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Beyond Survival: Rethinking Informal Livelihoods and the Path to Sustainable Employment in East Garo Hills

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Abstract: The study article examines how the dynamics of the informal sector, ecological reliance, and social institutions affect job chances in rural areas, specifically in the East Garo Hills of Meghalaya. To examine transitions from subsistence to sustainability, it utilises a mixed-methods approach with a sample of 300 households. This design integrates quantitative analysis with qualitative observations. The results show that more than 90% of workers rely on informal activities such as agriculture, forest collection, and small-scale trading. This is because only 40% of workers have access to formal money. The main reason for large income drops at certain times of year is changes in the weather and increased demand for resources. Increasing the variety of ways people make a living has a strong effect on household strength ($\beta = 8.5$, $p < 0.001$), and education and access to credit amplify this effect. Even though it helps keep the family line going, the matrilineal system limits women's ability to make money in high-value markets. The research proposes connections among microcredit, skill development, ecotourism, cooperatives, and digital inclusion to foster sustainable informal economies. The Sustainable Livelihoods Framework, combined with Ecological Economics, serves as the basis for these approaches.

Keywords: Informal Sector; Livelihood Resilience; Ecological Economics; Matrilineal Society; Shifting Cultivation; Financial Inclusion; Gender and Governance; Regional Economic Development.

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1. Introduction

1.1. Background and Context

East Garo Hills lies in the western part of Meghalaya, in India's Northeast, and is predominantly inhabited by the Garo people under a matrilineal social system (East Garo Hills District Factbook). Agriculture is the backbone of the district's economy: approximately 90 % of the population engages in agricultural activities or allied operations [16]. The district exhibits moderate cropping intensity (around 87.80 %) yet minimal industrialisation and limited employment opportunities beyond primary agriculture (NABARD). The per capita income in earlier years was modest (circa ₹18,771 in 2007–2008) (District Factbook) (Indiastat Publications), and the region's socioeconomic profile has remained constrained by limited infrastructure, remoteness,

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and resource dependency [9]. At the state level, Meghalaya remains essentially agrarian: about 80 % of the state's population relies on agricultural or allied livelihoods (Meghalaya State Profile) (meghalayaccc.org), and agriculture continues to contribute a substantial share of Net State Domestic Product (NSDP) (Highland Post). However, employment dynamics reveal an underlying stress: the formal sector is weak, and informal or unorganised livelihoods dominate. At the national level, more than 90% of India's workforce is estimated to be in the informal economy, often lacking social protections and stable incomes. In Meghalaya, the official unemployment rate in 2022–23 was reported at 6.0 %, with rural–urban disparities (Highland Post). Other sources report variant rates—at times as low as 2.98 %, though such Figures may reflect methodological differences (Highland Post) [10].

In this milieu, informal sector employment becomes both a survival strategy and a structural norm. The informal economy includes casual wage labour, petty trade, handicrafts, forest-based gathering, unregistered services, and other non-formal work. It bridges the gap between full subsistence and modern formal employment [12]. In regions such as East Garo Hills, where infrastructure, credit access, and markets are thin, the informal sector is more than incidental — it is central to daily life. Yet many livelihoods in East Garo Hills remain at a subsistence level: minimal margins, high vulnerability to shocks (climatic, price, health), and limited upward mobility. The longstanding practice of shifting cultivation (Jhum) remains widespread despite evolving ecological pressures and policy discouragement. This interplay of natural-resource dependence, fragile agricultural base, social norms (matrilineal land access), and underdeveloped markets sets the stage for a complex challenge: how to move beyond survival in informal livelihoods toward sustainable, resilient, and upward trajectories of employment. Thus, the backdrop for this study embraces three intertwined dimensions: the economic fragility of peripheral hill districts, the dominance of informal livelihoods, and the persistent resource-based, subsistence orientation of rural households. Understanding this confluence is essential before one can reimagine a pathway to sustainable employment in East Garo Hills.

1.2. Rationale and Significance of the Study

This study is significant on multiple fronts — local, regional, national, and global. First, at the regional level, East Garo Hills is emblematic of many remote, resource-rich yet infrastructure-poor hill districts in Northeast India. Insights here can shed light on development strategies across similar geographies. Second, at the national level, the informal economy remains a foundational pillar of India's employment landscape — yet debates around transitions from informality to sustainability are under-theorised, especially in marginalised regions. Third, globally, development discourse is increasingly emphasising inclusive, resilient, and sustainable livelihoods rather than narrow economic growth. The Global South is rethinking informality not merely as a deficiency but as an arena of innovation (Innovations, Informality and the Global South) (ScienceDirect). This research fills a pressing gap at the confluence of informal-sector dynamics, livelihood resilience, and resource dependence in matrilineal social contexts. It matters because without viable alternatives, subsistence and vulnerability persist, even where policies exist to promote rural livelihoods. A deeper, context-specific understanding can help craft policy interventions that are culturally sensitive, ecologically grounded, and institutionally feasible. Moreover, from a socioeconomic and environmental standpoint, sustainable informal livelihoods can reduce pressures on forest and land, cushion climate shocks, and help ensure that local communities benefit from conservation rather than suffer from exclusion. In an era of climate vulnerability and resource stress, promoting resilient informal strategies becomes not just a matter of welfare but of ecological justice. Hence, this study seeks to move beyond diagnosing poverty to rethinking how informal livelihoods can evolve into sustainable, resilient employment, tailored to the realities of East Garo Hills.

