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Determinants of Livelihood Outcome Among Rural Households in Ondo State Forest Reserves – Nigeria

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ABSTRACT

The study examined the determinants of livelihood outcomes among rural households residing in forest reserves in Ondo State, Nigeria. Socio-economic characteristics, the livelihood outcomes and relationship to household well-being, as well as the effect of access to the land on livelihood performance were critically assessed in this study. A total of 216 respondents were selected from mangrove/freshwater swamp ecological zone forests of the state using multistage sampling techniques. A structured questionnaire, focus group discussion, and interviews of key informants were used to gather data, which were analyzed using descriptive and inferential statistics. The result revealed the respondents' mean age to be 43.2 years, the household size to be approximately 6, and a mean annual income of ₦312,400. The livelihood outcome index of the respondents came out with a mean lower than expected value, representing a very low livelihood outcome despite the overreliance on the forest resources. Due to the nature of the zone, the food availability recorded a high mean index of 63.5%, while other indicators used to operationalize food security recorded a low mean index. The regression result revealed that some of the socio-characteristics, such as level of education, income, age, primary occupation, and indigenous status, have positive implications on livelihood outcomes of the respondents in the study area. By implication, the study concluded that the livelihood outcome generally depended on socio-economic abilities, and availability of resources alone does not guarantee food security. Therefore, improving households' well-being is a function of numerous factors in the study area.

Keywords*: Livelihood outcomes; Forest reserves; Rural Household; Socioeconomics; Well-being*

INTRODUCTION

It is generally known that land, a free gift of nature, is a crucial factor that supports human beings and their existence. Land and its resources provide food, shelter, and the means of livelihood for people around the world. Land is regarded as a good location for economic activities and cultural practices as well as a vehicle for wealth accumulation and storage of resources (Deininger & Feder 2009). Ondo State, Nigeria, is blessed with abundant forests, and the forests contribute positively to the livelihood and general well-being of the people in the rural areas of the state. It is not surprising that over 16% of the land in the state is forest zone (Iwala and Oladipo, 2017). The rural people around the forest generate their income from farming activities and gathering of non-timber forest products. However, the fertile land of the forest had given rise to population pressure, resulting in land scarcity and competition for the land and conflicts over the forest resources (Azeez & Aluko, 2019). Land is a critical natural resource that supports human existence by providing food, shelter, and means of livelihood. It underpins economic activities, social structures, and cultural practices while serving as a vehicle for wealth accumulation and intergenerational transfer of resources (Deininger & Feder 2009). In rural areas, particularly those surrounding forest reserves, land and its associated resources are essential for sustaining livelihoods. In Ondo State, Nigeria, forests contribute significantly to the livelihood of rural households, with over 16% of the land area designated as forest reserves (Agbelusi, 1994). The majority of the rural population depends on farming, non-timber forest products (NTFPs), and small-scale trading for income generation (Aluko, 2016; FAO, 2010). However, increasing population pressure, land scarcity, and competing land uses have intensified conflicts over access and control of forest resources (Azeez & Aluko, 2019).

Evidence has shown that livelihood outcomes declined drastically as a result of conflicts. It is believed that overlapping activities between agriculture and forestry activities are the major causes of conflicts in the forest reserve area (Agbeja & Otesile, 2017). The multifaceted nature of the conflicts most times manifested as boundary and resource conflicts between human activities and resource conservation (Oladeji & Thomas, 2010). Therefore, the livelihood outcome and the activities bear the consequences of the conflicts that threaten food security and reduce agricultural productivity as well as the general well-being of the people. The proper understanding of factors that determine livelihood outcomes within this context should involve the analysis of the socio-economic characteristics, livelihood activities, and the causes of land use conflicts (Scoones, 2009).

Due to the complexity of the environment, rural dwellers engaged in multiple livelihood strategies to reduce exposure to risk and improve income in the midst of the crisis. Generally, livelihood activities in the context of forest reserves are categorized into farming activities and non-farming activities. Ellis (2000) and Bryceson (2002) subcategorized the activities into crop production, livestock rearing, NTFP collection, trading, and artisanal work. The workability of these strategies is directly linked to socio-economic attributes such as age, education, income, and any other attributes that influence risk management (Heffernan et al., 2002). The extent of land use conflicts in forest zones gives more dimension to households' livelihood outcomes.

