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AN EMPIRICAL STUDY OF LIVELIHOOD DIVERSIFICATION OF PEOPLE OF FOREST FRINGE AREAS OF JALPAIGURI DISTRICT

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ABSTRACT:

Empirical study on livelihood diversification of the people of forest fringe areas of Jalpaiguri District has been performed through data from the sample households. Main results of the study were that there were gram panchayats, villages and sex wise significant differences of livelihood indicators: percentages of earners and shares of earnings belonging to female and migrant labourers. There were some households solely financed by female earners or migrant labourers. Most prominent livelihood activity was non-farm. Factor analyses coupled with reliability analyses of 25 push and 16 pull livelihood factors have been constructed. Policies should focus on empowering people particularly females and migrant labourers through skill development in eco-tourism, NTFP processing, and small-scale farming with access to credit and market linkage. Improving livelihoods of people requires a diversified strategy that transitions them from subsistence-based, forest dependency to sustainable, income-generating activities; strengthening farm, off-farm, and non-farm sectors, often supported by government initiatives.

Keywords: Simpson's Index (SI) of Livelihood Diversity, Push and Pull Livelihood Factors, Migrant Labourer, Female Earner, Factor Analysis, Most Prominent Livelihood Activity

JEL Codes: H41, L73, Q23, Q56, Q57, R11

1.0 INTRODUCTION

Livelihood diversification is the process of individuals or households incorporating multiple income-generating activities together with their primary sources to cope with

economic uncertainty and environmental changes. It is important because it develops resilience against economic and environmental shocks, reduces poverty and food insecurity, and improves overall well-being by creating more stable and varied income sources. By combining activities within and outside the primary sector, households and communities can redesign to changing circumstances, enhance their cash income, and develop a more robust and sustainable foundation for their lives.

Empirical studies on livelihood diversification are necessary to validate theories, identify context-specific drivers and impacts, and develop targeted policies for rural households etc. They provide crucial evidences to present how livelihood diversification enhances income, food security, and resilience to shocks, understanding the roles of physical and social capital etc.

Empirical studies on livelihood diversification point out key factors across several categories, including demographic attributes (age, education, household size, dependency ratio, gender etc), asset endowments (land size, livestock, financial assets etc), institutional and market factors (access to credit, extension services, social networks, markets etc), and environmental and risk factors (climate change, natural disasters, seasonal variability, risk aversion etc.). Those factors, both individual and household-level, corporate to influence the decision and capacity of people to diversify their income sources.

The objective of the study is of empirical analysis in livelihood diversification to quantify and identify the impact of various factors (socio-economic and resource-based) on a household's choice and intensity of livelihood strategies.

The study is organized into the following sections: 1. Introduction, 2. Review of Literatures, 3. Data and Methodology, 4. Results on Empirical Study on Livelihood Diversification and Discussions, 5. Conclusions.

2.0 RATIONALE OF THE PAPER

Ten literatures related to the present study have been reviewed. All of them utilized descriptive statistics like cross tables, percentages, correlation coefficients etc in analyzing the livelihood and livelihood diversification data. The present study is an extension of the previous studies incorporating (a) different measures like average, minimum, maximum, standard deviation, skewness and kurtosis (excess), (b) different statistical tests like t test, chi-square (χ^2) test, ANOVA tests with post hoc test (Duncan) in analyzing and comparing livelihood indicators gram panchayat, village and sex wise. It also dealt with analyzing push and pull livelihood factors utilizing factor analysis coupled with reliability analysis.



3.0 OBJECTIVES

Following objectives have been dealt in the study: -

- (a) To study prevailing livelihood structure of the forest fringe area people and relative weightages of different income sources in their living standards.
- (b) To study the extent of livelihood diversification of the inhabitants of the study area.
- (c) To study which types of livelihoods providing more security in comparison with the others.
- (d) To study the factors and determinants which are driving to divert their livelihoods?
- (e) To trace the extent of their impoverishment and livelihood vulnerability due to the large-scale extraction of forest resources and the resulting effect of huge elephant attack.
- (f) To search the obstacles to diversify the livelihoods of the inhabitants.
- (g) To study the role of forests and forest products to provide the livelihood security to them.
- (h) To identify the push and pull factors to drive the inhabitants to migrate to different areas.
- (i) To study the role of agro-forestry system in securing livelihood practices of the inhabitants.
- (j) To study the landholding status of the inhabitants and the utilization patterns of those landholdings.
- (k) To identify the problems faced by the inhabitants of the forest-fringe area of being outside the forest jurisdiction.
- (l) To identify how much the government schemes have benefited the inhabitants to uplift their standard of living and what further steps are needed.
- (m) To study the composition of the social groups of the study area and the comparison of the livelihood status of different social groups.
- (n) How the livelihood diversification affecting the forest fringe village societies.
- (o) To search the future possibilities of the livelihood diversification of the forest fringe area people.

4.0 REVIEW OF LITERATURES

Carswell, G. (2002), based on research from southern Ethiopia, presented evidence that non-farm and off-farm activities were carried out by a significant proportion of adults and made an important contribution to livelihoods. There was a high involvement of women in diversification and the contribution of diversification activities to cash incomes was important for poorer households. The single most important activity was trading, while labouring for others was also important. Consideration of the historical and social contexts was critical for a firm understanding of livelihood change and the changing role and

importance of diversification activities.

Khan et al. (2017) examined the question ‘Can diversification of livelihood sources increase the income of farmers?’ through a case study conducted on 151 farm households in the districts of Moradabad and Aligarh in Uttar Pradesh in the first quarter of 2017. The study considered three sources of incomes, namely, crops, animal husbandry and non-farm sector. The analytical tools used in the study were Simpson index of diversification, chi-square test; observed a significant difference between the incomes of diversified and undiversified farm households.

Ahmed et al. (2018) investigated the patterns and extent of livelihood diversification in rural Bangladesh. The study identified the major factors affecting extent of livelihood diversification by drawing a random sample of 500 rural farm households in Bangladesh through a multi-stage sampling technique. The results revealed that remittance contributed the highest to the household income followed by petty business and rice farming. Simpson Index of Diversification showed that majority of the rural households had “medium” and “high” level diversified livelihood activities.

Roy et al. (2018) conducted is a longitudinal study, in West Bengal during the period 2007-18 and in order to examine the changing dimensions of rural livelihood, a repeated field survey was undertaken in an interval of 10 years. Following a multistage sampling technique, a total of 200 sample households were selected in probability proportionate to different livelihood groups from the study area. Two districts were selected purposively, one representing a more diversified (Burdwan) and the other less diversified agriculture (Purulia) based on diversification indices. The capacity of agriculture sector in providing employment to the rural masses reached saturation, but there were still scope within agriculture to increase the farm income through development of irrigation facilities and promoting diversification towards high value crops and agri-business activities. The growth in non-farm employment opportunities remained inadequate to absorb the surplus labour left agriculture sector due to push factors. Therefore, creation of off-farm and non-farm employment scopes for rural households held the key for a sustainable livelihood.

Kumar et al. (2020) attempted to quantify the magnitude of livelihood diversification in north and south transects of Bengaluru across rural-urban. Simpson Diversification Index did not show any significant difference in livelihood diversification over the rural-urban gradient in north of Bengaluru, but differences were significant in south of Bengaluru.

Jatto et al. (2020) assessed the livelihood diversification choices of forest dwellers in Onigambari Forest Reserve, Oyo State, Nigeria. A multi-staged sampling technique was used to select ninety-five respondents. Farming was the predominant occupation area with the

majority (54.74 percent) of the households engaged in a combination of farm and non-farm activities, 30.53 percent of them engaged in only non-farm activities.

Payra, T. (2023) attempted to find the determinants that influence the choice of livelihood of the households toward sustainable livelihoods in the Jungal Mahal region in West Bengal, India based on primary data randomly collected from 244 households from 9 blocks in Jungal Mahal region. It was found that the average shares of income earnings by the households from the forest, agriculture, wage earner, and non-firm livelihood activities were 35, 31.1, 24.8, and 9.1 percent respectively.