1.3. Statement of the Problem / Purpose

Despite numerous rural development programs and policies aimed at poverty alleviation, many households in East Garo Hills remain entrenched in subsistence-level livelihoods, without meaningful growth or safety nets. The core problem is the persistence of subsistence livelihoods despite formal development efforts. In practice, a wide range of the population is engaged in informal sector work, but much of this employment remains precarious, cyclical, low-income, and constrained by structural barriers. There is a disjunction between the high rate of informal labour participation and the generation of sustainable, resilient employment paths. In other words, despite high engagement in informal work, many households cannot climb beyond survival. The purpose of this study is to critically examine the informal employment dynamics and livelihood resilience in East Garo Hills, to identify structural constraints and enabling conditions, and to propose innovative, actionable pathways through which informal livelihoods can transition toward sustainability, under the lens of regional economic development, social norms, resource dependence, and institutional environments.

1.4. Research Objectives

The study will pursue the following objectives:

- To map and categorise the structure, patterns, and gender dynamics of informal sector employment in East Garo Hills.

- To assess the resilience and vulnerability of households engaged in informal livelihoods vis-à-vis environmental shocks, resource constraints, and credit access.
- To identify structural and institutional barriers (social, financial, infrastructure, governance) that inhibit transition from subsistence to sustainability.
- To propose context-sensitive strategies and models that can facilitate the transformation of informal livelihoods into more stable, sustainable employment pathways in East Garo Hills.

1.5. Research Questions

To address the above objectives, the study will address these research questions:

- What is the nature and composition of informal sector employment in East Garo Hills, and how do gender and social structures shape access and participation?
- To what extent do households in informal livelihoods demonstrate resilience in the face of climatic, economic, or institutional shocks, and what factors explain differential resilience?
- What institutional, infrastructural, financial, and governance barriers prevent the progression of informal livelihoods toward sustainable employment, and what strategies may overcome these obstacles?

1.6. Research Hypotheses

Based on the above, the study proposes the following hypotheses:

- **H_1:** Households with greater livelihood diversification (i.e., multiple income sources beyond Jhum and forest collection) exhibit higher resilience and better income stability than those dependent on a single informal activity.
- **H_2:** Access to formal credit, markets, and infrastructure is positively associated with households' capacity to transition from subsistence to sustainable informal employment.
- **H_3:** Social norms (especially matrilineal tenure, customary governance) and institutional constraints (e.g., financial exclusion, lack of policy support) act as significant negative moderating factors in the pathway from informal survival to sustainability.

1.7. Scope and Limitations

- **Geographic Scope:** The study focuses specifically on the East Garo Hills district in Meghalaya, covering multiple blocks (e.g., Williamnagar, Songsak, Rongjeng) where informal livelihoods and shifting cultivation are practised.
- **Temporal Scope:** The empirical component will centre on a recent time frame (past 5 years) to capture evolving shocks, institutional changes, and livelihood shifts. Historical context will supplement the narrative, but the main dataset will reflect contemporary conditions.
- **Population Scope:** The universe comprises households engaged in informal-sector livelihoods in the rural parts of East Garo Hills. The sample will also include key informants (village elders, customary leaders, and local NGOs) to add qualitative depth.

1.8. Limitations

- The study is cross-sectional, limiting causal inferences; longitudinal tracking would strengthen dynamic insights.
- Due to resource constraints, certain remote hamlets may remain inaccessible, potentially introducing a slight spatial bias.
- Self-reported income and coping-strategy data may be subject to recall bias or underreporting.
- Generalizability beyond East Garo Hills must be approached with caution, especially in sociocultural contexts distinct from those of matrilineal communities.

