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# The Political Ecology of Tree Logging for Timber in Koinadugu District, Northern Province, Sierra Leone

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## ABSTRACT

**Background:** In rural Sierra Leone, particularly the northern Koinadugu District, commercial timber logging has rapidly expanded into a primary livelihood strategy. While economically significant, this booming trade raises severe ecological, climatic, and social anxieties among local populations. Despite these escalating changes, empirical research capturing how rural communities directly experience and perceive these shifts remains scarce. This study evaluates the socioeconomic and ecological impacts of timber extraction from the perspective of the communities living through them.

**Methods:** We conducted a cross-sectional, mixed-methods study across Koinadugu District between November and December 2022. Quantitative data were gathered through structured questionnaires with community residents, complemented by qualitative key informant interviews with forestry officials and local authorities. Quantitative findings were analyzed using descriptive statistics, while qualitative insights were synthesized using thematic analysis to evaluate logging practices alongside community environmental shifts.

**Results:** Among the 261 participants surveyed (78.5% male), logging was universally recognized as a vital mechanism for economic survival, driven heavily by systemic poverty, structural unemployment, and a rising cost of living. However, these immediate financial gains coexist with severe localized crises. Environmentally, residents reported stark micro-climatic



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disruptions, including dropping rainfall levels, surging temperatures, recurrent droughts, deforested landscapes, and degraded soil structures. Socially, the trade correlates with alarming community challenges, including spikes in drug abuse, teenage pregnancy, robbery, accidents, and child labor. While participants value short-term job creation and business growth, they expressed deep distress over accelerating environmental damage and the weak enforcement of forest protection laws.

**Conclusion:** Timber logging in Koinadugu District functions as an immediate economic lifeline that simultaneously compromises the long-term environmental and social stability of rural communities. Resolving this friction requires a swift transition away from weak institutional oversight toward rigorous forest governance, strict legal enforcement of environmental boundaries, and the targeted investment in sustainable alternative livelihoods to reduce rural dependence on destructive logging**.**

**Keywords:** Timber logging; Deforestation; Climate change; Livelihood; Environmental degradation; Koinadugu District; Sierra Leone.

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## INTRODUCTION

Forests play a critical role in maintaining ecological balance and supporting human livelihoods through the provision of timber, fuelwood, food resources, biodiversity conservation, soil protection, and climate regulation. Globally, forests serve as major carbon sinks and contribute significantly to the regulation of atmospheric temperature and rainfall patterns. However, increasing rates of deforestation and unsustainable logging activities continue to threaten forest ecosystems, particularly in low- and middle-income countries where communities rely heavily on forest resources for economic survival. Deforestation has been associated with biodiversity loss, climate change, soil erosion, flooding, and disruption of ecosystem services (FAO, 1999; European Commission, 2012).

In many African countries, including Sierra Leone, forests have experienced significant degradation due to agricultural expansion, mining activities, charcoal production, urbanization, and commercial timber extraction. Sierra Leone was once characterized by extensive tropical rainforest vegetation, but over the years the country has witnessed substantial forest loss. Earlier reports suggested that less than 5% of Sierra Leone's land area remained covered by mature closed-canopy forest compared to approximately 20% several decades earlier (Sugar et al., 1990). Although recent debates have highlighted inconsistencies in forest-cover estimates, studies continue to emphasize ongoing environmental pressure on forest ecosystems within the country (Wadsworth & Lebbie, 2019).

Timber logging has increasingly emerged as an important economic activity in rural districts of Sierra Leone, particularly in the northern region. In districts such as Koinadugu, timber logging provides employment opportunities and income generation for local communities, transport operators, investors, and traders. Timber products are widely used in construction, furniture production, and other commercial activities, thereby contributing to local and national economies. However, despite these economic benefits, uncontrolled logging activities may result in adverse environmental and social consequences if

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not properly regulated.

Previous studies conducted in different parts of Africa have demonstrated that unsustainable timber harvesting contributes to environmental degradation and negatively affects forest ecosystems. Adekunle and Olagoke (2010), in a study conducted in southwestern Nigeria, reported that logging activities caused damage to residual trees, soil compaction, and ecosystem disturbance even under selective logging practices. Similarly, Obasi et al. (2015) identified several environmental and socioeconomic consequences of timber harvesting in Nigeria, including climate change, biodiversity loss, destruction of forest resources, disputes over land, and increased cost of living. Furthermore, political ecology studies have highlighted how weak governance systems, corruption, poor enforcement of forestry regulations, and unequal power relations contribute to unsustainable forest exploitation (Charles, 2001; Doc. Anàl. Geogr., 2008).

In Koinadugu District, timber logging has become increasingly visible over recent years, with reports of extensive tree harvesting in several chiefdoms and growing concerns regarding its environmental and social implications. Communities have expressed concerns about changing weather patterns, increasing temperatures, reduced rainfall, destruction of agricultural land, and social problems associated with timber activities. Despite these concerns, there remains limited published research examining the perceived ecological and socioeconomic impacts of timber logging in rural Sierra Leone, particularly within Koinadugu District.

