

Assessing Livelihood Security Through Forest Tenure: A Study of Santal Tribes in Bankura District, West Bengal

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INTRODUCTION

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 popularly known as the Forest Rights Act (FRA) was passed by the Indian Parliament on December 29, 2006, and came into effect on December 31, 2007 (Sahoo *et al.*, 2024). This legislation represents a significant step in acknowledging and securing the rights of forest-dependent people, particularly Scheduled Tribes, who have historically depended on forests for their livelihood, culture, and identity. The Act aims to correct the 'historical injustice' done to these communities, especially during the colonial period, when their customary rights were systematically curtailed under forest conservation policies. This deprivation continued post-independence, often in the name of environmental protection and biodiversity conservation (Mathew & Umesh, 2019). India is home to the largest population of forest-dependent people globally (Elias *et al.*, 2020). Tribal communities, deeply embedded in forest ecosystems, have long depended on these landscapes for subsistence through agriculture, collection of forest products, grazing, and cultural practices. According to a report by the Food and Agriculture Organization (FAO, 2005), over 53 million tribal people benefit directly or indirectly from non-timber forest products (NTFPs). However, their relationship with forests was severely disrupted during colonial rule as state control over forestland intensified. The FRA recognizes three broad categories of rights: individual rights to cultivate forest land, community rights to access and manage forest resources, and ownership rights over minor forest produce (MFPs). These provisions are designed to secure land tenure and promote sustainable forest-based livelihoods, food security, and empowerment through community-based forest governance (Lawlor *et al.*, 2019; Miller *et al.*, 2021). Despite its progressive framework, the FRA has been irregular across states. In many areas, the Act's full potential remains unrealized due to bureaucratic hurdles, lack of awareness, and resistance from forest departments. Nevertheless, the FRA remains a landmark legal tool in India's forest governance framework and is critical to the socioeconomic advancement of tribal communities.

Abstract: This study examines the impact of land tenure security under the Forest Rights Act (FRA), 2006, on the sustainable livelihood outcomes of the Santal tribal community in Bankura District, West Bengal. Drawing on primary data from 208 forest-dwelling households both recipients and non-recipients of Individual Forest Rights (IFR or 'patta') and secondary sources, the research employs a Sustainable Livelihood Security Index (SLSI) and multiple linear regression analysis to assess the ecological, economic, and social dimensions of livelihood security. While FRA title holders demonstrate enhanced economic security and stronger social capital through higher participation in Forest Protection Committees and community organizations, they lag in human and financial capital compared with non-FRA households. Regression results underscore the significance of legal land entitlement, income, livestock ownership, education, and forest dependence as key determinants of livelihood security. However, the majority of FRA beneficiaries underutilize their patta land, largely due to its non-arable condition and the lack of institutional support. Despite its progressive intent, the FRA's potential remains unrealized. This study highlights the need for integrated policy interventions focusing on capacity building, institutional coordination, and productive land use to fully harness the FRA's socio-economic benefits and ensure long-term livelihood sustainability for forest-dependent tribal communities.

Keywords: Forest Rights Act (2006), Sustainable livelihood security, Land tenure, Tribal communities, Forest-based livelihoods.

This study focuses on the Bankura district of West Bengal, where the Santal tribe constitutes a significant proportion of the forest-dwelling population. The FRA was implemented in the state in 2008, and by 2009, a considerable number of 'patta' lands individual land titles were distributed to eligible beneficiaries. In this context, this study seeks to evaluate the extent to which the FRA has contributed to enhancing the sustainable livelihood security of the Santal tribal community. It also aims to explore whether the recognition of forest rights has brought about tangible improvements in their socio-economic conditions or if challenges persist in realizing the Act's intended benefits.

Interconnection between Land tenure and Livelihood: Data sources

A Conceptual Framework

Household livelihood security refers to adequate and sustained access to income and essential resources required to fulfil basic human needs, such as sufficient food, clean drinking water, healthcare, education, housing, and opportunities for community engagement and social inclusion. (Frankenberger 1996). Stable employment is a fundamental aspect of livelihood security. A reliable source of income allows individuals to support themselves and their families, access essential goods and services, and invest in their future (Mishra & Debata, 2021).