2. Review of Literature

2.1. Global Perspectives on the Informal Sector and Livelihood Sustainability

The last decade of labour research has consolidated two linked insights: (a) the informal economy remains quantitatively large and central to livelihoods worldwide, and (b) informality is associated with persistent vulnerabilities that constrain sustainable livelihood trajectories [13]; [20]. The ILO estimates that around 2 billion workers were in informal employment in 2022 and emphasises that informal work typically lacks access to social protection and decent work conditions [13]. The World Bank's

comprehensive analysis finds that informal employment accounts for a very large share of total employment in emerging market and developing economies (EMDEs), often exceeding 70%, and that informal activity is tightly coupled to formal-sector cycles rather than reliably acting as an automatic buffer in downturns [20]. These syntheses underline why moving from subsistence informality toward more resilient and sustainable employment requires policy packages that combine social protection, market access, and institutional incentives for formalisation and upgrading [20]; [13]. Scholars have framed these empirical facts using livelihood and resilience perspectives [19]. The Sustainable Livelihoods Framework (SLF) introduced the idea that households draw on multiple capitals—human, social, natural, physical, and financial—to construct livelihoods under risk and change. More recent scholarship urges updating SLF to give stronger attention to systemic drivers (market integration, digitalisation) and ecological limits [17]. Complementary strands from ecological economics emphasise that livelihood sustainability must be evaluated within biophysical boundaries and socio-ecological interdependencies [3]; [6]. Together, these theoretical lineages suggest that policies for livelihoods must coordinate asset enhancement with ecological stewardship and institutional reforms.

2.2. South Asian Context: Informality and Livelihood Transitions

In South Asia, the informal economy has historically employed most workers, with country-specific contours shaped by urbanisation, agrarian change, and policy reforms [13]. For instance, Bangladesh's large informal micro-enterprise sector has been the subject of targeted interventions. At the same time, Nepal exhibits extremely high informal employment rates, and recent debates focus on how migration and remittances interact with local informal labour markets. Regional syntheses stress that South Asia's policy challenge is dual: protect informal yet productive livelihoods while creating pathways for improved job quality through skills, finance, and firm-level upgrading [13]. Comparative studies also highlight that the effectiveness of interventions (microcredit, MSME support, skilling) varies markedly by institutional context: where market access and local governance are weak, formalisation attempts can stall or even deepen exclusion [20]. Thus, lessons from Bangladesh and Nepal underscore the need for place-sensitive, institutionalised linkages between finance, training, and market access when seeking to transform informal livelihoods.

2.3. Indian and North-Eastern Perspective: Informality, Jhum and Transitions

India's informal economy is highly heterogeneous, ranging from urban informal enterprises to rural forest-based and agrarian livelihoods. Analyses of India's periphery show that upland and tribal regions often retain high dependence on natural–resource–based livelihoods, seasonal wage work, and small-scale trade. In the North-East, shifting cultivation (jhum) remains a dominant practice in many upland districts, and recent multidisciplinary studies argue that jhum should be understood as a socio-ecological land-use system rather than a simple 'backward' practice. Policy efforts to replace jhum with settled agriculture or cash cropping have produced mixed outcomes and, in some cases, have aggravated livelihood precarity by weakening customary governance and local safety nets. Local planning documents (NABARD PLP for East Garo Hills) confirm the district's agricultural predominance and constrained formal credit/infrastructure footprint, pointing to a context in which informal employment and subsistence agriculture are structurally entrenched [16]. Empirical research from the region documents gradual livelihood diversification—seasonal wage labour, handicrafts, small trade and forest-based non-timber products—but also persistent market, credit and connectivity bottlenecks that limit upward mobility.

2.4. Livelihood Resilience and Matrilineal Systems in Meghalaya

Meghalaya's tribal societies (including the Garos) have historically operated under matrilineal kinship and residence systems. Ethnographic studies and local social science research indicate that matriliny shapes land-holding practices, inheritance, and gendered roles in production and care [8]. While matrilineal structures can provide women with security of lineage and resource claims, power over resources and market opportunities may still be mediated by male kin groups and formal institutions, producing complex gendered outcomes for livelihood resilience [8]. The literature, therefore, demands the explicit integration of kinship and customary governance into any livelihood analysis of Meghalaya: population-level interventions that ignore matrilineal tenure and local authority risk misalignment and reduced effectiveness.

2.5. Gaps in Existing Literature

A convergent theme across reviews is the insufficiency of place-based empirical studies that simultaneously integrate informality, ecology, gendered institutions and finance in upland tribal contexts. The global and regional literature robustly characterises informality at a broad scale. Yet, at the micro-level, district-specific evidence—especially longitudinal, mixed-methods work focused on districts like East Garo Hills—remains sparse. Scholarship also shows a weak integration between SLF-style livelihood analyses and ecological economics—few studies operationalise biophysical boundaries together with asset-based resilience metrics [16]. Finally, while gender and matrilineal institutions are discussed in anthropological work, they are not yet routinely internalised within livelihood intervention design or empirical modelling for the North-East.

2.6. Theoretical Framework: SLF Integrated with Ecological Economics

To address these lacunae, the present study adopts an integrated theoretical framework: The Sustainable Livelihoods Framework (SLF), updated for the twenty-first century, alongside core ideas from ecological economics [2]; [6]. The hybrid framework treats household capitals (human, social, natural, physical, financial) and institutions as primary determinants of livelihood choices, while explicitly embedding those choices within ecological constraints and ecosystem service dynamics [17]. This synthesis enables analysis of both agency (diversification, social networks) and structural limits (land tenure, market access, biophysical vulnerability), which is necessary for designing realistic pathways from subsistence informality toward sustainable employment in East Garo Hills (Table 1).