Patidar et al. (2023), based on primary data collected through a structured interview schedule as well as key informant interviews (KIIs) and focused group discussions (FGDs), attempted to measure the impact of livelihood diversification on household economic well-being and to examine the socioeconomic determinants of various livelihood strategies in rural Sagar, Madhya Pradesh, India. Women's participation in the labour force was positively associated with household economic well-being.

Chase et al. (2024) studied the rural livelihood diversification in Khonoma Village of Kohima district, Nagaland, India with the object to analyze the extent of diversification; relationship between age and diversification; and the diversification between men and women; based on data collected from 20 female and 10 male respondents and utilizing Simpson Diversity Index. The study found 93 percent of the village engaged in agriculture, 70 percent depends on agriculture for their livelihood, 73 percent engaged in livestock assets, 36.67 percent engaged in different labor activities and 16.67 percent in formal employment. Diversification was more advantageous for the age 41 and above; and female respondents had higher diversity than male respondents.

The study of Chakraborti et al. (2025) analyzed different livelihood options of rural youth in a northern district Jalpaiguri of West Bengal. Four villages from four blocks were selected by random sampling. Finally, twenty-five respondents were randomly selected from the exhaustive list of each of the four selected villages, making a total number of 100 respondents from the entire district. The statistical tools like mean, frequency and percentage were used for the analysis. The Simpson index of Diversity was used to measure occupational diversification. The recent studies showed that around 40 percent of youth had quit their traditional avocation of agriculture and were finding jobs in non-agricultural areas. The Data collection was conducted during December, 2022 to June, 2023. The result showed that forty-four percent respondents involved in agriculture. The result showed that most (55 percent) of

the respondents possessed no livelihood diversity followed by 6, 35, and 4 percent had low, medium and high level of livelihood diversity respectively.

5.0 RESEARCH METHODOLOGY

An empirical study on livelihood diversification typically is based on the data collected through primary sources (surveys using structured or semi-structured questionnaires). The methodology involves a sampling technique (e.g., multistage) to select households of forest fringe areas of Jalpaiguri District (Sampling design has been presented through Figure 1 given below) and then calculation of Simpson's Index (SI) of Livelihood Diversity) and (a) presenting data through cross tables, averages, minimum, maximum, median, standard deviations, skewness, kurtosis (excess), percentages, coefficients of correlation etc, (b) results of statistical tests like χ^2 (Chi-square) tests for homogeneity/independence, t test, analysis of variance (ANOVA) with Post-hoc (Duncan), qualitative analyses like factor analysis (exploratory) and reliability analyses to measure diversification, identify its determinants, and assess its impacts on factors like income and food security etc.

5.1 Sources of Data

Some secondary data related to livelihood diversification in forest fringe areas of Jalpaiguri district are mainly available through the published research papers. The empirical part of the study is mostly based on the primary data collected through a multi-stage (five-stage) sampling where the ultimate sample units are the sampled households of the fringe forest areas of the district Jalpaiguri

5.2 Method of Sample Drawn

The sample design for collecting the primary data for our study is as follows: -

Jalpaiguri district has three sub-divisions: Jalpaiguri, Mal (or Malbazar) and Dhupguri.

Out of those three sub-divisions, two sub-divisions: Mal and Dhupguri have been selected using simple random sampling.

Out of four blocks under Malbazar sub-divisions: Mal, Matiali. Nagrakata and Kranti; Nagrakata block have been selected using purposive sampling. Out of five Gram panchayats (GPs) under Nagrakata block, Angrabhasa 1 Gram panchayat has been selected using simple random sampling. Similarly, out of two blocks under Dhupguri sub-division: Dhupguri and Banarhat, Banarhat block has been selected using purposive sampling. Out of seven Gram panchayats under Banarhat block, Salbari 1 Gram panchayat has been selected using simple random sampling.

From Angrabhasa 1 Gram Panchayat, out of five villages (namely, Upper Kalabari Basti, Hridaypur, Kalabari Basti, Khairkata and Kalabari Bagan), three villages (namely, Upper

Kalabari Basti, Hridaypur and Khairkata) have been selected using purposive sampling. From each of the three selected villages of Angrabhasa 1 Gram Panchayat, 70 households have been selected using simple random sampling, that is, the total number of households sampled from that Gram Panchayat is $70 \times 3 = 210$.

Similarly, from Salbari 1 Gram panchayat, out of ten villages (namely, Purba Duramari, Paschim Duramari, Modhya Salbari, Chanadipa, Dakshin Salbari, Forest Basti, Mela Basti, Uttar Salbari, Rangatipar, Simuljhora), four villages (viz., Purba Duramari, Madhya Salbari, Chanadhipa and Uttar Salbari) have been selected using purposive sampling. From each of the four selected villages of Salbari 1 Gram Panchayat, 50 households have been selected using simple random sampling, that is, the total number of households sampled from that Gram Panchayat is $50 \times 4 = 200$.

Therefore, the total number of sampled households which are the ultimate sampling units (s.u.) from two Gram Panchayats is $210 + 200 = 410$.

Each of those 410 sampled households has been interviewed through administering questionnaire to gather relevant data pertaining to our study.

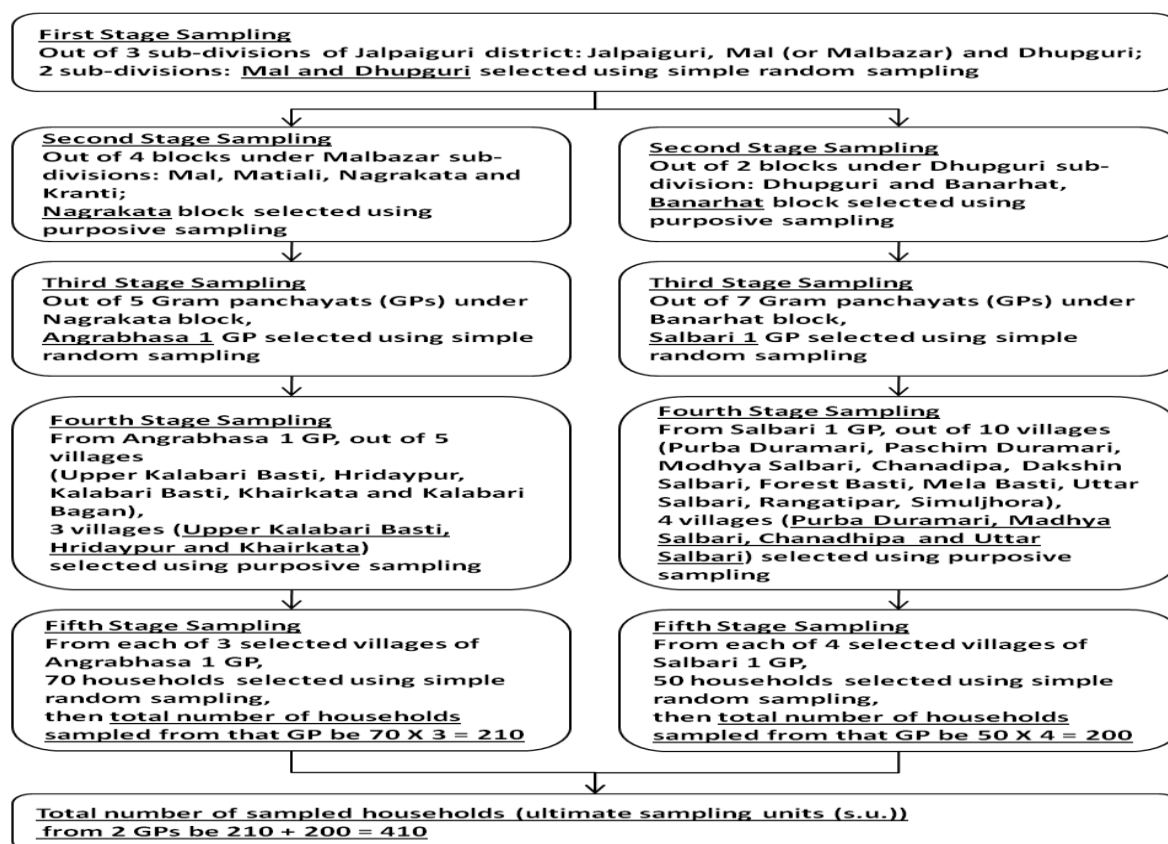


Figure 1: Sampling Technique for Selecting Households from Forest Fringe Areas of Jalpaiguri District

Source: Developed by Researcher

4.0 ANALYSIS

Factor analysis is of two types – Exploratory (EFA) and Confirmatory (CFA).

