

Traditional Resource Utilization and Changing Livelihood Patterns among the Saura Tribe: A Geographical Study of Rayagada District, Odisha

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ABSTRACT

This geographical study investigates the dynamics of traditional resource utilization and changing livelihood patterns among the Saura tribe in Rayagada district, Odisha. Long recognized for their indigenous soil-water conservation techniques, terraced paddy cultivation (Jhong), and shifting cultivation (Podu), the Saura tribe represents a distinct socio-ecological system deeply integrated into the Eastern Ghats hill ecosystem. Utilizing a mixed-method research design combining multi-stage stratified random sampling (N = 360 households across four tribal development blocks), GIS spatial profiling, field observations, focus group discussions, and econometric modeling, this study examines the trajectory of tribal resource governance from traditional subsistence to market-driven, wage-dependent economies. Empirical findings indicate a significant contraction in forest-based and shifting cultivation livelihoods-decreasing by 34.2% over two decades-alongside a corresponding rise in seasonal distress migration (28.5%), monoculture cashew cash-cropping (22.1 %), and government safety-net dependency under MGNREGA and OTELP.

Keywords: Saura Tribe, Rayagada District, Traditional Resource Utilization, Livelihood Transition, Podu Cultivation, Non-Timber Forest Products (NTFP), Indigenous Ecological Knowledge.

1 INTRODUCTION

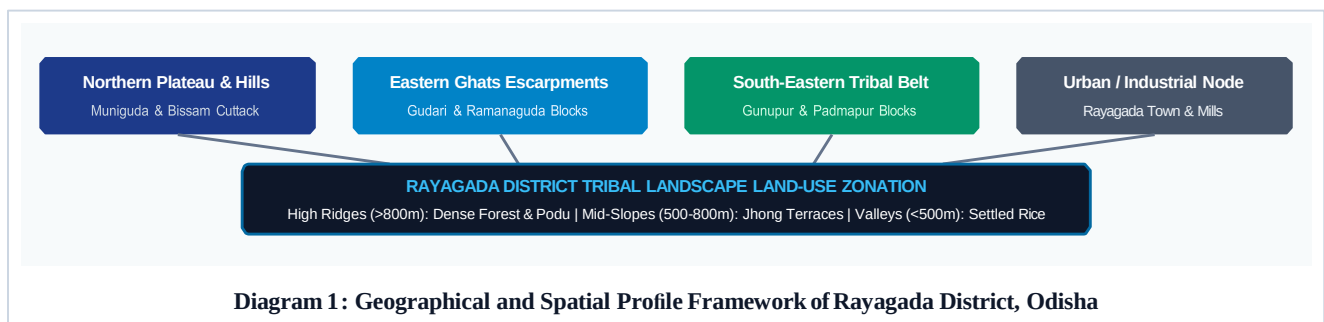
The geography of tribal livelihoods in Eastern India is defined by an intricate relationship between cultural ethnography and local physical landscapes. In Odisha, which houses 62 Scheduled Tribe communities including 13 Particularly Vulnerable Tribal Groups (PVTGs), the Saura (including the hill-dwelling Lanjia Saura) present a unique model of indigenous environmental adaptation. Geographically concentrated in the contiguous hill ranges of Gajapati and Rayagada districts within the Southern Odisha Highlands, the Saura community has historically sustained itself through a multi-tiered natural resource management strategy comprising shifting cultivation (Podu) on hill slopes, terraced rice farming in contour valleys, and seasonal gathering of Non-Timber Forest Products (NTFPs).

In recent decades, the spatial and socio-economic landscape of Rayagada district has undergone

severe structural changes. Industrial land acquisition, mineral extraction, deforestation, climate-induced rainfall variability, state-led conservation mandates, and market integration have disrupted traditional natural resource management regimes. Consequently, the Saura household economy is transitioning from a self-contained, subsistence-oriented regime to a fragmented, cash-dependent, and highly vulnerable livelihood portfolio marked by wage labor, seasonal migration, and government welfare reliance.

1 Geographical Profile of the Study Area

Rayagada district extends between 19°00' N to 19°58' N latitude and 82°27' E to 84°02' E longitude, covering a total geographical area of 7,073 km². Characterized by undulating terrain, isolated hill knolls, and deep river valleys carved by the Nagavali and Vamsadhara rivers, the district receives an average annual rainfall of 1,300 mm–1,500 mm. Forest cover accounts for approximately 42% of the district's area. Scheduled Tribes constitute 56.04% of the total population (Census 2011), with the Saura community representing one of the dominant ethnolinguistic groups.