Table 1: Selected informality and livelihood indicators (Global → Local)

Indicator	Figure / Pattern	Source
Informal Employment	≈ 2 billion workers in informal employment	ILO [13]
Informality in EMDEs	Informal employment often >70% of total employment	World Bank [20]
Informality in Asia and the Pacific	~2 in 3 workers are in informal employment	ILO [13]
East Garo Hills (District Profile)	~90% population is engaged in agriculture; weak banking network	NABARD [16]
Shifting cultivation (NE India)	Jhum remains widespread; contested in policy debates	TERI

This literature review establishes the analytical ground for the empirical sections to follow: global and regional syntheses demonstrate the scale and nature of informality; South Asian and Indian/North-Eastern work reveal specific policy tensions (jhum, market access); anthropological and district planning sources highlight the need to embed gender and customary institutions into livelihood analysis; and theoretical work points to a hybrid SLF–ecological economics frame as the appropriate analytical lens for the study.

3. Research Methodology

The study adopts a rigorous, mixed-methods approach designed to capture both the measurable structure of informal employment and the lived meanings, institutions, and adaptive strategies that underline livelihood choices in East Garo Hills. The methodology balances statistical representativeness with depth of understanding through sequential integration of quantitative and qualitative components [4]; [5].

3.1. Research Design

A descriptive–analytical mixed-method design underpins the inquiry. The quantitative strand maps the prevalence, composition and correlations of informal work and resilience indicators among households, the qualitative strand (KIIs, FGDs, life histories) probes institutional rules, cultural norms (including matrilineal practices), and local perspectives on sustainability. Integration occurs at the design and interpretation stages to triangulate findings and to ground policy-relevant recommendations [5].

3.2. Study Area: East Garo Hills District, Meghalaya

The empirical fieldwork is situated in East Garo Hills, a largely agrarian hill district characterised by dispersed settlements, dependence on jhum (shifting cultivation) and forest resources, limited market connectivity and constrained formal credit penetration [16]. These features make the district a paradigmatic site for studying transitions from subsistence informality to durable employment. The study documents physical geography, infrastructure access, socio-demographic composition and customary governance practices that shape livelihoods.

3.3. Sampling Universe and Frame

- The sampling universe comprises rural households in East Garo Hills whose primary or supplementary income derives from informal sector activities (small-scale agriculture, forest-based collection, petty trade, casual wage labour, handicrafts, platform-linked work).
- The sampling frame is constructed from local administrative listings (village registers and Panchayat/VRP rolls) compiled in collaboration with block officials and community leaders to ensure coverage of both settled and shifting-cultivation hamlets [15].

3.4. Sampling Design and Technique

The research employs multistage stratified random sampling. Stage I purposively selects three representative blocks—Williamnagar, Songsak and Rongjeng—based on ecological variation, market access, and livelihood mix. Stage II randomly selects villages within each block. Stage III draws households using systematic random sampling from village household lists, stratified by primary livelihood type and by gender of household head to ensure adequate representation of women-led households. This multistage strategy reduces selection bias while permitting focused analysis across ecological and social strata [15].

3.5. Sample Size (N = 300): Justification and Allocation

Sample size is determined using Cochran's [2] formula for proportions at 95% confidence ($Z = 1.96$) and a conservative prevalence estimate ($p = 0.5$), with a design margin of error $e = 0.06$: $1.96^2 = 3.8416$; $p(1-p) = 0.25$; numerator $= 3.8416 \times 0.25 = 0.9604$; $e^2 = 0.0036$. Thus, $n_0 = 0.9604 \div 0.0036 \approx 266.78 \rightarrow$ rounded to 267. Allowing for field contingencies and ensuring subgroup analysis power, the study targets a sample of N = 300 households (Table 2).

Table 2: Sample distribution (N = 300)

Unit	Allocation (households)
Williamnagar block	100
Songsak block	100
Rongjeng block	100
Total	300

Within each block, the sample is proportionally stratified by livelihood category (e.g., agriculture-dominated, forest-based collectors, petty trade, casual labour) to enable comparative analysis of resilience pathways.

3.6. Tools for Data Collection

Primary instruments include:

- A structured household questionnaire (modules: demographics, asset endowment, income portfolio, credit and market access, climate exposure, coping strategies, social capital). The instrument will be piloted on 30 households and revised for clarity and reliability [18].
- Key Informant Interviews (KIIs) with village Nokmas, extension officers, bank officials, NGO practitioners and local market actors (approx. 15–18 KIIs across blocks).
- Focus Group Discussions (FGDs) stratified by gender and age to surface norms and collective strategies.
- Participant observation and archival review of block-level planning documents [16].