The main difference: Exploratory Factor Analysis (EFA) discovers hidden structures, identifying the number of factors and which variables load onto them, ideal for theory generation; while Confirmatory Factor Analysis (CFA) tests pre-defined theories.

Factor analysis is of two types – Exploratory (EFA) and Confirmatory (CFA).

The main difference: Exploratory nature (number of factors, specific loadings) fits the data well, used for theory testing. EFA is flexible (variables can load multiple ways), whereas CFA is rigid.

For qualitative analyses, factor analysis (a statistical method for data reduction) is performed first to identify the underlying factors in the data set, and then reliability analysis is performed on the resulting factors to measure their internal consistency. A factor is a cluster of highly correlated variables (items) that represent a single underlying, unobservable dimension or concept, simplifying complex data by revealing these latent structures. Those groups of variables (items) that load onto the same factor show they belong together, revealing a basic pattern or construct in the data, with factors acting as the core underlying themes.

Factor loading in factor analysis is a correlation coefficient showing how strongly an observed variable links to an underlying (latent) factor, indicating the variable's importance to that factor; high absolute loadings signify strong relationships. Higher absolute values of factor loadings (closer to 1 or -1) mean a stronger link (e.g., >0.7 is often considered strong).

The sign (positive or negative) indicates the direction of the relationship (positive association vs. inverse association).

Number of factors in factor analysis lies between 1 and number of variables under the study (both inclusive).

In factor analysis, the variance explained by a factor is measured by its eigenvalue, indicating how much of the total variability in the variables that specific factor captures, with higher eigenvalues (often >1) suggesting a more significant underlying dimension, expressed as a percentage of total variance which is equal to $100 * \text{variance explained by a factor} / \text{number of variables under study}$.

The sum of squared loadings for a factor also shows its explained variance, and communalities (h^2) show the variance in each individual item explained by all factors.

Variance explained by a factor is greater than those of subsequent factors is a core principle in Factor Analysis and Principal Component Analysis (PCA); the first



factor/component captures the most variation in the data, the second captures the next most, and so on, with each new factor explaining progressively less variance, helping to identify key underlying patterns and reduce data complexity.

The Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity are crucial pre-analysis checks for factor analysis, determining if the data is suitable for uncovering underlying factors: KMO measures sampling adequacy (values > 0.9 is marvelous, > 0.8 is meritorious, > 0.7 is middling, > 0.6 is mediocre, > 0.5 is miserable, and < 0.5 is unacceptable), while Bartlett's tests if variables correlate enough (rejecting the identity matrix null hypothesis, $p < 0.05$), both confirming the variables are related enough for factor reduction.

Step 1: Factor Analysis

Purpose: To identify the underlying structure of the data set and group variables that are strongly correlated with each other.

Process:

- (a) Calculate a correlation matrix of variables to be used in the analysis and examine the data for suitability for factor analysis by KMO test and Bartlett's Test of Sphericity.
- (b) Choose an extraction method (e.g., Principal Components). Extract the factors.
- (c) Determine the number of factors to retain. Apply a rotation method (e.g., Varimax) to help with interpretation. Rotation is essential in factor analysis to simplify the results, making factors easier to interpret by creating a "simple structure" where variables load strongly on one factor and weakly on others, moving away from the often-messy initial solution with middling loadings on multiple factors.
- (d) Interpret and label the new factors.

Outcome: A smaller set of latent factors that represent the relationships among your original variables.

Step 2: Reliability Analysis

Purpose: To measure the internal consistency of each factor identified in the previous step.

Process: Use the variables that were grouped into each factor from the factor analysis. Perform a reliability analysis to calculate Cronbach's Alpha (α) for each factor separately.

Outcome: A score (e.g., Cronbach's Alpha) for each factor, indicating how reliably the items within that factor measure the same underlying concept.

Cronbach's Alpha (α) is: $\alpha > 0.9$ as excellent, $\alpha > 0.8$ as good, $\alpha > 0.7$ as acceptable, $\alpha > 0.6$ as questionable, $\alpha > 0.5$ as poor and $\alpha < 0.5$ as unacceptable.

(Kothari, C. R., 2007; Panneerselvam, R., 2008)

4.1 RESULTS ON EMPIRICAL STUDY ON LIVELIHOOD DIVERSIFICATION AND DISCUSSIONS

Empirical study on livelihood diversification of the people of forest fringe areas of Jalpaiguri District has been performed through the data from the sample households as well as the data from all the earning members of the sampled households (number of sampled households is 410, each of the sampled households having 1 to 4 earning members and each of the earning members, earning from 1 to 2 earning sources). Total number of earning members and earning sources belonging to sampled 410 households were 788 and 881 respectively.

The gram panchayat (GP) and village wise distribution of livelihood activities of all the earners of the sampled households from the forest fringe areas of Jalpaiguri District has been provided in the following table (Table 1).

Table 1: GP and Village Wise Distribution of Livelihood Activities of All Earners of Sampled Households from Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

GP/Village	Activities			Total
	Farm	Off-farm	Non-farm	
Salbari 1 GP				
Purba Duramari 1	29 (24.8)	13 (11.1)	75 (64.1)	117 (100)
Madhya Salbari	30 (31.3)	9 (9.4)	57 (59.4)	96 (100)
Uttar Salbari	39 (50.0)	9 (11.5)	30 (38.5)	78 (100)
Chanadhipa	33 (36.7)	11 (12.2)	46 (51.1)	90 (100)
Salbari 1 GP Total	131 (34.4)	42 (11.0)	208 (54.6)	381 (100)
Angrabhasa 1 GP				
Uttar Kalabari Basti	79 (49.7)	21 (13.2)	59 (37.1)	159 (100)
Khairakata	136 (78.2)	19 (10.9)	19 (10.9)	174 (100)
Hridaypur	77 (46.1)	16 (9.6)	74 (44.3)	167 (100)
Angrabhasa 1 GP Total	292 (58.4)	56 (11.2)	152 (30.4)	500 (100)
Overall Total	423 (48.0)	98 (11.1)	360 (40.9)	881 (100)

Source: Field Survey, 2024

Chi-square (χ^2) tests for homogeneity imply that (a) the villages of Salbari 1 GP and Angrabhasa 1 GP and (b) the Salbari 1 GP and Angrabhasa 1 GP were not homogeneous (heterogeneous) in respect of Livelihood Activities of earners with respective P-values 0.015, <0.001 and <0.001.

Earners of Salbari 1 GP are more involved with non-farm activities whereas those of Angrabhasa 1 GP were more involved with farm activities. Reasons behind those is Angrabhasa 1 GP in the Jalpaiguri District is a predominantly rural area characterized by an agrarian economy heavily reliant on the tea industry and agriculture, a diverse population with a significant presence of Scheduled Castes and Tribes, and a moderate literacy rate (based on the perceptions of the researcher through interviews with the respondents during field survey).

Generally, involvement of earners in off-farm activities both in Salbari 1 GP and Angrabhasa 1 GP was not prominent and around 10 percent of livelihood activities were associated with off-farm.