The Forest Rights Act 2006 offers Individual Forest Rights (IFR) to forest dwellers, which they have been using for residence and livelihood activities (Khosla & Bhattacharya, 2020). This ensures tenure security, thus reducing the risk of exclusion and displacement from both private encroachment and state expropriation (Holden and Ghebru, 2016). This right allows forest dwellers to use forest land efficiently for their livelihood activities. As they have legal property rights and no risk of eviction, they would use human and physical capital to achieve optimal production from that land. Thus, forest rights secure livelihood opportunities and food security for households (Oduro *et al.* 2021). Socio-economic factors (i.e., land size, income, and livestock) tend to influence investment in forest land in terms of physical and human capital (Holden & Ghebru 2016). Demographic factors (i.e., family size, age, gender, education level, and dependency ratio) also influence human and physical investment in forest land (Zakari *et al.* 2014).

STUDY AREA

Bankura district, situated in the southwestern part of West Bengal, lies within 22°3'N to 23°38'N latitude and 86°36'E to 87°46'E longitude. It has been selected as a study area for the following reasons: Bankura district has relatively higher area under forest cover (1279.37 sq. km) compared to other districts in West Bengal, 18.59% of its geographical area is covered under forest (FSI report, 2021). It has been the 2nd largest beneficiary of Individual Forest Rights (IFR) and 1st in community forest rights in West Bengal; tribal people residing here are mostly reliant on forest resources for their livelihood.

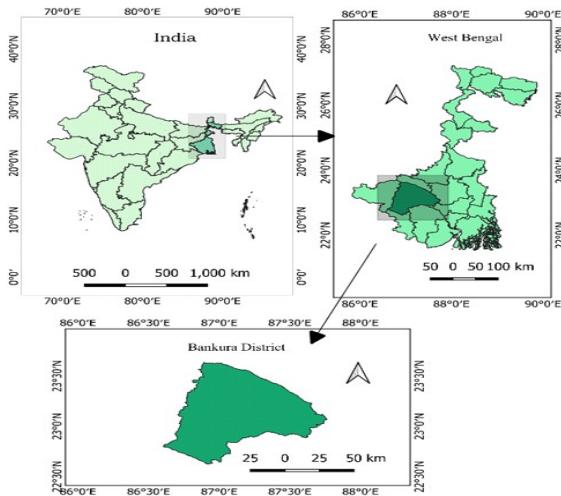


Figure 1: Location of study area

Secondary data were obtained from the Ministry of Tribal Affairs, Government of India.

This study draws on primary data collected from four purposively selected villages in the Barjora block of Bankura district, West Bengal. The survey targeted forest-dwelling households, comprising both recipients and non-recipients of Individual Forest Rights (IFR), commonly referred to as 'patta,' under the Forest Rights Act, 2006. A semi-structured questionnaire was administered to capture detailed information on land tenure and livelihood conditions of the respondents. In total, 208 forest-dwelling households were surveyed, of which 49.24% held IFR titles and 50.72% lacked legal recognition of land rights. This comparative approach enables an assessment of the differential impact of land tenure security on the tribal livelihood.

METHODS

A Sustainable Livelihood Security Index (SLSI) has been constructed to analyse the livelihood security level of the tribal community in the study area after Hahn *et al.* (2009). It is an aggregate index composed of three component indices: the Ecological Security Index, Economic Security Index, and Social Security Index.