Understanding community perceptions of timber logging is important for informing sustainable forest management policies and developing interventions that balance environmental protection with livelihood needs. Therefore, this study aimed to assess community perceptions regarding the ecological and socioeconomic impacts of timber logging in Koinadugu District, Northern Sierra Leone. Specifically, the study explored the characteristics and drivers of timber logging, its perceived environmental effects, and its associated social and economic consequences within local communities..

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## METHODS

### Study Design and Setting

This study employed a community-based cross-sectional mixed-methods design integrating both quantitative and qualitative approaches. The design was selected to capture a broad understanding of community perceptions while also allowing in-depth exploration of stakeholder perspectives on timber logging. The study was conducted in Koinadugu District, located in the Northern Province of Sierra Leone. Koinadugu is the largest district in the country by land area and is predominantly rural, with livelihoods largely dependent on agriculture, mining, and natural resource exploitation, including timber logging. The district is characterized by dispersed settlements, forested landscapes, and varying levels of access to infrastructure and markets.

### Population and Sampling

The study population comprised residents of selected communities within Koinadugu District, including individuals directly or indirectly involved in timber-related activities as well as those not engaged in the timber trade. Key informants such as local authorities, forestry stakeholders, and representatives of relevant institutions were also included for qualitative insights. A total of 261 respondents were included in the quantitative component of the study. Participants were selected using a combination of purposive and snowball sampling techniques. Initial participants were identified within timber-affected communities, after which additional respondents were recruited based on referrals from previously identified participants. This approach was used to access individuals involved in different stages of the timber value chain, including cutters, transporters, suppliers, and community members. Key informant interviews were conducted with selected stakeholders based on their relevance and knowledge of timber governance and environmental management in the district.

### Data Collection Tool

Data were collected using two main instruments: a structured questionnaire and a semi-structured interview guide. The questionnaire was designed to capture quantitative information on socio-demographic characteristics, awareness and involvement in timber logging, perceived drivers of logging activities, and

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perceived environmental and social impacts. The interview guide was used to obtain qualitative information from key informants, focusing on governance structures, enforcement of forestry regulations, operational dynamics of the timber trade, and observed environmental changes.

The instruments were developed based on relevant literature on deforestation, political ecology, and forest resource management, and were adapted to the local context of Sierra Leone.

**Data Collection Procedures**

Data collection was carried out over a two-week period from 19th November to 3rd December 2022. Trained research assistants administered questionnaires to respondents in selected communities within the district. Interviews were conducted face-to-face with key informants, including community leaders and representatives of forestry-related institutions.

Questionnaires were administered in English and Krio, depending on the preference and literacy level of respondents. For participants with limited literacy, questions were read aloud and responses were recorded by the data collectors. Interviews were conducted using a semi-structured format to allow participants to freely express their experiences and perspectives while ensuring coverage of key thematic areas. All interviews were documented through written notes.

**Data Analysis**

Quantitative data were entered into Microsoft Excel and analyzed using descriptive statistical methods. Results were summarized using frequencies and percentages and presented in tables for clarity and interpretation. The analysis focused on describing socio-demographic characteristics, patterns of involvement in timber logging, perceived drivers, and reported environmental and social impacts.

Qualitative data obtained from key informant interviews were analyzed using thematic content analysis. Responses were organized into key themes aligned with the study objectives, including governance and enforcement, timber supply chain dynamics, and perceived environmental and social consequences. Findings from both quantitative and qualitative components were triangulated to provide a comprehensive understanding of timber

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logging in the study area..

## RESULTS

### 4.1 Introduction

This chapter presents data based on the objectives of this study.

### 4.2 Socio-demographics

#### 4.2.1 Respondents by age

The study revealed that the study of respondent is in different age categories. This is as indicated below:

**Table 4.1: Age of Respondents**

The table 4.1 above presents the age of the respondents. From the table, the results show that 19% of the respondents were between 15-25 years old, 30% were between 26-35 years old, another 30% were between 36-45 years old, 15% were between 46-55 years old and 6% were above 56 years old.

| Age group | No of Respondents | Percentage(%) |
|---|---|---|
| 15-25 | 50 | 19 |
| 26-35 | 77 | 30 |
| 36-45 | 78 | 30 |
| 46-55 | 40 | 15 |
| 56 and above | 16 | 6 |
| Total | 261 | 100 |

**Source: Designed by Researcher (Dec. 2022)**

#### 4.2.2 Respondents Categorize by Gender

**Table 4.2: Gender of Respondents**

| Gender | No. of Respondents | Percentage (%) |
|---|---|---|
| Male | 205 | 78.54 |
| Female | 56 | 21.46 |
| Total | 261 | 100 |

Table 4.2shows the gender of the respondents that participated in this research study and that 78.54% of respondents were male while 21.46% of respondents were female.