GP and village wise distribution of occupations of earners of the sampled households from the forest fringe areas of Jalpaiguri District has been provided in the following table (Table 2).

Table 2: GP and Village Wise Distribution of Occupations of All Earners of Sampled Households from Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

GP/ Village	Occupations												Total
	Cultivation	Livestock	Wage Labourer	(Shopkeeper)	Migrant	Service	Rickshaw	Garden Labourer	Employee	Processing cum	Others		
Salbari 1 GP													
Purba Duramari 1	15(12.8)		23(19.7)	9(7.7)	19(16.2)	3(2.6)	3(2.6)	4(3.4)	12(10.3)	4(3.4)	25(21.4)	117(100)	
Madhya Salbari	23(24.0)	3(3.1)	19(19.8)	13(13.5)	11(11.5)	3(3.1)	1(1.0)		16(16.7)		7(7.3)	96(100)	
Uttar Salbari	27(34.6)	6(7.7)	3(3.8)	3(3.8)	9(11.5)	1(1.3)	3(3.8)	2(2.6)	9(11.5)	1(1.3)	14(17.9)	78(100)	
Chandhipa	29(32.2)	2(2.2)	4(4.4)	2(2.2)	18(20.0)	2(2.2)	9(10.0)	5(5.6)	7(7.8)		12(13.3)	90(100)	
Salbari	94(24.2)	11(2.8)	49(12.3)	27(6.9)	57(14.5)	9(2.3)	16(4.1)	11(2.8)	44(11.2)	5(1.3)	58(14.7)	381(100)	



1 GP	.7)	(2.9)	.9)	1)	.0)	(2.4)	(4.2)	(2.9)	.5)	)	(15.2)	(100)
Total												
Angrabhasa 1 GP												
Uttar												
Kalaba	5	47(29	17(10	10(6.	24(15	2		10		7	37	159
ri	(3.1)	.6)	.7)	3)	.1)	(1.3)		(6.3)		(4.4)	(23.3)	(100)
Basti												
Khaira	67(38	34(19	5		13		1(0.6	10		9(5.1	35	174
kata	.5)	.5)	(2.9)		(7.5)		)	(5.7)		)	(20.1)	(100)
Hriday	6	46(27	22(13	3(1.8	40(24	3	2	6		8(4.8	31	167
pur	(3.6)	.5)	.2)	)	.0)	(1.8)	(1.2)	(3.6)		)	(18.6)	(100)
Angra												
bhasa	78(15	127(2	44	13	77(46	5	3	26		24	103(2	500
1 GP	.6)	5.4)	(8.8)	(2.6)	.1)	(1.0)	(0.6)	(5.2)		(4.8)	0.6)	(100)
Total												
Overall	172(1	138(1	93(10	40(4.	134(1	14(1.	19	37	44	29	161(1	881
l Total	9.5)	5.7)	.6)	5)	5.2)	6)	(2.2)	(4.2)	(5.0)	(3.3)	8.3)	(100)

Source: Field Survey, 2024

Chi-square (χ^2) tests for homogeneity imply that (a) the villages of Salbari 1 GP and Angrabhasa 1 GP and (b) the GPs Salbasri 1 and Angrabhasa 1 were not homogeneous (heterogeneous) in respect of occupations of earners with P-values <0.001 in all cases. Percentage of earners with occupation 'cultivation' was higher in Salbari 1 GP compared with that in Angrabhasa 1 GP. Percentage of earners with occupation 'migrant' was higher (more than three times) in Angrabhasa 1 GP compared with that in Salbari 1 GP. Percentage of earners with occupation 'livestock' was higher (more than eight times) in Angrabhasa 1 GP compared with that in Salbari 1 GP.

Migrant labourers from Jalpaiguri District basically work in tea gardens and construction, often moving seasonally for better income, with many migrating to southern, northern and western India for domestic work, rag-picking, or construction. Generally, migrant labourers were male family members. The district administration has been working to register those workers for welfare schemes (like Karmasathi) via portals, recognizing their significant contribution, though challenges remain in reaching all unorganized workers, as seen with low e-Shram and other portals registration making it hard to provide social security benefits. The current number of migrant laborers from the Jalpaiguri District is not available,



as comprehensive real-time statistics are difficult to compile. However, data from various reports provides insights into registration numbers, migration patterns, and historical data.

State-level Enrollment: In September 2023, the Jalpaiguri District administration received over 5,500 applications for enrollment in the state government's Karmasathi portal, which aims to create a database of migrant workers.

Seasonal Migration Rate: Based on 2007-08 data from the National Sample Survey Organization (NSSO), Jalpaiguri District had a seasonal migration rate of approximately 1.12 percent of its population.

GP, village and sex wise distributions of (a) number of earners, (b) number of activities of earners, (c) average and standard deviation of yearly income (Rs) per earners and (d) average and standard deviation of yearly income (Rs) per earning sources of the people of forest fringe areas of Jalpaiguri District have been provided in the following table (Table 3).

Table 3: GP, Village and Sex Wise Distributions of (a) No. of Earners, (b) No. of Activities of Earners, (c) Average and SD of Yearly Income (Rs) per Earners and (d) Average and SD of Yearly Income (Rs) per Earning Sources of People of Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

Village	Sex	No. of Earners	No. of Activities of Earners		Average and SD of Yly Income (Rs) per Earner		Average and SD of Yly Income (Rs) per Earning Source	
			1	2	Average	SD	Average	SD
Salbari 1 GP								
Parba Duramari 1	Male	87 (84.5)	73 (83.9)	14 (16.1)	56115	28265	49540	22817
	Female	16 (15.5)	14 (100)		32500	13297	32000	13038
	Person	103 (100)	87 (86.1)	14 (13.9)	52447	27812	46991	22502
Madhya Salbari	Male	71 (78.9)	67 (94.4)	4 (5.6)	55972	23173	52347	19884
	Female	19 (21.1)	17 (89.5)	2 (10.5)	25158	11899	22762	8642



	Person	90 (100)	84 (93.3)	6 (6.7)	49467	24716	45875	21791
Uttar Salbari	Male	50(67.6)	47 (94.0)	3 (6.0)	53120	21182	50113	19979
	Female	24 (32.4)	23 (95.8)	1 (4.2)	49833	31073	47680	31388
	Person	74 (100)	70 (94.6)	4 (5.4)	52054	24653	49333	24040
Chanadhipa	Male	80 (88.9)	80 (100)		53825	16806	54825	15766
	Female	10 (11.1)	10 (100)		36000	20133	36000	20133
	Person	90 (100)	90 (100)		51844	17984	52733	17235
Salbari 1 GP Total	Male	288(80.7)	267 (92.7)	21 (7.3)	54924	22942	51695	19984
	Female	69 (19.3)	66 (95.7)	3 (4.3)	37014	23642	35260	23223
	Person	357 (100)	333 (93.3)	24 (6.7)	51462	24109	48546	21605
Angrabhasa 1 GP								
Uttar Kalabari Basti	Male	82 (60.3)	65 (79.3)	17 (20.7)	71829	34539	58820	28832
	Female	54 (39.7)	48 (88.9)	6 (11.1)	42741	21643	37424	12556
	Person	136 (100)	113 (83.1)	23 (16.9)	60279	33222	50881	26197
Khairakata	Male	90 (63.8)	59 (65.6)	31 (34.4)	76000	25662	57355	16452
	Female	51 (36.2)	49 (96.1)	2 (3.9)	42431	15901	40151	12648
	Person	141 (100)	108 (76.6)	33 (23.4)	63858	27766	52115	17289
Hridaypur	Male	93 (60.4)	84	9 (9.7)	75935	34117	68843	32829

			(90.3)					
	Female	61 (39.6)	57 (93.4)	4 (6.6)	38885	11936	36492	7762
	Person	154 (100)	141 (91.6)	13 (8.4)	61260	32959	56252	30484
Angrabhasa 1 GP Total	Male	265 (61.5)	208 (78.5)	57 (21.5)	74687	31580	61437	26838
	Female	166 (38.5)	154 (92.8)	12 (7.2)	41229	16796	37898	11112
	Person	431 (100)	362 (84.0)	69 (6.0)	61800	31405	53104	25205
Grand Total	Male	553 (70.2)	475 (85.9)	78 (14.1)	64394	29125	56681	24218
	Female	235 (29.8)	220 (93.6)	15 (6.4)	39991	19106	37128	15642
	Person	788 (100)	695 (88.2)	93 (11.8)	57117	28780	51133	23810

Source: Field Survey, 2024

The results of the above table (Table 3) revealed that the percentages of female earners were about 20 and 40 percent respectively in Salbari 1 and Angrabhasa 1 GP. Chi-square (χ^2) tests for homogeneity imply that sex composition of the earners of Salbari 1 was not homogeneous (P-value = 0.004) and Angrabhasa 1 GP is homogeneous.