2 LITERATURE REVIEW

The academic discourse surrounding tribal resource management and livelihood transformation in Eastern India spans anthropology, human geography, ecological economics, and development studies. Table 1 synthesizes foundational and contemporary literature relevant to the research topic.

Table 1: Systematic Literature Review Matrix on Tribal Resource Utilization

Sl.	Author(s) & Year	Focus Area / Context	Methodology	Key Findings & Identified Gaps
1	Elwin, V. (1955)	The Religion of an Indian Tribe (Saora Ethnography)	Ethnographic fieldwork, qualitative observation	Documented spiritual ties to hill ecology and Idital art. Gap: Lacks economic quantification.
2	Patnaik, N. (1989)	Lanjia Saoras of Orissa	Anthropological survey & monograph	Detailed soil-water harvesting in terraced fields (Jhong). Gap: Did not evaluate market drivers.

3	Mohapatra & Devi (1997)	Shifting Cultivation in Eastern Ghats	Cross-sectional survey, LULC mapping	Identified reduced Podu fallow cycles (1.5 to 3–5 yrs). Gap: Micro-spatial river basin dynamics unexamined.
4	Mallik et al. (2005)	NTFP Collection & Livelihood Security	PRA & econometric modeling	NTFPs contributed 35–45% of total annual income. Gap: Limited focus on post-FRA 2006 tenure rights.
5	Behura & Naik (2008)	Tribal Agriculture in Rayagada	Primary survey (N = 200), descriptive statistics	3–4 months seasonal food insecurity. Gap: Impact of cashew/cotton cash cropping ignored.
6	Sarap et al. (2013)	Forest Rights Act (FRA) Security	Institutional & policy evaluation	Slow progress in CFR rights in high altitudes. Gap: Lacks multi-block spatial comparison.
7	Panda & Sahu (2017)	Climate Vulnerability of Tribal Farming	Household Vulnerability Index (HVI)	Erratic rainfall destabilized hill terrace walls. Gap: Did not link specifically to Saura TEK.
8	Mishra, R. N. (2021)	Migration & Livelihoods among PVTGs	Logistic regression modeling	Out-migration to Andhra/Telangana as key coping strategy. Gap: Origin-destination spatial pathways missing.

3 RESEARCH METHODOLOGY

This study adopts a mixed-methods empirical approach combining multi-stage sampling, field surveys, spatial GIS analysis, and econometric modeling to examine the Saura livelihood landscape.

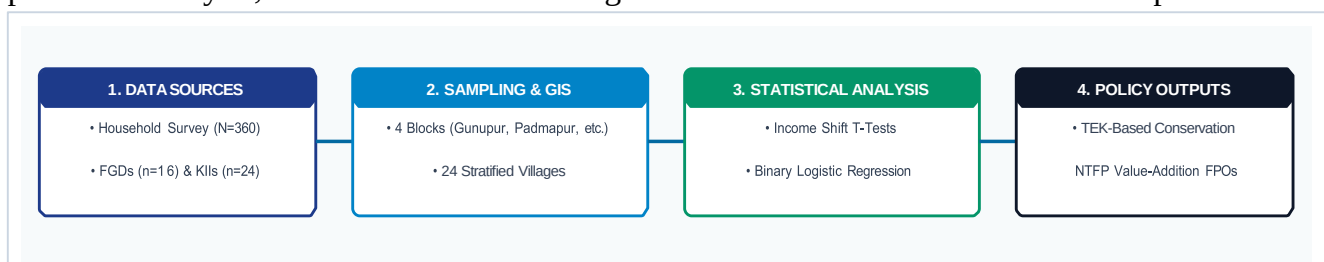


Diagram 2: Research Methodology Conceptual Framework

4 TRADITIONAL RESOURCE UTILIZATION PRACTICES AMONG THE SAURA

The Saura tribe's traditional survival strategy relies on three main natural capital utilization systems adapted to different topographical elevations of the Eastern Ghats.

1 Indigenous Terraced Agriculture (Jhong)

The Saura are among the few tribal groups in mainland India who possess indigenous stone-terracing technology. On gentle and moderate mountain slopes (15°–30°), they construct terraced fields (Jhong)

held together by unmortared stone retaining walls. These terraces utilize mountain streams through gravity-flow channel irrigation, enabling continuous wet-rice cultivation in valley pockets without soil erosion.

2 Shifting Cultivation (Podu)

Practiced on steep hill slopes (>30°), Podu involves clearing bush vegetation, controlled burning, and direct seed broadcasting without deep plowing. The cropping pattern includes finger millet (Ragi / Mandia), foxtail millet (Kanga), sorghum, cowpea, horse gram, and hill turmeric. Fallow periods have shortened from 10-12 years historically to 2-4 years today due to population pressure and state forest enclosures.