#### 4.2.3 Education level of Respondents

**Table 4.3: Education level of Respondents**

| Level of Education | No. of Respondents | Percentage (%) |
|---|---|---|
| No School | 47 | 18 |
| High School | 119 | 46 |
| Vocational | 6 | 2 |
| University | 85 | 33 |
| Other | 4 | 2 |
| Total | 261 | 100 |

Table 4.3 showed that a total of 47 respondents (18%) of respondents had no form of education, 119 (46%) of the total respondents had high school or secondary school education, 6 (2%) of the total respondents had vocational education, 85(33%) had university education and 4(2%) of the total respondents have other forms of education like Arabic.

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**4.2.4 Respondents Employment**

| Employment | No. of Respondents | Percentage (%) |
|---|---|---|
| Business | 80 | 30.53 |
| Contractor | 22 | 8.40 |
| Driver | 4 | 1.53 |
| Farmer | 7 | 2.67 |
| Miner | 13 | 4.96 |
| Unemployed | 100 | 38.17 |
| Police | 6 | 2.29 |
| Social Worker | 3 | 1.15 |
| Tailor | 4 | 1.53 |
| Teacher | 23 | 8.78 |
| Total | 262 | 100 |

The data from table 4.4, shows that 80 (30%) of the total respondents are into business, 22(8.40) are contractors, 4(1.53%) of the total respondents are drivers, 7(2.67) are farmers, 13(4.96%) are miners, 6(1.15%) are police, 3(1.15%) are social workers, 4(1.53) of the total respondents are tailors, 23 (8.785%) are teachers and 100(38.17%) are unemployed.

**4.3 Characterising the tree logging for timber in Kabala Koinadugu District: the nature and extent of tree logging for timber in Koinadugu District**

**Table 4.5**

| | Yes | No |
|---|---|---|
| Are you in to the timber business? | 109 | 153 |
| Are you aware of tree logging for timber in Koinadugu District? | 250 | 12 |
| Is it done in every community? | 250 | 12 |
| Are the differences due to availabilty? | 219 | 45 |
| Are the differences due to accessibility? | 210 | 52 |
| Are the differences due to existing bye-laws? | 212 | 50 |
| Is tree logging for timber seasonal? | 242 | 20 |
| Are there laws that prevent tree logging for timber? | 237 | 25 |
| Are the laws enforced? | 109 | 153 |
| Are you aware of risks associated with timber logging? | 229 | 33 |
| Are you worried about the level of deforestation? | 213 | 49 |
| Are there benefits that tree logging for timber provides? | 248 | 14 |

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| | Yes | No |
|---|---|---|
| Are there effects of tree logging for timber? | 245 | 17 |
| Are there any changes in the weather patterns? | 250 | 12 |
| Are you aware of climate change? | 235 | 27 |
| Do you think timber logging associated with climate change? | 250 | 12 |
| Do you think timber logging makes your community unsafe? | 219 | 43 |

The summary of table 4.5 shows that some of the respondents are into the timber business, and a large number of the respondents are aware of the timber business in the district. It also shows that most of the respondents believe it is not done in all the communities and they believe it is as a result of the differences due to availability, accessibility and existing bye-laws. A large number of respondents said it is done during the dry season. Most of the respondents responded that there are laws that prevent tree logging for timber but also a large number of the respondents believe these laws are not enforced.

Furthermore, a higher number of the respondents are aware of the risks associated with timber logging and are worried about the level of deforestation in the districts. A higher number of the respondents are also aware of the benefits, effects, climate change and changes in the weather. Lastly, most of the respondents think timber logging makes their community unsafe and that it is associated with climate change

### 4.3.1 Their Roles in the timber business

**Table 4.6: Roles played in the Timber business**

| Roles | No. of Respondents | Percentage (%) |
|---|---|---|
| Carrier | 4 | 1.53 |
| Driver | 11 | 4.20 |
| Middleman | 13 | 4.96 |
| Power saw Operator | 40 | 15.27 |
| Retailer | 30 | 11.45 |
| Supplier | 7 | 2.67 |
| Not Involved | 157 | 59.92 |
| Total | 262 | 100.00 |

Table 4.6 shows the roles played by respondents who are involved in the timber business. 4(1.53%) of the total respondents

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are carriers (loaders or off-loaders), 11(4.20%) are drivers, 13(4.96%) are the middlemen, 40(15.27%) of the total respondents are power-saw operators (cutters), 30(11.45) of the total respondents are retailers, 7(2.67%) are suppliers whiles 157(59.92%) of the total respondents are not involved in the timber business, hence plays no role.

### 4.3.2 Respondents' thoughts toward timber logging

**Table 4.7: Respondents' thoughts towards timber logging**

| Their thoughts towards timber logging in their community | No. of Respondents | Percentage (%) |
|---|---|---|
| Good | 119 | 45.42 |
| Bad | 143 | 54.58 |
| Total | 262 | 100 |

According to the table above, 45.42% of the total respondents think timber logging its good and profitable and 58% of the total respondents think it wrong/bad.