Earners with second earning sources for males and females were 7.3 and 4.3 percent respectively in Salbari 1 GP, whereas those in Angrabhasa 1 GP are 21.5 and 7.2 respectively.

Regarding the average yearly income (Rs) per earners, ANOVA tests reveal that (a) GP and village wise, there were no significant differences among villages of Salbari 1 GP as well as Angrabhasa 1 GP, (b) GP and sex and village wise, there were no significant differences per male earners of villages of Salbari 1 GP as well as Angrabhasa 1 GP and female earners of Angrabhasa 1 GP; but there were significant differences per female earners of villages of Salbari 1 GP (P-value = 0.004), average yearly incomes (Rs) of female earners of Uttar Salbari village differ significantly from those of female earners of other villages of Salbari 1 GP, (c) GP wise, there were significant differences (P-values < 0.001) and (d) GP

and sex wise, there were significant differences per male earners of Salabari 1 GP (P-value<0.001), but there was no significant differences per female earners of Angrabhasa 1 GP.

Regarding the average yearly income (Rs) per earning sources, ANOVA tests reveal that (a) GP and village wise, there were no significant differences of villages of Salbari 1 GP as well as Angrabhasa 1 GP, (b) GP, sex and village wise, there were no significant differences per male earning sources of villages of Salbari 1 GP and female earning sources of Angrabhasa 1 GP; but there were significant differences (1) among female earners of Salbari 1 GP (P-value = 0.002), average yearly incomes (Rs) per female earning sources of Madhya Salbari and Uttar Salbari villages were least and greatest among the villages of Salbari 1 GP, and (2) average yearly incomes (Rs) per male earning sources of Hridaypur village was greatest, (c) GP wise, there were significant differences (P-values = 0.005) and (d) GP and sex wise, there were significant differences per male earning sources of Salabari 1 GP (P-value<0.001), but there was no significant differences per female earning sources of Angrabhasa 1 GP.

Most prominent livelihood activity is a livelihood activity which provides major share of income to an individual earner or a household.

GP, village and sex wise distributions of (a) number of earners, (b) most prominent livelihood activity of earners and (c) numbers of farm, off-farm and non-farm activities of earners of the people of forest fringe areas of Jalpaiguri District have been provided in the following table (Table 4).

Table 4: GP, Village and Sex Wise Distributions of (a) No. of Earners, (b) Most Prominent Livelihood Activity of Earners and (c) No. of Farm, Off-farm and Non-farm Activities of Earners of People of Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

Village	Sex	No. of Earners	Most Prominent Livelihood Activity			No. of Farm Activity		No. of Off-farm Activity		No. of Non-farm Activity	
			Farm	Off-farm	Non-farm	No	At Least One	No	At Least One	No	At Least One
Salbari 1 GP											
Parba	Male	87(10	22(25	5(		62(71	25(28	80(92	7(8.0	23(26	64(73



Durama ri 1		0)	.3)	5.7)	60(6 9.0)	.3)	.7)	.0)	)	.4)	.6)
	Fem ale	16(10 0)	3(18. 7)	6(37. 5)	7(43. 8)	13(81 .3)	3(18. 7)	11(68 .8)	5(31. 2)	9(56. 3)	7(43. 7)
	Pers on	103(1 00)	25(24 .3)	11(10 .7)	67(65 .0)	75(72 .8)	28(27 .2)	91(88 .3)	12(1 1.7)	32(31 .1)	71(68 .9)
Madhy a Salbari	Male	71(10 0)	26(36 .6)	5(7.0)	40(56 .4)	45(63 .4)	26(36 .6)	66(93 .0)	5(7.0)	29(40 .8)	42(59 .2)
	Fem ale	19(10 0)	5(26. 3)	4(21. 0)	10(52 .7)	13(68 .4)	6(31. 6)	15(78 .9)	4(21. 1)	8(42. 1)	11(57 .9)
	Pers on	90(10 0)	31(34 .4)	9(10. 0)	50(55 .6)	58(64 .4)	32(35 .6)	81(90 .0)	9(10. 0)	37(41 .1)	53(58 .9)
Uttar Salbari	Male	50(10 0)	30(60 .0)	4(8.0)	16(32 .0)	20(40 .0)	30(60 .0)	44(88 .0)	6(12. 0)	34(68 .0)	16(32 .0)
	Fem ale	24(10 0)	8(33. 3)	3(12. 5)	13(54 .2)	16(66 .7)	8(33. 3)	21(87 .5)	3(12. 5)	10(41 .7)	14(58 .3)
	Pers on	74(10 0)	38(51 .4)	7(9.5)	19(25 .7)	36(48 .6)	38(51 .4)	65(87 .8)	9(12. 2)	44(59 .5)	30(40 .5)
Chanad hipa	Male	80(10 0)	32(40 .0)	9(11. 2)	39(48 .8)	48(60 .0)	32(40 .0)	71(88 .8)	9(11. 2)	40(50 .0)	40(50 .0)
	Fem ale	10(10 0)	2(20. 0)	4(40. 0)	4(40. 0)	8(80. 0)	2(20. 0)	6(60. 0)	4(40. 0)	6(60. 0)	4(40. 0)
	Pers on	90(10 0)	34(37 .8)	13(14 .4)	43(47 .8)	56(62 .2)	34(37 .8)	77(85 .6)	13(1 4.4)	46(51 .1)	44(48 .9)
Salbari 1 GP Total	Male	288(1 00)	110(3 8.2)	23(8. 0)	155(5 3.8)	175(6 0.8)	113(3 9.2)	261(9 0.6)	27(9. 4)	126(4 3.8)	162(5 6.2)
	Fem ale	69(10 0)	18(26 .1)	17(24 .6)	34(49 .3)	50(72 .5)	19(27 .5)	53(76 .8)	16(2 3.2)	33(47 .8)	36(52 .2)
	Pers on	357(1 00)	128(3 5.9)	40(11 .2)	189(5 2.9)	225(6 3.0)	132(3 7.0)	314(8 8.0)	43(1 2.0)	159(4 4.5)	198(5 5.5)
Angrabhasa 1 GP											
Uttar Kalabar i Basti	Male	82(10 0)	23(28 .0)	3(3.7)	56(68 .3)	50(61 .0)	32(39 .0)	77(93 .9)	5(6.1)	24(29 .3)	58(70 .7)
	Fem	54(10 0)	38(70 0)	15(27 0)	1(1.8)	14(25 0)	40(74 0)	39(72 0)	15(2 0)	53(98 0)	1(1.9)