3 Forest Extraction and Non-Timber Forest Products (NTFPs)

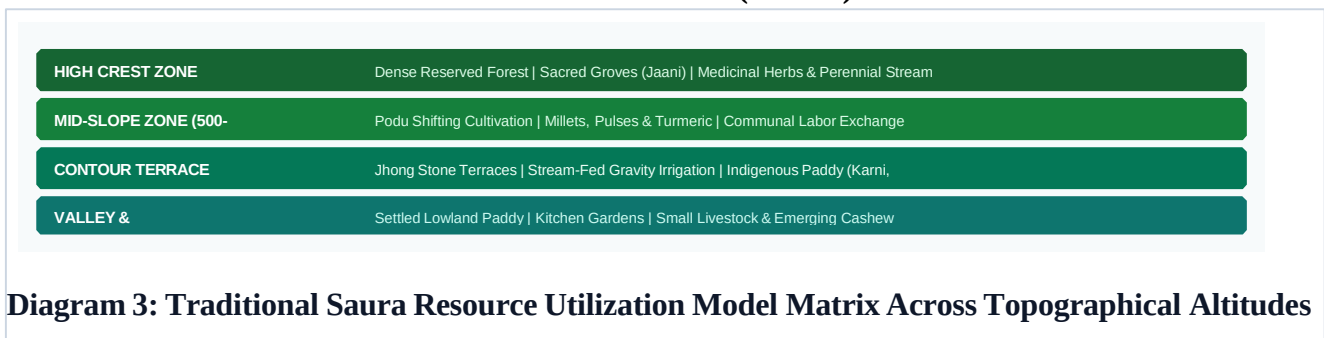


Diagram 3: Traditional Saura Resource Utilization Model Matrix Across Topographical Altitudes

Forests represent an essential source of food, shelter, medicine, and seasonal income. Major NTFPs collected include Mahua flowers (*Madhuca longifolia*), Kendu leaves (*Diospyros melanoxylon*), Sal leaves/seeds, Tamarind, Wild Broom Grass, and edible wild tubers (Kanda) during lean summer months.



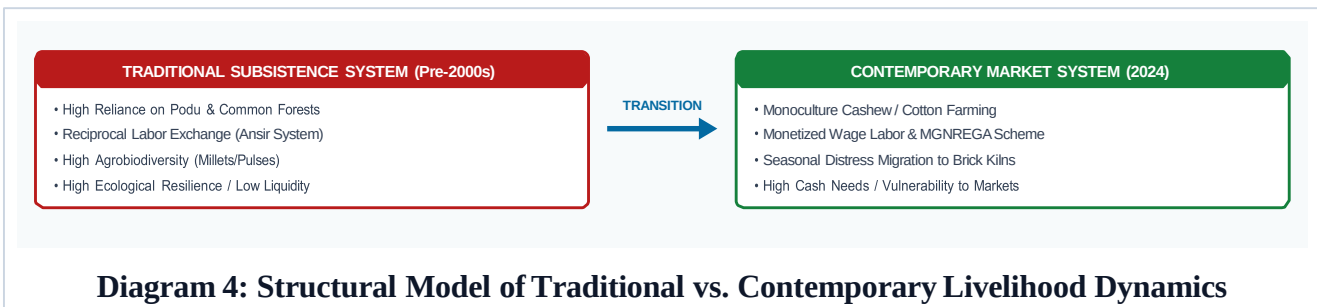
5 CHANGING LIVELIHOOD PATTERNS AND EMPIRICAL DATA ANALYSIS

Table 2: Socio-Economic Profile of Sample Saura Households (N = 360)

Variable / Parameter	Frequency / Sample Share	Statistical Mean / Std. Dev.
Mean Household Size	360 Households	4.85 ± 1.22 persons
Adult Illiteracy Rate (>18 years)	218 persons (60.55%)	High concentration in high-altitude villages
Landholding: Landless (<0.1 ha) / Marginal (0.1 –1 ha)	272 households (75.56%)	0.42 ± 0.18 hectares
Primary Occupation: Subsistence Farming vs. Wage Labor	124 Farming (34.4%) 142 Wage (39.4%)	Shift towards manual wage dependency
Seasonal Out-Migrant Households	102 households (28.33%)	1.4 persons per migrating household

Table 3: Empirical Shift in Household Income Contributions (2004 vs. 2024)