### 4.3.3 Chiefdom/ Communities, timber logging is done

**Table 4.8: Chiefdom/communities in which timber logging is done**

| Chiefdoms/Communities | No. of Respondents | Percentage (%) |
|---|---|---|
| Bafodia | 15 | 5.73 |
| Dogoloya | 28 | 10.69 |
| Seimamaia | 7 | 2.67 |
| Beninkoro | 7 | 2.67 |
| Yataya | 18 | 6.87 |
| Bindi | 4 | 1.53 |
| Sengbeh | 14 | 5.34 |
| Musaia | 14 | 5.34 |
| Kawoshiror | 6 | 2.29 |
| Krutor | 7 | 2.67 |
| Nieni | 7 | 2.67 |
| Kanunka | 7 | 2.67 |
| Mongo | 5 | 1.91 |
| Tinkifika | 7 | 2.67 |
| Kamaro | 7 | 2.67 |
| Don't know | 109 | 41.60 |
| Total | 262 | 100.00 |

**Source: Developed by the Researcher December 2022**

From table 4.8, it shows that timber logging is done in 15 chiefdoms in Koinadugu Districts with Dogoloya having the highest percentage(10.69%) of responses and Bindi havng the lowest percentage (1.53%) of responses for timber logging and 109(41.60%) do not know the chiefdoms/communities timber logging is

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done.

**4.3.4 Buyers of the timber**

**Table 4.9: Buyers of the timber**

| Buyers | No. of Respondents | Percentage (%) |
|---|---|---|
| Chinese | 157 | 59.92 |
| Guineans | 15 | 5.73 |
| Nigerians | 15 | 5.73 |
| Foreigners | 18 | 6.87 |
| Germans | 3 | 1.15 |
| Liberians | 8 | 3.05 |
| Investors | 28 | 10.69 |
| Retailers | 10 | 3.82 |
| Don't know | 8 | 3.05 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

Table 4.9 shows that of the total respondents, 59.92% are Chinese, 5.73% are Guineans, 5.73% are Nigerians, 6.87% are foreigners (not specified), 1.15% are Germans, 3.05% are Liberians, 10.69% are investors, 3.82% are retailers and 8% of the total respondents don't know the buyers.

**4.3.5 The cutters of the timber**

**Table 4.10: Cutters of the timber**

| Cutters | No. of Respondents | Percentage (%) |
|---|---|---|
| Indigenes | 49 | 18.70 |
| Power saw operators | 213 | 81.30 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

Table 4.10 shows that, 18.70% are the total respondents said the cutters of the timber are the indigenes of the chiefdoms or the district and 81.30% of the total respondents said the cutters are power saw operators.

**4.3.6 The timber suppliers**

**Table 4.11: The timber suppliers**

| Suppliers | Frequency | Percentage (%) |
|---|---|---|
| Indigenes | 67 | 25.57 |
| Guineans | 4 | 1.53 |
| Malians | 5 | 1.91 |
| Internal investors | 133 | 50.76 |
| Don't know | 53 | 20.23 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

Table 4.11 shows that 67 respondents said the suppliers are indigenes are the district, 4 respondents said the suppliers are Guineans,

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5 respondents said they are Malians, 133 respondents said the suppliers are internal investors, and 53 respondents do not know the suppliers of the timber.

**4.3.7 The middlemen involved**

**Table 4.12: the middlemen involved**

| Middlemen | Frequency | Percentage (%) |
|---|---|---|
| Chiefs | 6 | 2.29 |
| Indigenes | 61 | 23.28 |
| Internal Investors | 24 | 9.16 |
| Land owners | 4 | 1.53 |
| Power-saw Operators | 34 | 12.98 |
| Retailers | 15 | 5.73 |
| Suppliers | 27 | 10.31 |
| Don't know | 91 | 34.73 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

Table 4.12 showsthat 6 respondents said the chiefs of the chiefdoms are the middlemen, 61 respondents said the indigenes, 24 respondents said internal investors, 4 respondents said land owners, 34 respondents said power-saw operators, 15 respondents said retailers, 27 respondents said suppliers and 91 respondents don not know who the middlemen are.

**4.3.8 The enablers of timber logging**

**Table 4.13: enablers of timber logging**

| Enablers | No. of Respondents | Percentage (%) |
|---|---|---|
| Chiefs | 147 | 56.11 |
| Indigenes | 34 | 12.98 |
| Government | 14 | 5.34 |
| Cutters | 4 | 1.53 |
| Don't Know | 63 | 24.05 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

From table 4.13, 147 respondents said the enablers are the chiefs, 34 respondents said the indigenes, 14 respondents said the government, 4 respondents said the cutters (power-saw operators) and 63 respondents do not know who the enablers are.