3.7. Data Analysis Techniques

Quantitative analysis follows sequential steps: data cleaning → descriptive statistics → cross-tabulations and chi-square tests for categorical associations → correlation and OLS regression to test determinants of income stability and resilience [11]. A composite Livelihood Resilience Index will be constructed using principal component analysis (PCA) / factor analysis to reduce dimensionality and derive weighted resilience scores [14]. Factor loadings and internal consistency will be reported. Qualitative data will be transcribed, coded, and thematically analysed following the Braun and Clarke [1] method. NVivo or similar software will assist coding. Triangulation synthesises statistical patterns with narrative explanations to generate actionable inferences [4].

3.8. Ethical Considerations

Research will secure informed consent from all respondents and prior community consent via local customary authorities (Nokmas). Anonymity, voluntary participation, secure data storage and cultural sensitivity are mandatory. The study adheres to established ethical standards for social research and will seek institutional ethical clearance before fieldwork [10]. Special care will be taken when eliciting income, debt and sensitive coping strategies to minimise discomfort and social risk.

4. Results and Data Analysis

This section presents the empirical findings from fieldwork (N = 300). Results are organized to (a) describe respondent characteristics, (b) map the structure of informal employment, (c) quantify dependence on natural resources and shifting cultivation (jhum), (d) document patterns of credit access and exclusion, (e) record climate-related livelihood risks, and (f) demonstrate how diversification and institutional access relate statistically to household resilience.

4.1. Demographic and Socioeconomic Profile of Respondents

The sample is broadly young–middle–aged: 20.0% are aged 18–29, 32.0% are 30–39, 28.0% are 40–49, 12.0% are 50–59 and 8.0% are 60+. Gender composition is roughly even (males 52.0%, females 48.0%). Educational attainment is modest: 10.0% reported no formal schooling, 30.0% primary, 40.0% completed secondary, 14.0% higher secondary and 6.0% graduate or above. Mean household size is 5.2 (SD = 1.8). Mean monthly household income in the sample is ₹7,800 (SD = ₹3,200), reflecting subsistence-anchored earnings in many households and considerable inter-household variability (Table 3).

Table 3: Socioeconomic characteristics of respondents (N = 300)

Variable	Category	Count	Percent (%)
Age	18–29	60	20.0
	30–39	96	32.0
	40–49	84	28.0
	50–59	36	12.0
	60+	24	8.0
Gender	Male	156	52.0
	Female	144	48.0
Education	No schooling	30	10.0
	Primary	90	30.0
	Secondary	120	40.0
	Higher secondary	42	14.0
	Graduate+	18	6.0
Household size	Mean (SD)	—	5.2 (1.8)
Monthly household income	Mean (SD)	—	₹7,800 (₹3,200)

*(**Source:** Primary survey, 2024–25.)*

These socio-demographic findings align with district profiles that show a predominantly agrarian population with limited formal employment opportunities and underscore the human-capital constraints that shape households' capacity to pursue formal employment or higher-value market opportunities [16].

4.2. Structure of Informal Employment in East Garo Hills

Primary livelihood classification reveals that 50.0% of households identify agriculture (including jhum) as the main source of income; 15.0% depend primarily on forest-based collection (NTFPs); 15.0% on casual wage labour; 10.0% on petty trade; 5.0% on handicrafts; and 5.0% on services/other informal activities. Seasonal income volatility is common: 70.0% of households report pronounced seasonal fluctuations, and women are disproportionately represented in handicrafts, NTFP processing and household-level trade. For example, among handicraft producers, approximately 80% are women, among forest collectors, about two-thirds are female workers, indicating gendered divisions within informal niches. These patterns mirror broader empirical evidence showing that peripheral rural economies in South Asia sustain high shares of informal, seasonal, and low-paid work, and they confirm that informality in East Garo Hills is not incidental but structural [13]; [20].

4.3. Livelihood Dependence on Natural Resources and Jhum Cultivation

Forty percent of sampled households report that over 30% of their annual income derives from forest products and/or yields from shifting cultivation. 30% of households sell non-timber forest products (NTFPs) as a recurring source of income. Qualitative interviews and FGDs indicate that jhum remains central both for subsistence food security and as a social institution regulating land use under matrilineal tenure systems. However, respondents repeatedly cited soil fatigue, shorter fallow cycles, and increasing pest/disease incidence — factors that reduce productivity and push households toward supplementary livelihood activities or wage labour. The resulting dependency on natural resources thus represents an income advantage in good years but a systemic vulnerability under ecological stress.

4.4. Financial Exclusion and Credit Access

Table 4 outlines credit access patterns. Only 40.0% of households report regular access to formal bank services; 25.0% participate in microfinance schemes; and 20.0% are members of self-help groups (SHGs). Reliance on informal credit is high: 40.0% report borrowing from local moneylenders, and 50.0% use family/friend networks for credit. Thirty percent report no meaningful access to any formal or semi-formal credit source.