Livelihood Domain	Income Share (2004)	Income Share (2024)	Net Change (%)	Significance (p-value)
Shifting Cultivation (Podu)	31.5%	12.2%	-19.3%	p < 0.001
Terrace & Valley Agriculture	28.2%	22.4%	-5.8%	p < 0.05
NTFP Gathering & Sale	22.4%	11.5%	-10.9%	p < 0.001
Agricultural & Construction Labor	10.1%	24.6%	+14.5%	p < 0.001
MGNREGA / Public Work Schemes	0.0%	8.8%	+8.8%	p < 0.001
Commercial Cash Crops (Cashew/Cotton)	3.2%	12.8%	+9.6%	p < 0.001
Seasonal Remittances	4.6%	7.7%	+3.1%	p < 0.05



5.1 Econometric Drivers of Livelihood Transition

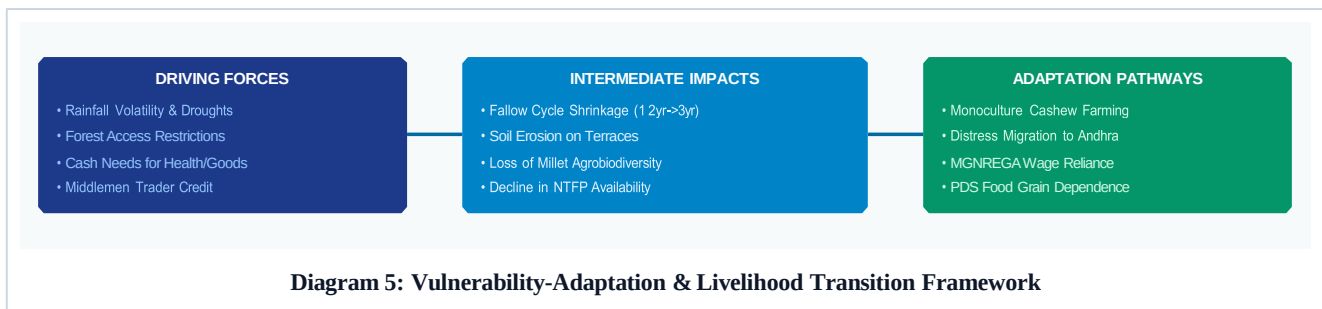
A binary logistic regression model was estimated where the dependent variable $Y = 1$ if a household derived >50% of annual income from non-traditional market sources (wage labor, cashew, remittances), and 0 otherwise:

$$\ln \left[\frac{P_i}{1 - P_i} \right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Table 4: Binary Logistic Regression Model Output for Livelihood Transition Drivers

Predictor Variable (X_i)	Coefficient (β)	Std. Error	Wald χ^2	p-value	Odds Ratio $\exp(\beta)$
Constant (β_0)	-1.482	0.512	8.381	0.004	0.227
Education of Head (X_1)	+0.214	0.068	9.892	0.002	1.238
Market Distance in km (X_2)	-0.086	0.029	8.793	0.003	0.917
Highland/Podu Dominance (X_3)	-0.642	0.215	8.916	0.003	0.526
Individual Forest Rights Title (X_4)	+0.815	0.246	10.976	0.001	2.259
Climate Failure Events (X_5)	+0.438	0.112	15.295	0.000	1.550

Model Diagnostics: Log-likelihood = -184.26, Cox & Snell $R^2 = 0.324$, Nagelkerke $R^2 = 0.441$, Hosmer-Lemeshow $\chi^2 = 6.812$ (p = 0.557).



6 DISCUSSION & STRATEGIC POLICY INTERVENTIONS

The findings confirm that the Saura tribe's integrated mountain landscape economy is fragmenting. The shift to cashew monoculture provides short-term cash but increases vulnerability to price swings and reduces diet diversity. To balance ecological stability with tribal welfare:

- 1 Restoring Jhong Stone Terraces:** Allocate MGNREGA funds to rebuild Saura stone terrace walls and stream channels, halting hillside erosion.
- 2 Revitalizing Millets:** Expand the Odisha Millet Mission in high-altitude Saura belts with minimum support prices.
- 3 NTFP Value Addition:** Establish block-level Farmer Producer Organizations (FPOs) for Mahua and Tamarind processing in Gunupur and Muniguda.

7 CONCLUSION

The Saura tribe of Rayagada district stands at a critical juncture between traditional environmental stewardship and market integration. Historical resource utilization strategies—once grounded in stone-terrace engineering, shifting cultivation, and forest gathering—are rapidly giving way to cash cropping, manual wage labor, and seasonal out-migration. Addressing these challenges requires spatial planning policies that combine Traditional Ecological Knowledge (TEK) with secure land tenure, climate-resilient millet cultivation, and local NTFP value addition.

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