	ale	0)	.4)	.8)		.9)	.1)	.2)	7.8)	.1)	
	Pers on	136(1 00)	61(44 .9)	18(13 .2)	57(41 .9)	64(47 .1)	72(52 .9)	116(8 5.3)	20(1 4.7)	77(56 .6)	59(43 .4)
Khairak ata	Male	90(10 0)	70(77 .8)	1(1.1)	19(21 .1)	17(18 .9)	73(81 .1)	89(98 .9)	1(1.1)	71(78 .9)	19(21 .1)
	Fem ale	51(10 0)	36(70 .6)	15(29 .4)		15(29 .4)	36(70 .6)	35(68 .6)	16(3 1.4)	51(10 0)	
	Pers on	141(1 00)	106(7 5.2)	16(11 .3)	19(13 .5)	32(22 .7)	109(7 7.3)	124(8 7.9)	17(1 2.1)	122(8 6.5)	19(13 .5)
Hriday pur	Male	93(10 0)	17(18 .3)	5(5.4)	71(76 .3)	71(76 .3)	22(23 .7)	87(93 .5)	6(6.5)	22(23 .7)	71(76 .3)
	Fem ale	61(10 0)	49(80 .3)	10(16 .4)	2(3.3)	10(16 .4)	51(83 .6)	50(82 .0)	11(1 8.0)	59(96 .7)	2(3.3)
	Pers on	154(1 00)	66(42 .9)	15(9. 7)	73(47 .4)	81(52 .6)	73(47 .4)	137(8 9.0)	17(1 1.0)	81(52 .6)	73(47 .4)
Angrab hasa 1 GP Total	Male	265(1 00)	110(4 1.5)	9(3.4)	146(5 5.1)	138(5 2.1)	127(4 7.9)	253(9 5.5)	12(4. 5)	117(4 4.1)	148(5 5.9)
	Fem ale	166(1 00)	123(7 4.1)	40(24 .1)	3(1.8)	39(23 .5)	127(7 6.5)	124(7 4.7)	42(2 5.3)	163(9 8.2)	3(1.8)
	Pers on	431(1 00)	233(5 4.1)	49(11 .4)	149(3 4.5)	177(4 1.1)	254(5 8.9)	377(8 7.5)	54(1 2.5)	280(6 5.0)	151(3 5.0)
Grand Total	Male	553(1 00)	220(3 9.8)	32(5. 8)	301(5 4.4)	313(5 6.6)	240(4 3.4)	514(9 2.9)	39(7. 1)	243(4 3.9)	310(5 6.1)
	Fem ale	235(1 00)	141(6 0.0)	57(24 .3)	37(15 .7)	89(37 .9)	146(6 2.1)	177(7 5.3)	58(2 4.7)	196(8 3.4)	39(16 .6)
	Pers on	788(1 00)	361(4 5.8)	89(11 .3)	338(4 2.9)	402(5 1.0)	386(4 9.0)	691(8 7.7)	97(1 2.3)	439(5 5.7)	349(4 4.3)

Source: Field Survey, 2024

Most prominent livelihood activates were non-farm activity for both male and female earners of Sabari 1 GP as well as Angrabhasa 1 GP, except the female earners of Angrabhasa 1 GP, in that case, it was farm activity. Highest percentages of earners having at least one activities belonged to non-farm activity for male and female earners of Salbari 1 GP and for male earners of Angrabhasa 1 GP, it was farm activity for female earners of Angrabhasa 1 GP.

Chi-square (χ^2) tests for homogeneity with respect to most prominent livelihood activities imply that the earners male earners were not homogeneous village wise both in Salbari 1 GP (P-value = 0.08) and Angrabhasa 1 GP (P-value < 0.001), but female earners were homogeneous in this respect.

Chi-square (χ^2) tests for homogeneity with respect to highest percentages of earners having at least one activity belonging to farm and non-farm activity for male earners village wise were not homogeneous for both Salbari 1 GP and Angrabhasa 1 GP (P-values < 0.001), it were homogeneous in other cases.

GP, village and sex wise distributions of (a) number of earners, (b) Simpson's livelihood diversification index (SLDI) (number of earners with no diversification, number of earners with 26-50 percent diversification, average and SD of SLDI of earners of the people of forest fringe areas of Jalpaiguri District have been provided in the following table (Table 5).

Table 5: GP, Village and Sex Wise Distributions of (a) Number of Earners, (b) Simpson's Livelihood Diversification Index (SLDI) (No. of Earners with No Diversification, Number of Earners with 26-50 % Diversification, Average and SD of SLDI of Earners of People of Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

Village	Sex	No. of Earners	Simpson’s Livelihood Diversification Index (SLDI)			
			No. of Earners with		Average	SD
			No Diversification	26-50 % Diversification		
Salbari 1 GP						
Parba Duramari 1	Male	87(100)	73 (83.9)	14 (16.1)	7.41	17.10
	Female	16(100)	16 (100)			
	Person	103(100)	89 (86.4)	14 (13.6)	6.26	15.93
Madhya Salbari	Male	71(100)	67 (94.4)	4 (5.6)	2.80	11.54
	Female	19(100)	17 (89.5)	2 (10.5)	4.92	14.75
	Person	90(100)	84 (93.3)	6 (6.7)	3.25	12.23
Uttar Salbari	Male	50(100)	47 (94.0)	3 (6.0)	2.97	11.89
	Female	24(100)	23 (95.8)	1 (4.2)	2.08	10.21
	Person	74(100)	70 (94.6)	4 (5.4)	2.69	11.31
Chanadhipa	Male	80(100)	80 (100)			
	Female	10(100)	10 (100)			



	Person	90(100)	90 (100)			
Salbari 1 GP Total	Male	288(100)	267 (92.7)	21 (7.3)	3.44	12.35
	Female	69(100)	66 (95.7)	3 (4.3)	2.08	9.83
	Person	357(100)	333 (93.3)	24 (6.7)	3.18	11.90
Angrabhasa 1 GP						
Uttar Kalabari Basti	Male	82(100)	64 (78.0)	18 (22.0)	10.10	19.37
	Female	54(100)	49 (90.7)	5 (9.3)	4.27	13.58
	Person	136(100)	113 (83.1)	23 (16.9)	7.78	17.48
Khairakata	Male	90(100)	59 (65.6)	31 (34.4)	16.54	22.94
	Female	51(100)	49 (96.1)	2 (3.9)	1.74	8.74
	Person	141(100)	108 (76.6)	33 (23.4)	11.18	20.32
Hridaypur	Male	93(100)	84 (90.3)	9 (9.7)	4.52	13.92
	Female	61(100)	57 (93.4)	4 (6.6)	3.23	12.29
	Person	154(100)	141 (91.6)	13 (8.4)	4.01	13.28
Angrabhasa 1 GP Total	Male	265(100)	207 (78.1)	58 (21.9)	10.33	19.62
	Female	166(100)	155 (93.4)	11 (6.6)	3.11	11.76
	Person	431(100)	362 (84.0)	69 (16.0)	7.55	17.38
Grand Total	Male	553(100)	474 (85.7)	79 (14.3)	6.74	16.59
	Female	235(100)	221 (94.0)	14 (6.0)	2.81	11.22
	Person	788(100)	695 (88.2)	93 (11.8)	5.57	15.29

Source: Field Survey, 2024

The above-mentioned table (Table 5) indicates that the majority of earners had no diversification. In general, percentages of female earners having no diversion were greater than those of male earners. Student's t tests revealed that averages of livelihood indices of earners differ significantly between (a) GP wise and (b) sex wise (in both cases, P-values < 0.001). There was a positive significant correlation coefficient (0.462 with P-value < 0.001) between livelihood index and yearly income (Rs) from all sources of earners.

GP, village and sex wise average and SD of yearly income (Rs) earned through farm, off-farm and non-farm livelihood activities of earners of the people of forest fringe areas of Jalpaiguri District have been provided in the following table (Table 6).