**4.3.9 Species of trees logged for timber**

**Table 4.14**

| Species | Frequency |
|---|---|
| Ebony | 2 |
| Walnut | 2 |
| Gbeni | 241 |
| Lengeh | 56 |

From the table above it shows that only four

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tree species are logged for timber in Koinadugu District of which Gbeni had 241 responses, followed by Lengehwith 56 responses then Ebony with 2 responses and Walnut with 2 responses.

**4.3.10 The preferred species**

**Table 4.15: The preferred species**

| Preferred Species | Frequency | Percentage (%) |
|---|---|---|
| Gbeni | 234 | 89.31 |
| Lengeh | 28 | 10.69 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

According to the table, only two of the species named above in Table 4.15were preferred which are Gbeni with 89.31% of the total responses and Lengeh with 10.69% of the total responses.

**4.3.11 Types of logging carried out**

**Table 4.16 type of logging carried out**

| Type of logging done | No. of Respondents | Percentage (%) |
|---|---|---|
| Non- Selective logging | 15 | 5.73 |
| Selective Logging | 247 | 94.27 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher December 2022**

The above shows that only 5.73% of the total respondents think non-selective logging is the type of logging done during timber logging and 94.27% of the total respondents think selective logging is the type being practised

**4.3.12 Reasons for the preferred species**

**Table 4.17 Reasons for the preferred species**

| Reasons for the preferred species | No. of Respondents | Percentage (%) |
|---|---|---|
| Accessibility | 21 | 8.02 |
| Big | 4 | 1.53 |
| Durable | 7 | 2.67 |
| Strong | 115 | 43.89 |
| Don't Know | 76 | 29.01 |
| high demand | 39 | 14.89 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

Table 4.17 shows the different reasons for the preferred species. 21 respondents believe it is due to accessibility, 4 respondents believe it is due to the size (how big it is), 7 respondents

believe it is because of it durability, 115 respondents believe it is because of it strength, 39 respondents believe it is because it is in high demand and 76 respondents don' know why.

**4.4 The Drivers and Ecological Risk Factors of tree logging for Timber**

**4.4.1. The Current weather**

**Table 4.18: The Current Weather**

| Weather | No. of Respondents | Percentage (%) |
|---|---|---|
| Hot | 255 | 97.33 |
| Cold | 7 | 2.67 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

From the table it shows that in recent times in Koinadugu District, 97.33% of respondents believe the weather has gotten warmer with only 2.67% believe it has gotten colder

**4.4.2. The level/amount of rain**

**Table 4.19: The level/amount of Rain**

| Rains | No. of Respondents | Percentage (%) |
|---|---|---|
| More | 5 | 1.91 |
| Less | 257 | 98.09 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher in December 2022**

From the table, it shows that 98.09% of the total respondents believe there has been less rain whilst 1.91% of the total respondents believe there's being more rains in recent times.

**4.4.3. Why people embark on timber logging**

**Table 4.20: Reasons for embarking on timber logging**

| Reasons why people embark on tree logging | Frequency | Percentage (%) |
|---|---|---|
| Food | 6 | 2.29 |
| Job | 150 | 57.25 |
| Sustainable Living | 34 | 12.98 |
| Increase standard of living | 46 | 17.56 |
| Don't Know | 26 | 9.92 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher December 2022**

From table 4.20 it shows the different motivations for people entering into the timber business or timber logging. 2.29% of the total respondents embark on timber logging to provide food, 57.25% of the total respondents to acquire a job, 12.98% of the total respondents to live sustainably, 17.56% of the total respondents increase their standard of living and 9.92% of the total respondents don't believe or know of any just reason why people do timber logging.

**4.4.4. Factors responsible for tree logging other than for timber**

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**Table 4.21: Factors responsible for tree logging other than for timber**

| Factors responsible for tree logging | Frequency | Percentage (%) |
|---|---|---|
| Agriculture | 14 | 5.34 |
| Charcoal | 6 | 2.29 |
| Construction | 7 | 2.67 |
| Cost of living | 7 | 2.67 |
| Illiteracy | 53 | 20.23 |
| Poverty | 118 | 45.04 |
| Government | 4 | 1.53 |
| Road Construction | 10 | 3.82 |
| Over Population | 4 | 1.53 |
| Don't Know | 39 | 14.89 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher December 2022**

Table 4.21 shows the factors responsible for tree logging other than for timber. 14 respondents believe it is for agriculture, 6 respondents believe it is for charcoal, 7 respondents believe it is for construction, 7 respondents believe it is due to the cost of living, 53 respondents believe it is due to illiteracy, 118 respondents believe it is due to poverty, 4 respondents believe it is the government, 10 respondents believe it is for road construction, 4 respondents believe it is due to over population and 39 respondents don't know of any other factors

