	Livestock Grassing	Hunting				
Age	10-20 years	Count	36	91	1	1	0	129	150.908 <sup>a</sup>	16	.000
		%	25.9%	15.3%	1.2%	.5%	0.0%	12.5%			
	21-30 years	Count	44	266	12	121	1	444			
		%	31.7%	44.9%	14.5%	56.5%	50.0%	43.1%			
	31-40 years	Count	53	223	59	90	1	426			
		%	38.1%	37.6%	71.1%	42.1%	50.0%	41.3%			
	41-50 years	Count	5	13	8	2	0	28			
		%	3.6%	2.2%	9.6%	.9%	0.0%	2.7%			
	51 and above years	Count	1	0	3	0	0	4			
		%	.7%	0.0%	3.6%	0.0%	0.0%	.4%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Gender	Male	Count	77	222	49	100	0	448	27.478 <sup>a</sup>	4	.000
		%	55.4%	37.4%	59.0%	46.7%	0.0%	43.5%			
	Female	Count	62	371	34	114	2	583			
		%	44.6%	62.6%	41.0%	53.3%	100.0%	56.5%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Marital status	Single	Count	46	113	2	61	0	222	94.576 <sup>a</sup>	12	.000
		%	33.1%	19.1%	2.4%	28.5%	0.0%	21.5%			
	Married	Count	53	362	45	93	1	554			
		%	38.1%	61.0%	54.2%	43.5%	50.0%	53.7%			
	Divorce	Count	36	87	27	28	1	179			
		%	25.9%	14.7%	32.5%	13.1%	50.0%	17.4%			
	Widow	Count	4	31	9	32	0	76			
		%	2.9%	5.2%	10.8%	15.0%	0.0%	7.4%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Household size	Less Than 5	Count	48	149	2	74	0	273	225.517 <sup>a</sup>	16	.000
		%	34.5%	25.1%	2.4%	34.6%	0.0%	26.5%			
	5-10	Count	32	236	17	100	1	386			
		%	23.0%	39.8%	20.5%	46.7%	50.0%	37.4%			
	11-15	Count	56	172	29	39	1	297			
		%	40.3%	29.0%	34.9%	18.2%	50.0%	28.8%			
	16-20	Count	2	31	32	1	0	66			
		%	1.4%	5.2%	38.6%	.5%	0.0%	6.4%			
	21 and Above	Count	1	5	3	0	0	9			
		%	.7%	.8%	3.6%	0.0%	0.0%	.9%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Level of education	Non-formal Education	Count	44	246	6	98	0	394	165.307 <sup>a</sup>	12	.000
		%	31.7%	41.5%	7.2%	45.8%	0.0%	38.2%			
	Primary	Count	18	64	8	7	2	99			
		%	12.9%	10.8%	9.6%	3.3%	100.0%	9.6%			
	Secondary	Count	32	194	35	108	0	369			
		%	23.0%	32.7%	42.2%	50.5%	0.0%	35.8%			
	Tertiary	Count	45	89	34	1	0	169			
		%	32.4%	15.0%	41.0%	.5%	0.0%	16.4%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Occupation	Farming	Count	43	211	15	104	0	373	160.692 <sup>a</sup>	16	.000
		%	30.9%	35.6%	18.1%	48.6%	0.0%	36.2%			
	Trading	Count	62	261	15	107	0	445			
		%	44.6%	44.0%	18.1%	50.0%	0.0%	43.2%			
	Civil Servant	Count	32	107	45	3	2	189			
		%	23.0%	18.0%	54.2%	1.4%	100.0%	18.3%			
	Artisan	Count	1	12	7	0	0	20			
		%	.7%	2.0%	8.4%	0.0%	0.0%	1.9%			
	Others	Count	1	2	1	0	0	4			
		%	.7%	.3%	1.2%	0.0%	0.0%	.4%			
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			
Monthly income	<N50,000	Count	40	165	3	140	1	349	366.947 <sup>a</sup>	16	.000
		%	28.8%	27.8%	3.6%	65.4%	50.0%	33.9%			
	N50,000-100,000	Count	82	346	16	73	0	517			
		%	59.0%	58.3%	19.3%	34.1%	0.0%	50.1%			
	N101,000-200,000	Count	16	75	56	0	1	148			
		%	11.5%	12.6%	67.5%	0.0%	50.0%	14.4%			
	N201-300,000	Count	0	6	7	1	0	14			
%		0.0%	1.0%	8.4%	.5%	0.0%	1.4%				
N301,000 and Above	Count	1	1	1	0	0	3				
	%	.7%	.2%	1.2%	0.0%	0.0%	.3%				
Total		Count	139	593	83	214	2	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

**Effects of Socio-Economic Characteristics on Frequency of Forest Degradation**

Results on the effects of socio-economic characteristics on frequency of forest visits displayed a significant relationships or Chi-Square values which implies that frequency of forest visits is strongly influenced by demographic factors (Table 4). This clearly revealed that low-income and larger households visit forests daily or weekly, often for fuelwood and grazing. In the same vein, educated respondents and civil servants visit the forest less frequently.