Table 6: GP, Village and Sex Wise Average and SD of Yly Income (Rs) Earned through Farm, Off-farm and Non-farm Livelihood Activities of Earners of People of Forest Fringe Areas of Jalpaiguri District

Village	Sex	Income (Rs) Earned through Farm Activity		Income (Rs) Earned through Off-farm Activity		Income (Rs) Earned through Non-farm Activity	
		Average	SD	Average	SD	Average	SD
Salbari 1 GP							
Parba Duramari 1	Male	15126	26409	4000	16196	38000	30907
	Female	8750	19279	10500	14742	18500	20701
	Person	14136	25458	5010	16085	34971	30312
Madhya Salbari	Male	17972	25531	5408	20058	32592	32365
	Female	10263	16492	3632	7455	11263	10043
	Person	16344	24035	5033	18117	28089	30346
Uttar Salbari	Male	27440	25657	5520	15373	20160	33014
	Female	15500	21078	8500	27060	27833	36000
	Person	23568	24769	6486	19782	22649	33956
Chanadhipa	Male	23850	29486	4450	14401	26125	29688
	Female	3600	11384	10400	14010	22000	29105
	Person	21600	28737	5111	14404	25667	29490
Salbari 1 GP Total	Male	20389	27231	4736	16570	30271	31819
	Female	10768	18382	7899	18548	20261	26753
	Person	18529	26016	5347	16989	28336	31122
Angrabhasa 1 GP							
Uttar Kalabari Basti	Male	17976	24695	3220	13295	50634	41741
	Female	28074	22473	13111	25243	2222	9910
	Person	21985	24265	7147	19489	31412	40610
Khairakata	Male	60178	35176	533	5060	16267	33956
	Female	32314	24395	10118	16343		
	Person	50099	34346	4000	11534	10383	28187
Hridaypur	Male	11333	22007	3011	11951	61634	45097
	Female	29967	14888	6951	15230	1967	10773
	Person	18714	21488	4571	13438	38000	46104



Angrabhasa 1 GP Total	Male	29977	35371	2234	10684	42823	44900
	Female	30072	20641	9928	19406	1446	8643
	Person	30014	30522	5197	15120	26886	40900
Grand Total	Male	24984	31732	3537	14104	36286	39115
	Female	24404	21822	9332	19141	6970	18287
	Person	24811	29119	5265	15984	27543	36778

Source: Field Survey, 2024

ANOVA tests revealed that (a) there were village wise significant differences of average income from farm activity for male earners both in Salbari 1 GP and Angrabhasa 1 GP (in all cases P-values < 0.001), in this context, there were no significant differences for female workers, (b) there were village wise significant differences of average income from non-farm activity for male earners both in Salbari 1 GP and Angrabhasa 1 GP (in all cases P-values < 0.001), in this context, there were no significant differences for female workers, (c) GP, village wise and sex wise no significant differences of off-farm activity could not be concluded.

Student t tests revealed that (a) there were sex wise significant differences of average income from off-farm as well as non-farm activities (P-values < 0.001), no significant difference could be concluded in case of farm activities and (b) there was GP wise significant difference of average income from farm activity (P-value < 0.001), no significant differences could be concluded in cases of off-farm and non-farm activities.

Analyses of livelihoods at individual and source levels have been done so far. Next, attempts have been made to analyze livelihoods at household levels.

GP and village wise distribution of households of the forest fringe areas of Jalpaiguri District based on level of livelihood diversification (Simpson's livelihood index) has been provided in the following table (Table 7).



Table 7: GP and Village Wise Distribution of Households of Forest Fringe Areas of Jalpaiguri District based on Level of Livelihood Diversification (Simpson's Livelihood Index) (Figures in Brackets indicate %)

Village	Level of Livelihood Diversification of Households				Total
	No Livelihood Diversification	Low Level Livelihood Diversification (Upto 38 Percent)	Medium Level Livelihood Diversification (39 – 63 Percent)	High Level Livelihood Diversification (Above 63 Percent)	
Salbari 1 GP					
Parba Duramari 1	4 (8.0)	2 (4.0)	32 (64.0)	12 (24.0)	50 (100)
Madhya Salbari	9 (18.0)	8 (16.0)	33 (66.0)		50 (100)
Uttar Salbari	26 (52.0)	2 (4.0)	19 (38.0)	3 (6.0)	50 (100)
Chanadhipa	10 (20.0)	5 (10.0)	35 (70.0)		50 (100)
Salbari 1 GP Total	49 (24.5)	17 (8.5)	119 (59.5)	15 (7.5)	200 (100)
Angrabhasa 1 GP					
Uttar Kalabari Basti	7 (10.0)	5 (7.1)	43 (61.4)	15 (21.5)	70 (100)
Khairakata	13 (18.6)		28 (40.0)	29 (41.4)	70 (100)
Hridaypur	12 (17.1)	5 (7.1)	36 (51.5)	17 (24.3)	70 (100)
Angrabhasa 1 GP Total	32 (15.2)	10 (4.8)	107 (51.0)	61 (29.0)	210 (100)
Grand Total	81 (19.8)	27 (6.6)	226 (55.1)	76 (18.5)	410

Source: Field Survey, 2024

52 percent of households of village Uttar Salbari under Salbari 1 GP had no livelihood diversification. About 20 percent of sampled households had no diversification.

Chi-square (χ^2) tests for homogeneity with respect to level of livelihood diversification of households of the forest fringe area of Jalpaiguri District revealed that (a) the villages under Salbari 1 GP as well as Angrabhasa 1 GP and (b) two GPs Salbari 1 GP and Angrabhasa 1 GP are not homogeneous with respective P-values < 0.001 , 0.015 and < 0.001 .

Table 5.5 provided GP, village and sex wise average, median, SD, skewness and kurtosis (excess) of level of livelihood diversification (Simpson's livelihood index) of individual earners of the forest fringe areas of Jalpaiguri District. GP and village wise average, median, SD, skewness and kurtosis (excess) of level of livelihood diversification (Simpson's livelihood index) of households of the forest fringe areas of Jalpaiguri District have been provided in the following table (Table 8).

Table 8: GP and Village Wise Average, Median, SD, Skewness and Kurtosis (Excess) of Level of Livelihood Diversification (Simpson's Livelihood Index) of Households of Forest Fringe Areas of Jalpaiguri District

Village	Simpson's Livelihood Index				
	Average	Median	SD	Skewness	Kurtosis (Excess)
Salbari 1 GP					
Parba Duramari 1	49.43	49.59	19.00	-0.98	2.26
Madhya Salbari	38.16	46.58	19.14	-1.28	0.32
Uttar Salbari	23.73	0.00	25.67	0.25	-1.80
Chanadhipa	36.98	46.88	19.08	-1.40	0.17
Salbari 1 GP Total	37.07	46.88	22.68	-0.70	-0.65
Angrabhasa 1 GP					
Uttar Kalabari Basti	46.12	48.49	17.97	-1.49	2.02
Khairakata	47.72	48.38	25.03	-1.07	-0.15
Hridaypur	44.25	46.88	23.21	-0.88	-0.18
Angrabhasa 1 GP Total	46.03	48.00	22.21	-1.06	0.22
Grand Total	41.66	46.88	22.86	-0.84	-0.33

Source: Field Survey, 2024

ANOVA tests (with Duncan Post-Hoc tests) on Simpson's livelihood indices of sampled households of forest fringe areas of Jalpaiguri District revealed that (a) there were village wise significant differences of averages of Simpson's livelihood indices of households

of Salbari 1 GP (P-value < 0.001) and the average of livelihood index of village Uttar Salbari was significantly lesser than those of villages Chanadhipa and Madhya Salbari which were again significantly lesser than that of village Purba Duramari 1, (b) there were no village wise significant differences of averages of Simpson's livelihood indices of households of Angrabhasa 1 GP and (c) there was GP wise significant differences of averages of Simpson's livelihood indices of households (P-value < 0.001).