**4.5 The Positive and Negative Benefits of timber logging in the communities**

**4.5.1. Benefits of tree logging for timber**

**Table 4.22: benefits of tree logging for timber**

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| Benefits of tree logging | No. of Respondents | Percentage (%) |
|---|---|---|
| Construction of Bridges | 7 | 2.67 |
| Economic Growth | 5 | 1.91 |
| Employment | 79 | 30.15 |
| Food | 14 | 5.34 |
| Shelter | 28 | 10.69 |
| Friendship | 7 | 2.67 |
| Intermarriages | 3 | 1.15 |
| Road Construction | 8 | 3.05 |
| Business Growth | 10 | 3.82 |
| Reduced Crime rate | 4 | 1.53 |
| Increased Foreign Exchange | 10 | 3.82 |
| Don't Know | 87 | 33.21 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher December 2022**

Table 4.22 shows all the different benefits of timber according to the respondents although 33.21% of the total respondents don't know of any benefit that timber logging provides.

### 4.5.2. Effects of tree logging for timber

**Table 4.23: Effects of tree logging for timber**

| Effects | Frequency | Percentage (%) |
|---|---|---|
| Climate Change | 43 | 16.41 |
| Drought | 90 | 34.35 |
| Destruction of Fauna and Flora | 4 | 1.53 |
| Poor Agricultural Yield | 4 | 1.53 |
| Deforestation | 12 | 4.58 |
| Destruction of Roads/Bridges | 8 | 3.05 |
| Destruction of Soil Organisms/Structure | 40 | 15.27 |
| Flooding | 15 | 5.73 |
| Excess heat | 10 | 3.82 |
| Poor animal rearing | 4 | 1.53 |
| Don't Know | 32 | 12.21 |
| Total | 262 | 100.00 |

**Source: Developed by Researcher December 2022**

Table 4.23 shows all the different benefits of timber according to the respondents although 12.21% of the respondents don't know of any effect that timber logging causes.

### 4.5.3. The Social Consequences of Tree logging for timber

**Table 4.24: Social Consequences of tree logging for timber**

| Social Consequences | Frequency |
|---|---|
| Teenage pregnancy | 155 |
| Drug abuse | 160 |

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| | |
|---|---|
| Robbery | 147 |
| Child labour | 42 |
| Death | 66 |
| Dropouts | 43 |
| Divorce | 11 |
| Illness | 19 |
| Accidents | 73 |
| Amputation | 8 |
| Prostitution | 31 |
| Early marriage | 49 |
| Price Inflation | 7 |
| Food shortage | 11 |
| Overcrowding | 7 |
| Rape | 7 |

**Source: Developed by Researcher December 2022**

Table 4.24 shows the all social consequences of tree logging for timber according to the respondents

**4.6 Interviews**

Interviews were conducted with different stakeholders, representative from related organisations both within the district and outside the district, in Freetown.

**The Council Chairman, Koinadugu District**

He said the timber logging is mainly done in Kamoukeh and Bafodia.

As a council the timber business brings revenue to the community but are being challenged as they lose support from donors; NACSA (National Commission for Social Actions) stopped constructing roads in the district because the timber vehicles continuously destroy the roads. He added that he had to put a stop to the timber vehicles from using these roads but to find another route. He concluded that after continuous meetings with NACSA and other donors, they have resumed supporting the district.

One of the effects of timber he highlighted was climate change. As a council, they have put provisions in place to combat the issue; they started a tree planting project, created job opportunities and skill training programs to engage the youths in the district.

**Timber Association Koinadugu District, Representative**

He started by saying the timber is a very good and profitable business but requires financial stability or support to go into the timber business and this is due to various reasons like:

-They'd have to pay (cola) to the chief of the chiefdom, the town chief of the town, the mammy Queen of the community where they need to harvest the timber from.

-They'd also have to pay the land owner (cola) to get access to the land

-After harvesting, they'd pay the town chief and

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the chief or give them the tenth log of every ten harvested.

He added that Nissan vehicles are used to transport the timber from the bush (Nissan point) to the to the 6-trye point using 6-tyre trailers to the trailer point, trailers transport it to Freetown to the Depot. But to transport the timber from the district to Freetown, the Council, Forestry Department, Timber Association would have to give them a purchased pass/receipt. From Freetown, the investors take then to the airport.

According to him, the:

Buyers are the Chinese

Harvesters are the indigenes of the community

He said the species harvested more is the Gbeni tree and this is because it is more preferred due to its ability to produce 3000 seeds, can withstand heavy wind and germinates during the dry season and the logging only happens in specific areas in the chiefdoms, communities. Only the 30 by 30 are being logged.

He said there's no specific price and that the price for timber can be looked at at various levels;

- he bush price: varies depending on the landowner
- issan point price, 6-trye point price, trailer point : depends on the distance
- D rivers of the vehicles: depends on distance
- B ridge/Road making: depends on distance
- L oading and off-loading; Nle 10- Nle 20

Some of the benefits according to him are: bridge/road construction, bushowners/farmers can buy bike to transport farm tools and goods easier, youth employment.

According to him, there's no outstanding negative impact.