Existing literature on rural livelihoods in Sub-Saharan Africa tends to be centered on studies in rural communities, rather than the concurrent impact of socioeconomics on livelihood outcomes, land tenure, and various uses of resources within the formal rural forest reserve settings in Nigeria. Past documentations examined natural and physical conditions of forest degradation or poverty-imbedded indicators in analyzing livelihood outcomes, which may not be sufficient without incorporating dwellers' behavior and contributions. This study therefore addressed that gap by simultaneously examining the socio-economic, occupational, and tenure-related determinants of livelihood outcomes within a forest reserve context in Ondo State. Specifically, the study assessed how socio-economic characteristics influenced livelihood outcomes, evaluated the extent to which economic and livelihood-related activities shaped household well-being, and determined the effects of land use activities and resource access conditions on rural households' livelihood outcomes. The novelty of this study lay in its application of a composite livelihood outcome index derived from five welfare dimensions to forest-fringe communities in

southwestern Nigeria, an approach that had not been previously applied to this specific ecological and institutional context.

METHODS

Study Area

The study was carried out in the mangrove/freshwater swamp ecological zone of Ondo State, Nigeria. The state comprises eighteen Local Government Areas (LGAs). The LGAs are Akoko North-East, North-West, South-East, and South-West; Akure North and South; Ese-Odo; Idanre, Ifedore, Ilaje, Ile-Oluji/Oke-Igbo, Irele, Odigbo, Ondo East and West, Ose, and Owo. The land cover of the state is approximately 12,000 km² and lies between longitudes 4°30' and 6° East of the Greenwich Meridian and 5°45' and 8°15' North of the Equator. The climate of the state was categorized into two seasons, a wet season (April to October) and a dry season (November to March). The temperature was around 25.9°C, while the annual mean rainfall was about 1546 mm. The state comprises sixteen (16) forest reserves, which spread across the state, and agriculture is the primary occupation of the people. (Azeez & Aluko, 2019). The forest reserves in Ondo State were distributed across three major agro-ecological zones. The High Forest zone included Akure, Akure-Ofusu, Akure-Ofusu Extension, Ala, Idanre, Oluwa, Onisere, Otu, and Irele Forest Reserves. The Savanna zone comprised Ipele-Idoani, Okelusi, Owo, Oyinmo, and Ose Forest Reserves. The Mangrove/Freshwater swamp ecological zone consisted of Eba and Ojigbobini Forest Reserves (Azeez & Aluko, 2019)

Sampling Procedure and Sample Size

A multistage sampling technique was employed for the selection of respondents in the Mangrove/Freshwater swamp forest agro-ecological zone of Ondo State, Nigeria. The study population comprised rural household heads residing within and around forest communities whose livelihoods were closely associated with forest resources.

At the first stage, two forest reserves located within the Mangrove/Freshwater swamp forest ecological zone were purposively selected based on the intensity of human–forest interactions and accessibility for field investigation. The selected reserves were Owo Forest Reserve and Ipele-Idoani Forest Reserve.

At the second stage, three settlements were selected from each forest reserve. The settlements selected from Owo Forest Reserve were Onipanu, Ita-Ipele, and Sanusi, while Daji, Ago Alo, and Akinloye settlements were selected from Ipele-Idoani Forest Reserve.

At the third stage, household listing was conducted in all selected settlements using Participatory Rural Appraisal (PRA) techniques to establish a reliable sampling frame. Thereafter, a proportionate sampling procedure was adopted, whereby fifty percent (50%) of the identified household heads in each settlement were randomly selected for questionnaire administration. This approach considered full representation in the selected forest reserves, shown in Table 1.

Table 1. An illustration of the Sampling Procedure and Sample Size

Forest Reserve	Settlement	Total Household Heads	Sampled Household Heads (50%)
Owo	Onipanu	80	40
	Ita-Ipele	72	36
	Sanusi	68	34
Subtotal (Owo)		**220**	**110**

Forest Reserve	Settlement	Total Household Heads	Sampled Household Heads (50%)
	Daji	76	38
Ipele-Idoani	Ago Alo	70	35
	Akinloye	66	33
Subtotal (Ipele-Idoani)		**212**	**106**
Grand Total (Mangrove/Fresh water		**432**	**216**

Data Collection

Primary data were collected through a structured questionnaire, focus group discussion, and interviews of key informants were used to gather data