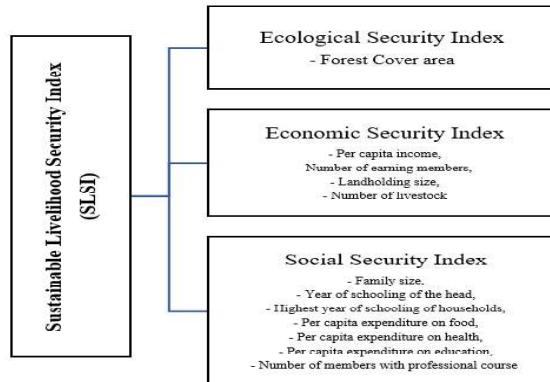


Figure 2: Indicators of livelihood security index [modified after Hahn *et al.* (2009)]

The indicators were acknowledged, and it was presumed that each indicator had equal weight. The indicators were standardized following the procedure adopted in measuring Life Expectancy in Human Development Reports. The formula used for the normalisation/standardisation of the indicators is as follows:

$$Index_{sd} = \frac{S_d - S_{min}}{S_{max} - S_{min}}$$

Where S_d is the subcomponent for community d , and S_{min} and S_{max} are the minimum and maximum values, respectively, for each subcomponent determined using data from the surveyed community. A combined Sustainable Livelihood Security Index (SLSI) for each household was then created by averaging the index values of the subcomponents.

To assess the factors determining the Sustainable Livelihood Security of the surveyed tribal community, a multivariate regression analysis was performed. The dependent variable

is the sustainable livelihood security index, and the independent variables are received *patta* land, years of schooling, age, sex, dependency on forest for livelihood, household size, per capita income, landholding size, and number of livestock.

RESULTS AND DISCUSSION

Table 1 provides a comparative overview of the natural, physical, financial, human, and social capital of FRA titleholders and non-FRA households. This helps us understand the impact of land rights on broader livelihood aspects.

Table 1: Comparison of livelihood status of FRA and non-FRA households.

Capitals/Indicators	FRA Holders	Non-FRA Holders
Natural Capital		
land holder (in %)	100	100
Practising agriculture (%)	79.59	87.88
Avg. land holding Size (in bigha)	2.35	2.95
Drinking Water Facilities (%)	100	100
Physical Capital		
Housing Type (%)		
Kutcha	57.14	48.48
Semi Pacca	10.2	11.11
Pucca	32.65	40.4
Avg. Livestock	9.15	6.6
distance of edu. centre (km)	2.8	1.5
Financial Capital		
Avg. monthly income (in rupees)	8061.2	21224.2
Average number of earnings members in hh	1.81	1.73
Human Capital		
Average family size	5.28	4.66
% of literate persons	47.96	53.54
Avg. year of schooling	7.63	10.13
% of members with professional skills	13.27	20.2
Social capital		
Participation in social organisations (%)	74.49	61.62
Participation in FPC (%)	87.76	75.76

(Source: Primary Survey, 2025)

Natural Capital

Both groups reported full land ownership (100%) and universal access to drinking water. However, a higher proportion of non-FRA holders (87.88%) engaged in agriculture than FRA holders (79.59%) did. The average landholding is also larger among non-FRA holders (2.95 bighas) than among FRA holders (2.35 bighas).

Physical Capital

Kutcha houses dominate both groups, though they are more prevalent among FRA holders (57.14%) than among non-FRA holders (48.48%). Non-FRA holders are more likely to reside in pucca houses (40.40%) than FRA holders (32.65%). FRA holders possessed more livestock on average (9.15% vs. 6.6%), indicating a greater reliance on livestock-based livelihoods. However, access to services is better among non-FRA holders, with shorter distances to health (6.39 km vs. 6.97 km) and educational facilities (1.5 km vs. 2.8 km).

Financial Capital

The comparison reveals a significant gap in financial capital between FRA and non-FRA households. Although both groups have a similar number of earning members per household (1.81 for FRA holders and 1.73 for non-FRA), non-FRA households report a much higher average monthly income (Rs. 21,224.2) compared to Rs. 8,061.2 among FRA holders. This suggests that the disparity is not rooted in household labor capacity but likely in differences in income-generating opportunities, access to better-paying jobs, or market linkages. The lower income among FRA households, despite comparable labor input, highlights potential economic marginalization and limited financial returns from land- or forest-based livelihoods, signalling the need for further policy attention.