**Forestry Department, Koinadugu District Representative**

He said there are three sizes of timber, havarie (below 30 by 30) which is not sold/harvested, the 30 by 30 which is usually sold/harvested and the Taco (60 by 60).

He added that only lengeh is harvested during the shut of the timber season.

He said most of the population is involved in the business because of the awareness of the profit.

He added that it is done in every chiefdom except Yifirin. According to him, it has caused destruction of roads and divorce. He concluded that most of the harvesters don not take license or are not registered and they are unable to guard the forest because there are only seven pin-

coded foresters.

**Environment Department from Council, Koinadugu District Representative**

He conversed that they issue license to loggers and they pay their tax to council but the benefits is not to be compared to the harm it causes to the environment.

He added that the buyers are mostly foreigners from Guinea and Liberia.

They chiefdoms where it timber logging is more prevalent are Tamso, Bonokoyakaia, Yifirin, Kamoukeh, and the species logged are Gbeni and Yemani.

Some of the drivers according to him are: poverty and lack of jobs

He said they've done proper and continuous sensitization of the impacts of timber logging and the population is very aware of them.

He suggested that the timber laws should be enforced.

**Sierra Leone Police, Koinadugu District Representative**

He highlighted employment to be the major benefits of timber logging but during the rainy season when timber season is shut, there's an increase in crime rates, drug trafficking as according to him, they take them help their depression.

**Social Activist, Koinadugu District**

He said the chiefs no longer accept cola to give permission but actual cash and the trnth log of every ten harvested. He said the vehicles used to transport the timber are cannibalised vehicles. Called "pull-na-doe" He added that according to the constitution, foreigners are not suppose to enter the forest, but the Chinese have been smuggled in and they use black foreigners who speak both Krio and Chinese to the forest.

He added that, during timber season, dollar was cheaper as it was sold at any price. Businesses grew but rents became expensive, looting becomes the order of the day after the closing of the timber season, labour is expensive hence food shortage as there's no one to do the farm work, increase in accidents, death, amputation, teenage pregnancy.

He recommended that the farmers should be supported.

**Human- Rights Activist, Koinadugu District**

In his words, "there are no benefits of timber logging except harm". He said the district is unsafe as there are high rates of theft and robbery, prostitution, rape, divorce, high level of dropouts etc. According to him, he really hasn't seen any benefits timber provides. He also said that with all the news/information that timber business is profitable and has changed lives, he's yet to see a rich man in Koinadugu who attained

his wealth from timber and even at that he added that only few of the rich people in the district even helps or contributes to the district. He also added that all timber has done is to introduce disgruntle people into the district and has destroyed the beautiful scenery, the peace, the quietness and fruitfulness of the district.

**Ministry of Forestry (MOF), Freetown Representative**

He said timber logging is legal in every district except in Western Area but logging in Koinadugu is permitted only in community forest and forest reserves and even at that must have a licence and registered power-saw and must have a concession area allocated to you either by the communities and/or approved by the Forestry Department in the district. He also added that the forest resources are govern by the 1988 Forestry Act which has been amended in 2022 and 1972 Wildlife Conservation Acts which was also mended in 2022, the Forestry Policy 2010, Forestry Regulation 2010 and Wildlife Policy 2010. They use these laws to manage their forest resources of which timber is a part. The Forestry Act amended 2022 have fines for defaulters which says if one is caught in or destroying the forest without clear approval or permission from the chief conservator of forest or director of forestry, the individual will pay a penalty of the amount stated in the act. He added, before the amendments of these acts the fines were very minor to the defaulters because they were asked to pay a fine of NLE1000 to NLE2000 per timber but now they are asked to pay NLE 15000 and above.

According to him, the MOF are the enablers as they are the policy makers and are responsible to regulate the forests and the commercial timber trade. He added that they are also the middlemen as they facilitates between the business people, the private sector and the local communities surrounding the forest reserves. He also said the investors who are involved in the business are referred to as the private sector and they can be anyone who has an interest. He said Sierra Leone is part the Mano River Union, ECOWAS, African Union, Common wealth and the likes, so all these are factors as to why anybody (foreigners) are allowed to log in Sierra Leone, they do not give restriction or stop foreigners as long as the individual has all his legal documents. MOR is unaware of the price of timber according to him, they don't sell as they only issue concession. He added that the government profits from the loyalties and taxes paid, transport permit. According to him, the timber species harvested are the *rosewood, tericarpus, tectona etc.*

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He said the main motivation for individuals is for livelihood and for the government for economic development and there is a clear market for the timber. In the communities, it provides jobs and increases foreign exchange and they'll be exposed to deforestation but the government has launched national tree planting project.

## DISCUSSION

This study examined community perceptions of the socioeconomic and ecological impacts of timber logging in Koinadugu District, Sierra Leone, within the broader context of rural livelihood dependence and environmental change. The findings demonstrate that timber logging is widely recognized by community members as both a critical source of income and a major driver of environmental degradation, with significant perceived implications for climate variability, ecosystem stability, and social wellbeing.