Data Analysis

Descriptive (frequency, and percentages) were used to operate the socio-economic characteristics of the respondents. This gives an overview of the variables as well as the livelihood conditions in the study area. To evaluate livelihood performance, a Livelihood Outcome Index (LOI) was constructed using composite indicators derived from key livelihood dimensions, namely food accessibility, food availability, food affordability, general wellbeing, and utilization of natural resources. Responses obtained from questionnaire items were standardized and aggregated to generate index scores for each livelihood component as well as an overall livelihood outcome score. The index values were expressed as percentages and categorized into low (<60%) and high (≥60%) livelihood outcome levels to facilitate interpretation and comparison among households.

Inferential statistics were applied to examine the determinants of livelihood outcomes. Specifically, multiple regression analysis was used to estimate the influence of selected socio-economic characteristics on livelihood outcomes among rural households. The regression approach enabled the study to determine both the direction and magnitude of relationships between explanatory variables and livelihood outcome while controlling for the simultaneous effects of other variables included in the model. Statistical significance was evaluated at 1% and 5% probability levels. It is acknowledged that, with nine predictors tested simultaneously, the probability of at least one spurious significant result increases under an uncorrected testing framework; the significance of individual predictors should therefore be interpreted in conjunction with the overall model F-statistic and the substantive theoretical basis for each variable rather than on the basis of any single p-value in isolation. Measurement of Variables.

Measurement of Variables

The study comprised dependent and independent variables derived from the research objectives and guided by the Sustainable Livelihood Framework.

Dependent Variable

This was measured using Livelihood Outcome Index (LOI). The composite score was obtained, and the measure of household welfare was constructed from five indicators:

- Food accessibility
- Food availability
- Food affordability
- General wellbeing
- Use of natural resources

Each indicator was measured using Likert-type response items reflecting household conditions. Scores were aggregated and converted into percentage indices, after which the overall livelihood outcome score for each household was computed as the means of the component indices. Higher scores indicated better livelihood performance.

Independent Variables

The explanatory variables included socio-economic characteristics hypothesized to influence livelihood outcomes:

- Age (years): This was measured at interval level: Respondents were asked to state the actual age in years
- Sex: Male =1 and female = 0
- Marital Status: married = 1 and otherwise (single, widowed, or divorced) =0
- Education Level: (non-formal = 0, primary = 1, secondary = 2, tertiary = 3).
- Household Size: This was measured at interval level
- Annual Income (₦): Annual total estimated household income earned
- Primary Occupation: farming = 1 and non-farm occupation = 0
- Land Acquisition Method: tenure security = 1. Other = 0
- Indigene Status: Indigenes = 1and non-indigenes = 0

Model Specification

A multiple linear regression model was employed; the livelihood outcome was a in a position of dependent variable.
The implicit functional relationship was expressed as:

$$LO = f(X1, X2, X3, X4, X5, X6, X7, X8, X9)$$

Where:

- LO = Livelihood Outcome Index
- X1 = Age
- X2 = Sex
- X3 = Marital Status
- X4 = Education Level
- X5 = Household Size
- X6 = Annual Income
- X7 = Primary Occupation
- X8 = Land Acquisition Method
- X9 = Indigene StatuS

The explicit econometric form of the model was specified as:

$$LOi = \beta0 + \beta1X1 + \beta2X2 + \beta3X3 + \beta4X4 + \beta5X5 + \beta6X6 + \beta7X7 + \beta8X8 + \beta9X9 + \varepsilon i$$

Where:

- 0β0 = Constant term (intercept)
- β1–β9 = Regression coefficients of explanatory variables
- εi = Random error term capturing unobserved factors affecting livelihood outcome

Livelihood Outcome Index was expressed as a percentage bounded between 0 and 100, OLS was considered appropriate in this context because the observed index values were distributed well within the interior of the feasible range (mean = 58.4%; standard deviation = 12.3%), and no predictions approached the theoretical bounds, thereby limiting the practical risk of boundary violations. This approach followed established practice in applied rural livelihood studies where composite percentage indices have been modelled using OLS when boundary concentration is not a concern (Scoones, 2009; Ellis, 2000). The regression coefficients reported in this study are unstandardized (raw) estimates, reflecting the change in

the Livelihood Outcome Index in percentage-point units associated with a one-unit increase in each predictor, holding all other variables constant. Variance inflation factors (VIF) were computed for all predictors; all values fell below 3.0, indicating that multicollinearity did not materially threaten the reliability of the individual coefficient estimates.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of Respondents in the Study Area