Human Capital

The data reflect notable disparities in human capital between FRA and non-FRA households. FRA households have a larger average family size (5.28 vs. 4.66), which may imply a higher dependency burden. In contrast, non-FRA households show stronger educational and skill indicators, with a higher literacy rate (53.54% vs. 47.96%), greater average years of schooling (10.13 vs. 7.63), and a higher percentage of members with professional skills (20.20% vs. 13.27%). These findings suggest that non-FRA households are relatively better positioned in terms of educational attainment and employability, which can directly influence livelihood outcomes, while lower human capital among FRA households may limit their access to diversified or higher income opportunities, emphasizing the need for targeted educational and skill development interventions.

Social Capital

The data indicate that FRA titleholders exhibit stronger social capital than non-FRA households. Participation in social organizations is higher among FRA holders (74.49%) than among non-FRA households (61.62%), suggesting greater community engagement and collective involvement. Similarly, participation in Forest Protection Committees (FPCs) is significantly higher among FRA holders (87.76%) than among non-FRA households (75.76%). This enhanced participation may be attributed to the legal recognition and sense of ownership conferred by FRA titles, which likely encourage greater involvement in community-based forest governance and decision-making processes. Such engagement can contribute to more sustainable resource management and improved social cohesion within tribal communities in India.

Table 2 compares the livelihood security indices between FRA title holders and non-FRA households. Ecological (0.36-0.37) and social security scores (0.29) were nearly equal for both groups, indicating similar access to natural resources and social services. However, FRA title holders show significantly higher economic security (0.39 vs. 0.24), suggesting that land rights under the FRA enhance economic well-being. Consequently, their overall Sustainable Livelihood Security index is higher (0.34) than that of non-FRA households (0.30), highlighting the positive impact of FRA on livelihood sustainability.

Table 2: Sustainable livelihood security index of FRA and non-FRA households.

Indices/HH types	FRA title holders	Non-FRA
Ecological security index	0.36	0.37
Economic security index	0.39	0.24
Social Security index	0.29	0.29
Sustainable livelihood security index (SLSI)	0.34	0.3

Utilisation of *patta* land for economic benefit

Effective utilization of forest land titles is essential to derive economic benefits from the rights granted under the Forest Rights Act. As shown in Figure 3, most households (72.45%) do not use their *patta* land for income-generating purposes. In contrast, only 27.55% of FRA title holders are utilizing their allotted land productively, primarily for agricultural and horticultural activities. The findings indicate that a significant proportion of beneficiaries are either using the land solely for residential purposes or have left it fallow. Among those utilizing the land, the focus is largely on subsistence activities rather than commercial use of the land. *Patta* lands ensure residential security but contribute minimally to income generation. They only receive land under the forest area where they used to reside. Some respondents reported that the land granted to them under the FRA was mostly non-arable or barren, limiting their ability to engage in productive livelihood activities.

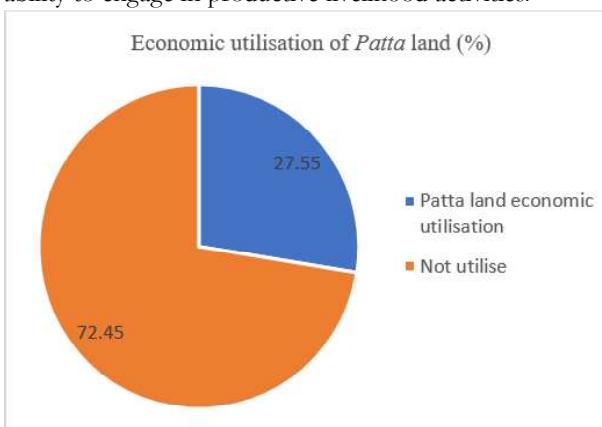


Figure 3: Economic utilization of *patta* land among FRA landholders.