### Timber logging as a livelihood strategy

The results show that timber logging is strongly linked to livelihood sustenance in the study area, with a large proportion of respondents identifying it as a source of employment and income generation. This finding is consistent with broader evidence from sub-Saharan Africa, where forest resource extraction forms an essential component of rural survival strategies, particularly in contexts of high unemployment and poverty (Kissinger et al., 2012). In the present study, poverty and lack of alternative employment opportunities were identified as major drivers of timber exploitation, reinforcing the argument that deforestation is often structurally driven by socioeconomic vulnerability rather than individual choice alone.

Similar patterns have been reported in West African contexts where timber harvesting and forest conversion are closely tied to rural livelihood insecurity (Obasi et al., 2015). The reliance on timber logging in Koinadugu District therefore reflects a coping mechanism in response to limited formal employment opportunities, weak rural development infrastructure, and increasing cost of living.

### Governance, power structures, and informal institutions

The findings further reveal that timber logging in the district is shaped by complex governance arrangements involving local authorities, community stakeholders, and informal intermediaries. Respondents identified chiefs, landowners, and local actors as key enablers of timber extraction, suggesting that customary authority systems

play a significant role in regulating or facilitating access to forest resources.

This aligns with political ecology perspectives that emphasize how power relations and institutional arrangements shape resource exploitation outcomes (Doc. Anàl. Geogr., 2008). Weak enforcement of forestry regulations, as reported by respondents, indicates governance gaps that may contribute to unsustainable harvesting practices. Similar dynamics have been documented in other developing contexts where limited institutional capacity and informal rent-seeking behaviors undermine sustainable forest management systems (Charles, 2001).

**Perceived environmental impacts**

A major finding of this study is the strong perception among respondents that timber logging is associated with adverse environmental changes, including reduced rainfall, increased temperatures, drought, and general climate variability. These perceptions are consistent with scientific evidence linking deforestation to disruptions in local hydrological cycles and microclimatic conditions (European Commission, 2012; FAO, 1999).

Deforestation reduces canopy cover, which in turn affects evapotranspiration processes and local rainfall patterns. It also exposes soil surfaces to erosion, reducing soil fertility and increasing vulnerability to land degradation. The reported increase in drought conditions and declining rainfall in the study area may therefore reflect broader ecological consequences of forest loss, although such perceptions should ideally be complemented with long-term meteorological data for confirmation.

**Social consequences of timber logging**

Beyond environmental effects, the study highlights significant perceived social consequences associated with timber logging activities. These include drug abuse, teenage pregnancy, robbery, accidents, and child labour. These findings suggest that timber logging sites may function as informal economic hubs that attract transient populations and associated social risks.

Similar social externalities have been observed in resource extraction zones in other African countries, where rapid economic activity without adequate regulation contributes to social instability and increased vulnerability among young people (Obasi et al., 2015). The association between timber logging and social problems may also reflect indirect effects of economic displacement,

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migration patterns, and weak community oversight structures.

**Ecological risks and biodiversity concerns**

The study also indicates that respondents are aware of the ecological risks associated with timber logging, particularly in relation to biodiversity loss and habitat degradation. This is consistent with established literature demonstrating that unsustainable logging contributes to forest fragmentation, loss of flora and fauna, and disruption of ecosystem services (Adekunle & Olagoke, 2010).

Selective logging practices reported in the study area may reduce visible forest loss in the short term; however, even selective extraction can have long-term ecological consequences through cumulative habitat disturbance and reduced species regeneration capacity. The preference for specific tree species further increases ecological pressure on certain forest resources, potentially leading to species depletion over time.

**Policy implications**

The findings highlight the need for strengthened forest governance systems in Sierra Leone, particularly in rural districts where enforcement capacity is limited. Improved regulatory enforcement, community-based forest management, and alternative livelihood programs are essential to reduce dependency on timber extraction. Strengthening collaboration between local authorities, forestry institutions, and community stakeholders may also improve compliance with sustainable logging practices.

Furthermore, integrating environmental education and awareness programs into rural development initiatives could help communities better understand the long-term ecological consequences of deforestation and encourage more sustainable resource use practices.

**Limitations of the study**

This study relied largely on self-reported perceptions, which may be influenced by recall bias and subjective interpretation of environmental change. Additionally, the cross-sectional design limits the ability to establish causal relationships between timber logging and observed environmental or social outcomes. Future studies incorporating longitudinal environmental data and remote sensing analysis would provide stronger empirical evidence of ecological change in the region.

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**Conclusion of discussion**

Overall, the findings demonstrate that timber logging in Koinadugu District is deeply embedded within rural livelihood systems but is simultaneously associated with perceived environmental degradation and social disruption. These interconnected dynamics reflect broader patterns of political ecology in resource-dependent communities and highlight the urgent need for balanced approaches that integrate livelihood support with sustainable forest management..

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