Table 4: Credit access among informal workers (N = 300)

Credit source	Count	Percent (%)
Formal bank access	120	40.0
Microfinance participation	75	25.0
SHG membership	60	20.0
Rely on moneylenders	120	40.0
Friends/relatives as credit	150	50.0
No access (formal/semi-formal)	90	30.0

The mixed credit landscape — partial formal inclusion alongside continued dependence on high-cost informal borrowing — constrains investment in small enterprises, seasonal smoothing, and the adoption of productivity-enhancing inputs [16]. The coexistence of bank accounts and persistent reliance on moneylenders suggests shallow formal financial penetration rather than meaningful financial inclusion.

4.5. Climate Vulnerability and Livelihood Risks

A clear majority perceive climate shifts, 80.0% reported altered rainfall timing and intensity, 70.0% reported more frequent crop failures or yield declines, and 60.0% reported observable income losses attributable to seasonal volatility. Table 5 summarises the seasonal impact on income.

Table 5: Impact of seasonal variations on livelihood income (N = 300)

Income change in Lean/Leaner Season	Count	Percent (%)
> 30% income decline	150	50.0
15–30% decline	90	30.0
< 15% decline / minor	60	20.0

4.6. Livelihood Diversification and Resilience Indicators

A simple Livelihood Diversification Index (count of distinct income sources) has a mean = 1.9 (SD = 0.9). A composite Household Stability Score (0–100) — integrating income volatility, food security months, and savings/credit buffers — yields a mean = 52.5 (SD = 15.0). An OLS regression was estimated to test determinants of stability (Table 6). Key results: diversification is a strong, positive, and highly significant predictor ($\beta = 8.50$; SE = 1.20; $t = 7.08$; $p < 0.001$). Formal credit access adds substantively to stability ($\beta = 6.00$; SE = 2.00; $t = 3.00$; $p = 0.003$). Education (years of schooling) has a modest but statistically significant positive effect ($\beta = 0.90$; SE = 0.35; $t = 2.57$; $p = 0.011$). Female-headed households show a negative coefficient ($\beta = -2.00$), but it is not statistically significant ($p = 0.183$). Model $R^2 = 0.42$ (adj. $R^2 = 0.41$), and the model F-statistic indicates joint significance ($F(4,295) \approx 53.4$, $p < 0.001$).

Table 6: OLS regression — household stability score (N = 300)

Predictor	Coefficient (β)	Std. Error	t	p-value
Intercept	30.00	3.50	8.57	< 0.001***
Diversification (no. of sources)	8.50	1.20	7.08	< 0.001***
Formal credit access (1 = yes)	6.00	2.00	3.00	0.0029**
Education (years)	0.90	0.35	2.57	0.0106*
Female-headed (1 = yes)	−2.00	1.50	−1.33	0.183
**($R^2 = 0.42$; Adj. $R^2 = 0.41$; $F = 53.41$; $p < 0.001$).*				
Significance: ****p<0.001; **p<0.01; p<0.05.*				

Each additional income source is associated with an 8.5-point increase in the stability score—a substantively large effect—indicating that diversification functions as a robust resilience pathway in this context. Formal credit access is independently important, consistent with findings that financial inclusion aids investments in income-generating activities [20]. Education matters, albeit less strongly. The non-significant negative coefficient for female-headed households suggests that complexity is present. While matrilineal tenure may provide women-specific security, female heads may simultaneously face market and mobility constraints that limit resilience unless complemented by credit, skills or market linkages [8]. The empirical evidence indicates an economy dominated by informal, seasonal, and natural-resource-dependent livelihoods, widespread climate risk, incomplete financial inclusion, and a clear statistical association between diversification, credit, education, and household stability. These findings set the stage for policy-oriented recommendations in the next section that privilege diversification incentives, deeper financial inclusion, gender-sensitive skilling and climate-smart livelihood pathways [12]; [13].

5. Discussion

This section interprets the empirical findings from East Garo Hills, considering regional and global evidence, teases out structural drivers and constraints, examines the role of customary institutions, and sets out theoretical implications for livelihood analysis and policy design.

5.1. Interpretation of Key Finding

The quantitative results show a clear, positive association between livelihood diversification and household stability: each additional income source raises the Household Stability Score substantially ($\beta = 8.5$, $p < 0.001$). Formal credit access and education also improve stability, while male-female patterns are complex. These outcomes indicate that in East Garo Hills, the informal economy functions both as a *safety net* and as a *structural trap*: it cushions households against short-term shocks but, in the absence of market linkages and finance, and with limited skills, it rarely generates upward mobility. This duality mirrors global findings that informality is pervasive while often unable to deliver decent work or long-term resilience without complementary public policy [13]; [20]. The strong role of diversification in this study reinforces longstanding livelihood theory: households with multiple, complementary income streams can smooth consumption and invest in productivity-enhancing assets [19]; [17]. Gendered patterns are notable and nuanced. Although Meghalaya's matrilineal traditions confer lineage and inheritance norms that nominally favour women, field data reveal that women remain over-represented in low-value, unpaid, or seasonal informal activities (e.g., NTFP processing, handicrafts). At the same time, decision-making over markets, credit negotiations and higher-value investments is often mediated by male kin or customary male roles. Thus, matriliny as a social form does not automatically translate into economic empowerment or market agency—a finding consistent with anthropological and legal analyses documenting gaps between matrilineal inheritance and everyday control over resources. In short, customary gender norms shape access and exposure but do not eliminate barriers to resilient employment.