Factors influencing the livelihood security of the tribal community of Bankura district

Multilinear Regression Analysis (Table 3) was conducted to assess the factors influencing the sustainable livelihood security of the tribal community in the study area. The model exhibited strong explanatory power, with an R^2 value of 0.7618 and an adjusted R^2 of 0.7490, suggesting approximately, 75% of the difference in the dependent variable is explained by the included predictors, that is, size of the FRA title (*patta*) land, age, sex, per capita income, household size, dependency ratio, year of schooling, number of livestock, receiving *patta* land, and dependence on forest for livelihood. This result indicates that the regression predictions are reliable.

Table 3: Results of multiple linear regression determining the factors of Sustainable Livelihood (dependent variable: sustainable livelihood security index).

Variables	Coef.	Std. Err.	P> t
age	0.00016	0.00029	0.58
sex	-0.006612	0.01271	0.603
FRA holder (<i>patta</i> land)	0.063282	0.009	0.000*
Dependency ratio	-0.00033	0.00009	0.000*
Dependence on the forest	0.06623	0.01936	0.001*
Landholding size	0.02576	0.0025	0.000*
Per capita income	0.00003	0.000003	0.000*
Number of livestock	0.00209	0.00074	0.005*
Household size	0.01197	0.00273	0.000*
Year of schooling	0.00522	0.001	0.000*
_cons	0.00506	0.03238	0.876
Number of obs.	208		
Prob > F	0.000		
R-squared	0.7618	Adj R-squared	0.7490

Table 3 presents the results of a multiple linear OLS regression model examining the determinants of household livelihood security. The model includes a range of demographic, socio-economic, and institutional variables. The results indicate that FRA land title ownership ($\beta=0.063$, $p < 0.001$) is a key determinant, suggesting that households with legal land entitlements under the Forest Right Act (FRA) are significantly more likely to have higher livelihood security. This finding underscores the positive impact of tenure security on rural livelihood. Dependence on forest resources for livelihood ($\beta=0.066$, $p < 0.001$) also had a significant positive effect, reflecting the critical role of forest-based income and resources for rural households. Similarly, landholding size ($\beta=0.026$, $p < 0.001$), per capita income, number of livestock, household size, and years of schooling were all positively and significantly associated with livelihood security. These variables reflect the contributions of natural, financial, human, and social capital to livelihood enhancement.

In contrast, the dependency ratio ($\beta = -0.00033$, $p < 0.001$) had a significant negative effect, indicating that households with more dependents face greater livelihood vulnerability. The coefficients for age and sex were statistically insignificant, indicating that these variables did not have a meaningful influence on the dependent variable within this model context.

CONCLUSION

This study provides critical insights into the relationship between land tenure security under the Forest Rights Act (FRA), 2006, and the sustainable livelihood outcomes of the Santal tribal community in Bankura District, West Bengal. The findings reveal that FRA land entitlement has a positive and statistically significant impact on overall livelihood security, particularly through enhanced economic security. FRA title holders demonstrate greater community engagement and livestock ownership; however, they lag behind non-FRA households in financial and human capital indicators such as income levels, education, and professional skills.

The Sustainable Livelihood Security Index (SLSI) confirms a modest advantage for FRA-recognized households, while multivariate regression analysis identifies legal land rights, forest dependence, education, livestock ownership, and per capita income as key contributors to improved livelihood outcomes. However, the underutilization of FRA lands for productive activities largely due to low awareness and limited institutional support emerges as a critical barrier.

Thus, while the FRA has succeeded in partially addressing historical injustices and advancing land tenure security, its full potential to transform tribal livelihoods remains unfulfilled. Moving forward, policy efforts must focus on strengthening awareness, education, and capacity building among tribal communities. Enhanced coordination between local governance institutions and forest departments is essential to promote sustainable land use and optimize the socio-economic benefits of forest rights. Only through such integrative and participatory approaches can the transformative promise of the FRA be fully harnessed to empower and enhance the well-being of India's forest-dwelling communities.

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