The age distribution of the respondents revealed that half of the respondents (50.0%) were within the age bracket of 41–50 years, with a mean age of 43.2 years. This indicates that respondents are in their active and economic period of life. The findings are in line with Adekunle *et al.* (2011), who reported a mean age of 43 years for forest dwellers in Southwest Nigeria. This suggests a strong capacity for active engagement in livelihood activities. This was also corroborated by a statement made by a participant in the in-depth interview at the reserve that "majority of us here are young adults between the ages of 40 and 47 years of age and still have a lot of power to carry out activities in the reserve." The distribution of sex revealed that the male gender (77.8%) dominates the households in the reserves. This is an indication that the livelihood activities in the area are highly demanding and require a lot of energy that could be supplied by the male gender. The assertion is supported by the FAO report 2022, which stated that the farming activities and forest-based livelihood activities are labor-intensive and strictly engaged in by the male gender.

In terms of marital status, it was revealed that 85.2% of the respondents were married. This is an indication that married people are engaged in activities to take care of the people around them and are also responsible for the livelihood and well-being of the family members. This was supported in the statement made by the people during the focus group discussion that “we have people that really rely on us, both children and family members." It is our responsibility to work diligently to take care of them. This is corroborated by Vercillo *et al.* (2026), who reported that married households often demonstrated a high level of livelihood resilience as a result of shared responsibility and diversified labor contribution. The distribution of educational qualifications shows that 38% of the respondents had secondary school education. This is an indication that there is a moderate literacy level in the study area with a mean score of 2.18. Word bank (2016), in the report, states that the power and influence of education in improving household livelihood are through diversifying income sources and teaching that helps in responding to economic shocks. All these are achievable through education, which is regarded as a critical asset in enhancing households’ livelihood abilities. (Heffernan et al., 2002). The low level of education in the study area implies that there would be limited opportunities, exposures

Household size averaged 5.9 persons, with over half of respondents (51.9%) having between five and eight members. Larger household sizes provided labour advantages for farming and non-timber forest product collection but could also increase consumption pressure on household income, thereby influencing livelihood sustainability (Ellis, 2000). Farming emerged as the dominant primary occupation (69.4%), confirming agriculture as the main livelihood foundation within forest reserve communities. Secondary occupations were largely trade-related (52.3%), indicating livelihood diversification as an adaptive strategy used by households to minimize income risk and seasonal vulnerability (Bryceson, 2002). Diversification has been identified as a key determinant of improved rural livelihood outcomes, particularly in resource-dependent environments.

Table 2 revealed that secondary occupations were largely trade-related (52.3%), indicating livelihood diversification as an adaptive strategy used by households to minimize income risk and seasonal vulnerability (Bryceson, 2002). It is an indication that diversification has been identified as a key determinant of improved rural livelihood outcomes, particularly in resource-dependent environments. In terms of income distribution, it shows that most respondents earned between ₦200,000 and ₦400,000 annually, with a mean income of ₦312,400, reflecting low-to-moderate earnings typical of subsistence rural

economies. This could be an implication that limited income levels constrained investment capacity and reduced households' ability to adopt improved technologies or alternative livelihood opportunities, as reported by FAO (2010). The level of indigenous people in the study area revealed a balance between indigenes (53.7%) and non-indigenes (46.3%), suggesting diverse tenure arrangements and varying levels of access to land resources. Such demographic composition often influenced livelihood outcomes through differential rights to land and forest resources (Azeez & Aluko, 2019). Consistent with this, land acquisition was predominantly through rental arrangements (59.7%), indicating insecure tenure conditions among many households. Insecure land tenure has been linked to reduced long-term investment in land management and lower livelihood productivity (Deininger & Jin, 2006).