Table 4. Effects of Socio-Economic Characteristics of Respondents on the Frequency of Forest Use

			How often do you visit the forest				Total	Value	df	Asymp. Sig. (2-sided)
			Daily	weekly	Monthly	Seasonally				
Age	10-20 years	Count	45	77	3	4	129	192.421 <sup>a</sup>	12	.000
		%	31.3%	16.0%	.8%	20.0%	12.5%			
	21-30 years	Count	39	263	138	4	444			
		%	27.1%	54.7%	35.8%	20.0%	43.1%			
	31-40 years	Count	54	123	237	12	426			
		%	37.5%	25.6%	61.4%	60.0%	41.3%			
	41-50 years	Count	5	15	8	0	28			
		%	3.5%	3.1%	2.1%	0.0%	2.7%			
	51 and above years	Count	1	3	0	0	4			
		%	.7%	.6%	0.0%	0.0%	.4%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Gender	Male	Count	79	151	208	10	448	53.547 <sup>a</sup>	3	.000
		%	54.9%	31.4%	53.9%	50.0%	43.5%			
	Female	Count	65	330	178	10	583			
		%	45.1%	68.6%	46.1%	50.0%	56.5%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Marital status	Single	Count	54	72	90	6	222	71.430 <sup>a</sup>	9	.000
		%	37.5%	15.0%	23.3%	30.0%	21.5%			
	Married	Count	47	308	192	7	554			
		%	32.6%	64.0%	49.7%	35.0%	53.7%			
	Divorce	Count	39	66	68	6	179			
		%	27.1%	13.7%	17.6%	30.0%	17.4%			
	Widow	Count	4	35	36	1	76			
		%	2.8%	7.3%	9.3%	5.0%	7.4%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Household size	Less Than 5	Count	43	100	120	10	273	121.594 <sup>a</sup>	12	.000
		%	29.9%	20.8%	31.1%	50.0%	26.5%			
	5-10	Count	27	241	116	2	386			
		%	18.8%	50.1%	30.1%	10.0%	37.4%			
	11-15	Count	70	125	97	5	297			
		%	48.6%	26.0%	25.1%	25.0%	28.8%			
	16-20	Count	3	12	48	3	66			
		%	2.1%	2.5%	12.4%	15.0%	6.4%			
	21 and Above	Count	1	3	5	0	9			
		%	.7%	.6%	1.3%	0.0%	.9%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Level of education	Non-formal Education	Count	47	205	140	2	394	153.643 <sup>a</sup>	9	.000
		%	32.6%	42.6%	36.3%	10.0%	38.2%			
	Primary	Count	33	54	12	0	99			
		%	22.9%	11.2%	3.1%	0.0%	9.6%			
	Secondary	Count	15	176	172	6	369			
		%	10.4%	36.6%	44.6%	30.0%	35.8%			
	Tertiary	Count	49	46	62	12	169			
		%	34.0%	9.6%	16.1%	60.0%	16.4%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Occupation	Farming	Count	61	162	146	4	373	63.275 <sup>a</sup>	12	.000
		%	42.4%	33.7%	37.8%	20.0%	36.2%			
	Trading	Count	51	253	135	6	445			
		%	35.4%	52.6%	35.0%	30.0%	43.2%			
	Civil Servant	Count	30	55	96	8	189			
		%	20.8%	11.4%	24.9%	40.0%	18.3%			
	Artisan	Count	2	10	7	1	20			
		%	1.4%	2.1%	1.8%	5.0%	1.9%			
	Others	Count	0	1	2	1	4			
		%	0.0%	.2%	.5%	5.0%	.4%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			
Monthly income	<N50,000	Count	57	128	157	7	349	157.653 <sup>a</sup>	12	.000
		%	39.6%	26.6%	40.7%	35.0%	33.9%			
	N50,000-100,000	Count	72	316	125	4	517			
		%	50.0%	65.7%	32.4%	20.0%	50.1%			
	N101,000-200,000	Count	12	34	96	6	148			
		%	8.3%	7.1%	24.9%	30.0%	14.4%			
	N201-300,000	Count	1	3	7	3	14			
		%	.7%	.6%	1.8%	15.0%	1.4%			
	N301,000 and Above	Count	2	0	1	0	3			
		%	1.4%	0.0%	.3%	0.0%	.3%			
Total		Count	144	481	386	20	1031			
		%	100.0%	100.0%	100.0%	100.0%	100.0%			

**Conclusion**

This study establishes that deforestation in the study area is a socio-ecological phenomenon driven by the intersection of human livelihood needs and weak governance. Statistical analysis confirms that key socio-economic characteristics, large household size, low education, limited income diversification, and primary reliance on agriculture significantly predict forest dependency and extraction intensity. The proximate drivers are agricultural expansion and fuelwood harvesting, exacerbated by underlying population pressure and poor policy enforcement. The consequences are severe, encompassing biodiversity loss, soil erosion, micro-climatic changes, and heightened community vulnerability through scarcity and conflict.

Crucially, degradation is not uniform but varies spatially with local socio-economic and governance contexts. These findings collectively indicate that while the crisis is anthropogenic, it is addressable through targeted, integrated interventions that reconcile livelihood security with forest stewardship.

### Recommendations

Based on the study's findings, five integrated policy actions are recommended:

i. Strengthen Participatory Forest Governance: Formalize and legally empower community-led forest management committees to enhance local oversight, curb illegal activities, and bridge the enforcement gap left by weak state institutions.

ii. Promote Sustainable Livelihood Diversification: Introduce and subsidize context-specific alternative livelihoods (e.g., agroforestry, beekeeping, NTFPs processing) paired with microcredit access to directly reduce household dependence on forest-degrading activities.

iii. Accelerate the Clean Energy Transition: Implement targeted subsidies and awareness campaigns to expand access to affordable liquefied petroleum gas (LPG) and improved cookstoves, thereby decoupling household energy needs from fuelwood extraction.

iv. Implement Targeted Reforestation and Land-Use Planning: Launch community-based native species afforestation programs in critically degraded LGAs and integrate legally binding sustainable land-use plans that demarcate agricultural zones from protected forest reserves.

v. Integrate Environmental Education and Adaptive Research: Embed forest conservation modules into local agricultural extension services and school curricula, while establishing a participatory monitoring system using remote sensing and community feedback for adaptive management.

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