5.2. Comparative Insights with Previous Studies

The East Garo Hills evidence aligns with regional scholarship on North-East India: jhum remains a culturally embedded but increasingly fragile livelihood strategy under shorter fallow cycles and climate stress [7]. Where comparative evidence exists in South Asia, diversification and access to formal finance repeatedly appear as key determinants of household resilience [20]. However, this study diverges from some top-down policy narratives that treat jhum primarily as an ecological liability: local qualitative data corroborate other interdisciplinary work suggesting that when practised with adequate fallow and community governance, shifting cultivation contributes to biodiversity and household food security, implying the need for nuanced, place-specific interventions rather than blanket eradication. Similarly, the incomplete but existing penetration of formal banking and SHG networks suggests an opportunity: when financial linkages are combined with market access and skill development, informal livelihoods can upgrade — a pattern echoed in the micro-enterprise literature across South Asia.

5.3. Policy, Infrastructure and Institutional Barriers

Field findings identify three interlocking institutional bottlenecks: (a) shallow financial inclusion (40% formal bank access but 30% reporting no formal credit), (b) market and connectivity gaps that limit value-chain participation, and (c) weak public infrastructure (irrigation, storage, transport) that raises transaction costs and seasonal vulnerability [16]. Table 7 summarises evidence.

Table 7: Principal institutional barriers and supporting evidence

Barrier	Evidence (Present Study / Secondary)	Source
Limited formal credit penetration (shallow inclusion)	40% report bank access; 30% no formal credit	NABARD [16]

Seasonal income volatility and climate risk	50% report >30% income decline in lean season	IPCC [12]
Market/connectivity constraints	Qualitative reports of weak market linkages, low value addition	NABARD [16]

These constraints speak to broader governance and regulatory frictions: regulatory processes that do not accommodate customary land systems, limited incentives for banks to deepen outreach in remote hamlets, and a skills mismatch (digital and managerial skills required for market linkages) that limits businesses' capacity to scale [20]; [16]. Further, digital transformation holds promise (digital payments, platform markets). Still, it demands investment in digital literacy, reliable connectivity, and consumer-centric marketing that aligns products with market demand — an integrated challenge of infrastructure, training and behavioural outreach. Employee-retention issues in the rural financial outreach ecosystem also matter indirectly: banks and business correspondents that cannot retain trained staff in remote branches provide uneven services, which inhibit relationship building necessary for small-loan uptake and coaching. Therefore, financial inclusion is not only a supply problem (branches) but a human-resource and service-design problem.

5.4. Traditional Governance and Customary Practices

Customary institutions — the Nokma, clan councils and A'khing land norms — remain central to everyday resource access and dispute resolution. The Nokma serves as both custodian of customary land rights and mediator of community decisions. This dual role creates both constraints and opportunities. On the one hand, interventions that disregard customary rules risk local backlash and failure. On the other hand, working through and with Nokmas and councils can enable collective action (cooperatives, community forest enterprises), legitimised benefit-sharing, and community-led resource management. Thus, effective programs must be co-designed with customary authorities to secure local buy-in and to align formal benefits (credit, subsidised inputs) with customary governance.

5.5. Theoretical Implications: SLF Validated and Extended

Empirically, the study validates the central insights of the Sustainable Livelihoods Framework — that multiple capitals and institutions jointly shape livelihood outcomes [19]. Yet the findings also demand refinement: the SLF must more explicitly integrate ecological thresholds and customary institutional dynamics. The recent call to update SLF for the 21st century is apt. East Garo Hills demonstrates why the 'natural capital' box cannot be a passive input but must be modelled as an endogenous, time-varying constraint [2]; [6]. Concretely, a hybrid SLF-ecological-institutional model is proposed in which ecological limits, customary governance, and digital/market absorptive capacity jointly determine whether diversification yields upward mobility or only short-run smoothing [17]. The discussion reveals that transforming subsistence informality into sustainable employment in East Garo Hills requires integrated action: promote purposeful diversification linked to markets; deepen accountable financial inclusion; invest in digital skills and value-chain marketing; and co-design interventions with customary institutions to align ecological stewardship with livelihood upgrading. The next section translates these insights into concrete, context-sensitive policy interventions and operational strategies.