Table 2. Socio-Economic Characteristics of Selected Household Heads (N = 216)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	≤30	12	5.6
	31–40	54	25.0
	41–50	108	50.0
	>50	42	19.4
Sex	Male	168	77.8
	Female	48	22.2
Marital Status	Married People	184	85.2
	Single/Widowed/Divorced	32	14.8
Educational Level	Non-formal	74	34.3
	Primary	44	20.4
	Secondary	82	38.0
	Tertiary	16	7.3
	1–4 persons	76	35.2
	5–8 persons	112	51.9
	>8 persons	28	12.9
Primary Occupation	Farming	150	69.4
	Trading	22	10.2
	Processing	18	8.3
	Artisan/Fishing/NTFP	26	12.1
Secondary Occupation	Trading	113	52.3
	Farming	73	33.8
	Others	30	13.9
Annual Income (₦)	<200,000	64	29.6
	200,000–400,000	96	44.4
	>400,000	56	26.0
Indigene Status	Indigene	116	53.7
	Non-indigene	100	46.3
Land Acquisition	Rent	129	59.7
	Inheritance	64	29.6
	Purchase	23	10.7

Livelihood Outcome Index among Respondents in the study Area

Table 3 revealed a mean score of 58.4% for livelihood outcomes in the study area. This is an indication that a larger proportion of respondents (54.6%) experienced low livelihood outcomes. The study

revealed that reliance on forest resources did not have much impact on the livelihood outcome. This is an implication that the availability of natural resources alone could not automatically translate into improved household welfare. The reports (by IFAD, 2021; FAO, 2022) on rural livelihood studies assumed that benefits derived from natural capital had the factors of structural economic imbalance in the affected area.

In terms of food availability, it recorded relatively high performance, with 67.6% of respondents classified within the high category. This suggested that agricultural production and forest resource extraction continued to support food supply within the communities. Forest ecosystems have recently been recognized as critical livelihood buffers that enhance household food provisioning, particularly in forest-fringe communities facing economic vulnerability (FAO, 2020). However, food accessibility remained low (57.4%), indicating that physical, institutional, and socio-economic barriers limited households' ability to obtain available food resources. This implied that land-use pressures and competition over forest resources constrained equitable access to livelihood assets, consistent with recent findings that unequal land access and governance challenges reduce rural livelihood security (UNDP, 2022; Mwangi *et al.,* 2021).

Table 3. Distribution of Livelihood Outcome Index among Respondents (N = 216)

Livelihood Indicator	Low Outcome (<60%) n (%)	High Outcome (≥60%) n (%)	Mean Index (%)	Interpretation
Food Accessibility	124 (57.4)	92 (42.6)	48.7	Access to food remained relatively low among households.
Food Availability	70 (32.4)	146 (67.6)	63.5	Food was generally available despite access challenges.
Food Affordability	75 (34.7)	141 (65.3)	61.8	Purchasing capacity moderately supported food consumption.
General Well-being	121 (56.0)	95 (44.0)	49.6	Overall welfare conditions of households were low.
Use of Natural Resources	56 (25.9)	160 (74.1)	68.4	High dependence on forest resources was observed.
Overall Livelihood Outcome	**118 (54.6)**	**98 (45.4)**	**58.4**	Majority recorded low livelihood outcome.

Determinants of Livelihood Outcome of the Respondents in the Study Area

The results (Table 4) from the analysis of the data from the reserves show that the F value = 35.72 at $p < 0.001$. This is in line with the past assumption by Ellis (2000), Scoones (2015), and the World Bank (2022) and confirms that socio-economic characteristics collectively and significantly influenced livelihood outcomes within the forest reserve communities. This is an indication that household socio-economic assets and demographic factors remained critical determinants of rural livelihood performance and welfare outcomes.

Age was revealed to have a positive influence on livelihood outcome ($\beta = 0.118$; SE = 0.052; $p < 0.05$); this could imply that with age, experience will definitely set in, and older heads have greater experience, social capital, and adaptive capacity in managing livelihood activities. This is in line with past evidence, reports, and studies by FAO (2021) and Abdulai & Huffman (2014), who reported that accumulated farming knowledge and resource management experience improved livelihood resilience among rural households. Explanatory variables in the model were directly linked with the livelihood outcome ($\beta = 0.346$; SE = 0.088; $p < 0.01$). This is an indication that higher educational attainment enhanced households' ability to diversify income sources, adopt innovations, and respond to economic shocks. This is aligned with findings that education strengthened human capital and improved livelihood diversification strategies in rural economies (UNDP, 2022).

Among all the variables and the significant predictors, the largest unstandardized coefficient was recorded in the testing of annual income ($\beta = 0.412$; SE = 0.073; $p < 0.01$). This is an indication that in all the variables tested against the dependent variable (livelihood outcome index), each unit of household

income had a far greater positive influence than other variables against the livelihood outcome index. This implies that improved food security, well-being, and livelihood stability are functions of higher earnings, i.e., the higher the household income, the better the index of livelihood outcome in the study area. This assumption was supported by the sustainable livelihood framework reported in the DFID (1999) and World Bank (2023) reports, which stated that drivers to household resilience and poverty reduction are directly linked with household income.

In the testing of primary occupation against the dependent variable, a positive significant result ($\beta = 0.176$; $SE = 0.071$; $p < 0.05$) was recorded; this implies that the major occupations in the forest zone are farming activities and stand as a key backbone of livelihood sustainability in the forest. The local economics in forest reserves depend on forest-based primary occupations and related activities (Angelsen *et al.,* 2014; FAO, 2022). This is corroborated by the statements from the participants in the focus group discussion that "we cannot survive the zone without farming activities and related occupations, which help us to earn a living, feed our families, and develop the area."

Table 4. Multiple Regression Results on Determinants of Livelihood Outcome (N = 216)

Variable	Coefficient (β)	Standard Error	t-value	(p-value)	Decision
Constant	21.384	4.216	5.07	0.000	Significant
Age	0.118	0.052	2.27	0.024	Significant
Sex	−0.064	0.981	−0.65	0.517	Not Significant
Marital Status	0.091	1.104	0.82	0.413	Not Significant
Education Level	0.346	0.088	3.93	0.000	Significant
Household Size	−0.205	0.067	−3.06	0.003	Significant
Annual Income	0.412	0.073	5.64	0.000	Significant
Primary Occupation	0.176	0.071	2.48	0.014	Significant
Land Acquisition Method	−0.149	0.062	−2.40	0.017	Significant
Indigene Status	0.132	0.059	2.24	0.026	Significant

$R^2 = 0.61$, Adjusted $R^2 = 0.58$, F-value = 35.72, Probability (F) = 0.000

Limitations and Future Research

The study was confined to two forest reserves within the Mangrove/Freshwater swamp ecological zone of Ondo State. Generalization of findings to other agro-ecological zones or forest reserve types within Nigeria should be made with caution, as the socio-ecological conditions, tenure arrangements, and livelihood profiles in High Forest and Savanna zone reserves may differ materially. Secondly, self-reported income data were subject to recall bias and social desirability effects, potentially introducing measurement error into the income variable, which recorded the largest coefficient among significant predictors. Finally, the study did not apply a correction for multiple comparisons; individual p-values should therefore be interpreted in light of the overall model significance and the theoretical grounding of each predictor. Future research could usefully extend this work by employing fractional regression or beta regression approaches to exploit the full properties of a bounded percentage outcome, and by incorporating spatial variation in forest resource access as an additional explanatory dimension.

CONCLUSIONS

The study concluded that rural households in Ondo State forest reserves experienced mixed but generally low livelihood outcomes despite strong dependence on forest resources for survival. Although forest environments supported food availability and natural resource utilization, structural socio-economic constraints limited improvements in household wellbeing. Education, income level, productive occupation, and indigenous land access advantages significantly enhanced livelihood outcomes, while large household size and insecure land tenure reduced welfare gains.

The findings further indicated that livelihood sustainability within forest communities was shaped by households' adaptive capacity, access to productive assets, and economic diversification rather than resource availability alone. Socio-economic empowerment therefore emerged as a critical pathway toward improving livelihood security and reducing vulnerability among forest-dependent households.

Recommendations

Based on the findings, the study recommended that:

1. Rural education and capacity-building programmers should be strengthened to improve households' ability to diversify livelihood strategies and adopt improved income-generating activities.
2. Income enhancement initiatives, including access to rural credit facilities, cooperative financing, and market linkages, should be promoted to strengthen household economic resilience.
3. Land tenure security reforms should be encouraged to reduce dependence on rented land and stimulate long-term investment in sustainable land and forest resource management.
4. Livelihood diversification programmers, particularly non-farm and value-addition activities related to forest products, should be supported to reduce vulnerability to seasonal income fluctuations.
5. Community-based forest management policies should integrate livelihood improvement objectives with conservation strategies to ensure sustainable resource use while enhancing rural wellbeing.

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