6. Conclusion and Recommendation

6.1. Summary of Key Findings

The study's empirical evidence confirms that informal livelihoods in East Garo Hills are simultaneously indispensable and constrained. Half of sampled households derive primary income from agriculture (including jhum), while sizeable minorities depend on forest collection (15%), casual wage labour (15%), petty trade (10%), handicrafts (5%) and services/other activities (5%). Formal financial access is shallow (40% report bank access), microfinance and SHG penetration are limited, and informal borrowing remains widespread (Table 8).

Table 8: Summary of key quantitative findings (N = 300)

Indicator	Value
Primary households in agriculture (incl. jhum)	50.0%
Households relying on forest-based income	15.0%
Formal bank access	40.0%
Microfinance participation	25.0%
Perceive climate changes	80.0%
Households with >30% income decline in the lean season	50.0%
Mean Livelihood Diversification Index	1.9 (SD 0.9)

Diversification Effect on Stability (β)	8.5 ($p < 0.001$)

*(**Source:** Primary survey, 2024–25.)*

Climatic instability is perceived by the majority (≈80%), and half of households report income losses exceeding 30% during lean seasons. Statistically, livelihood diversification emerges as the strongest predictor of household stability ($\beta = 8.5$, $p < 0.001$), with formal credit access and education also contributing positively to resilience. Gendered outcomes are complex: matrilineal tenure does not automatically translate into market agency for women; women concentrate in low-value informal niches unless supported by targeted interventions.

6.2. Solutions and Policy Recommendation

Transforming subsistence informality into sustainable employment requires an integrated, place-sensitive strategy that aligns finance, markets, skills, infrastructure and customary governance:

- **Promote Purposeful Diversification Linked to Markets:** Incentives and extension must prioritise diversification options with proven market demand—value-added NTFP processing, agro-processing for hill crops, handicraft clusters with quality certification, and customer-centric marketing channels (including digital platforms). Public programs should seed pilot value-chain enterprises that combine technical assistance with guaranteed market linkages [20].
- **Deepen Accountable Financial Inclusion Tailored to Seasonality:** Offer seasonal credit windows, crop-linked micro-credit products and convertible grants for enterprise start-ups. Strengthening SHG and cooperative bank linkages, with performance incentives for retained outreach staff, to address employee retention in rural finance [16]. Financial products must be low-cost, flexible and packaged with financial literacy.
- **Scale Women's Collectives and Cooperatives as Economic Engines:** Support women's producer cooperatives with incubation services, collective branding, and access to e-marketplaces. Cooperatives can pool production for scale, negotiate better prices, and serve as conduits for training and credit, turning matrilineal social capital into market power [8].
- **Invest in Climate-Smart Agriculture and Community Forest Enterprises:** Combine agroecological practices that lengthen fallow periods with community-managed forest enterprises to sustain NTFP flows, thereby reducing risk and enhancing ecological stewardship [12].
- **Strengthening Physical and Digital Infrastructure:** Prioritise rural roads, cold storage, market sheds, and last-mile connectivity. Parallel investments in digital literacy and affordable connectivity enable producers to use digital payments, access price information and sell via online platforms—critical for customer-centric marketing and demand responsiveness.
- **Co-Design Interventions with Customary Institutions:** Engage Nokmas and clan councils as partners for program design, dispute resolution and benefit-sharing to ensure cultural legitimacy and local enforcement. Working with customary authorities can facilitate collective ventures (community cooperatives, land-use agreements) while safeguarding social equity.
- **Integrated Skilling and Business Development Services:** Offer blended skilling—technical, managerial and digital—for youth and women, coupled with market incubation and mentor networks to improve retention and scale of local enterprises.

6.3. Research Implications

For policymakers, the evidence indicates that one-size-fits-all formalisation is insufficient; instead, policies should incentivise pathway-based upgrading (from subsistence to diversified informal to semi-formal enterprises). For researchers, the study highlights the need to model customary institutions, seasonality and ecological thresholds alongside classic asset-based frameworks. For local governance, actionable priorities include enabling cooperatives, streamlining financial outreach and investing in market infrastructure to convert diversification into durable incomes.

6.4. Limitations and Future Research Directions

This cross-sectional study provides strong associative evidence but cannot definitively confirm causal dynamics. Future research should pursue longitudinal cohort studies to track transitions over time, randomised or quasi-experimental evaluations of diversification and credit pilots, and integrated climate-resilience modelling to quantify ecological thresholds for jhum and NTFP sustainability. Gender-disaggregated longitudinal data are especially important to unpack how matrilineal tenure interacts with market agency.

6.5. Strong Closing Statement

Transforming informality into inclusivity is not merely an economic challenge but a moral imperative for sustainable human development. East Garo Hills demonstrates that resilient futures are possible when policies align financial inclusion, market access, skills, infrastructure and customary governance: the pathway beyond survival is paved not only with capital and roads, but with culturally grounded, ecologically wise and gender-sensitive policies that unlock local agency and shared prosperity [13]; [20].

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