GP and village wise probability distributions of Simpson's livelihood indices of sampled households were generally (a) negatively skewed except that of village Uttar Salbari, in that case skewness was positive (0.25) and (b) (i) leptokurtic in cases of villages Purba Duramari 1, Madhya Salbari, Chanadhipa of Salbari 1 GP, Uttar Kalabari Basti of Angrabhasa 1 GP and Angrabhasa 1 GP itself and (ii) platykurtic in cases of village Uttar Salbari of Salbari 1 GP; Salbari 1 GP itself; Khairakata and Hridaypur of Angrabhasa 1 GP; two sampled gram panchayats. In economics, skewness of a distribution measures the asymmetry of data, revealing if extreme values (outliers) are concentrated on the high (positive skew) or low (negative skew) end, impacting measures like income, asset returns, and risk perception, with positive skew (like income) showing most people earn less than the average, while negative skew (like easy test scores) indicates most scores are high, but some low scores pull the mean down. A positive (or negative) value of kurtosis (excess) indicates that the distribution has high (or low) concentration of values near the average.

Table 5.4 provided GP, village and sex wise distributions of most prominent livelihood activity of earners in the forest fringe areas of Jalpaiguri District. GP and village wise distribution of most prominent livelihood activity of households in the forest fringe areas of Jalpaiguri District have been provided in the following table (Table 9).

Table 9: GP and Village Wise Distributions of Most Prominent Livelihood Activity of Households in Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate %)

Village	Most Prominent Livelihood Activity			Total
	Farm	Off-farm	Non-farm	
Salbari 1 GP				
Parba Duramari 1	12 (24.0)	3 (6.0)	35 (70.0)	50 (100)
Madhya Salbari	16 (32.0)	4 (8.0)	30 (60.0)	50 (100)
Uttar Salbari	26 (52.0)	6 (12.0)	18 (36.0)	50 (100)
Chanadhipa	28 (56.0)	3 (6.0)	19 (38.0)	50 (100)

Salbari 1 GP Total	82 (41.0)	16 (8.0)	102 (51.0)	200 (100)
Angrabhasa 1 GP				
Uttar Kalabari Basti	20 (28.6)	7 (10.0)	43 (61.4)	70 (100)
Khairakata	62 (88.6)		8 (11.4)	70 (100)
Hridaypur	9 (12.9)	2 (2.9)	59 (84.2)	70 (100)
Angrabhasa 1 GP Total	91 (43.3)	9 (4.3)	110 (52.4)	210 (100)
Grand Total	173 (42.2)	25 (6.1)	212 (51.7)	410 (100)

Source: Field Survey, 2024

Most prominent livelihood activities were non-farm activity for households of the villages of both Sabari 1 GP and Angrabhasa 1 GP.

Chi-square (χ^2) tests for homogeneity with respect to most prominent livelihood activities imply that the households were not homogeneous village wise both in Salbari 1 GP (in both cases P-values < 0.001), but the sampled GPs were homogeneous in this respect.

Table 5.3 provided GP, village and sex wise average and SD of yearly income per earners and per earning sources. Table 5.6 provided GP, village and sex wise average and SD of yearly income through different livelihood activities (farm, off-farm and non-farm).

GP and village wise average, median, SD, skewness and kurtosis (excess) of household yearly income (Rs) by male and female earners of the forest fringe areas of Jalpaiguri District have been provided in the following table (Table 10).

Table 10: GP and Village Wise Average, Median, SD, Skewness and Kurtosis (Excess) of Household Yly Income (Rs) by Male and Female Earners of Forest Fringe Areas of Jalpaiguri District

Village	Earners	Yearly Income (Rs)				
		Average	Median	SD	Skewness	Kurtosis (Excess)
Salbari 1 GP						
Parba Duramari 1	Male	98120	96000	31853	0.08	0.44
	Female	10400		17998	1.63	1.61
	Family	132280	100000	174705	6.67	46.09
Madhya Salbari	Male	78040	68000	34244	0.53	-0.70
	Female	9560		14289	1.53	2.10
	Family	87600	80000	32529	0.76	0.21
Uttar Salbari	Male	53280	60000	25110	0.10	0.70
	Female	23760		32900	1.62	2.35



	Family	75576	70000	28158	0.54	-0.07
Chanadhipa	Male	86920	96000	28068	-0.43	-0.34
	Female	8080		19403	2.43	4.86
	Family	95000	96000	21753	-0.07	-0.90
Salbari 1 GP Total	Male	79090	72000	34086	0.18	-0.31
	Female	12950		23002	2.29	6.16
	Family	97614	90000	92405	11.75	155.60
Angrabhasa 1 GP						
Uttar	Male	83457	720000	37999	0.94	0.06
Kalabari	Female	33543	36000	26960	0.86	1.13
Basti	Family	117000	104000	49367	1.43	1.66
Khairakata	Male	99143	100000	44134	1.22	1.08
	Female	30914	36000	25716	0.39	-0.37
	Family	130057	114000	54916	0.60	-0.54
Hridaypur	Male	100943	94000	46917	1.13	2.61
	Female	33886	36000	25231	0.25	-0.45
	Family	142543	120000	74361	3.75	20.42
Angrabhasa 1 GP Total	Male	94514	86000	43686	1.14	1.69
	Female	32781	36000	25889	0.51	0.14
	Family	129867	112000	61115	2.75	16.04
Grand Total	Male	86990	76000	40001	0.95	1.81
	Female	23107	20000	26428	1.09	0.97
	Family	114134	100000	79521	9.32	132.17

Source: Field Survey, 2024

ANOVA tests on averages of yearly incomes by male, female earners of family and family as a whole of the sampled households of the forest fringe areas of Jalpaiguri District revealed that there were significant differences of averages (a) among villages of Salbari 1 GP (P-values < 0.001, 0.002 and 0.014 in cases of averages of male, female earners and family respectively) and Angrabhasa 1 GP except those averages by female earners in Angrabhasa 1 GP (P-values 0.033 and 0.046 in cases of averages of male earners and family respectively) and (b) between gram panchayats (P-values < 0.001 in all cases of averages of male, female earners and family). Most of the skewness and kurtosis (excess) relating to yearly incomes of households were positive. There were significant differences of yearly

income earned by male and female earners of sampled households in the forest fringe areas of Jalpaiguri District.

In connection to the above-mentioned table (Table 5.10), GP and village wise average, median, SD, skewness and kurtosis (excess) of percentage of yearly income by female earners out of total yearly income of households having female earners of the forest fringe areas of Jalpaiguri District have been provided in the following table (Table 11).

Table 11: GP and Village Wise Average, Median, SD, Skewness and Kurtosis (Excess) of % of Yly Income by Female Earners out of Total Yly Income of Households Having Female Earners of Forest Fringe Areas of Jalpaiguri District (Figures in Brackets indicate % of No. of Households)

Village	No. of Households having Female Earners	% of Yly Income by Female Earners out of Total Yly Income of Households Having Female Earners						
		Minimum	Maximum	Average	Median	SD	Skewness	Kurtosis (Excess)
Salbari 1 GP								
Purba Duramari 1	15 (30.0)	14.29	50.00	30.61	28.57	12.11	0.45	-0.95
Madhya Salbari	19 (38.0)	14.29	50.00	31.93	29.41	9.86	0.31	-0.57
Uttar Salbari	24 (48.0)	20.00	100.00	53.77	50.00	22.78	0.84	0.30
Chanadhipa	9 (18.0)	25.00	75.00	48.44	54.55	18.65	-0.07	-1.81
Salbari 1 GP Total	67 (35.5)	14.29	100.00	41.68	37.50	19.88	1.19	1.54
Angrabhasa 1 GP								
Uttar Kalabari Basti	53 (75.7)	16.67	70.59	36.44	34.55	12.47	0.75	0.43
Khairkata	48 (68.6)	9.84	50.00	31.59	37.50	9.97	-0.35	-0.89

	)							
Hridaypur	52 (74.3)	11.39	100.00	34.34	35.29	14.6 9	1.74	6.78
Angrabhasa 1 GP Total	153 (72.9)	9.84	100.00	34.21	35.29	12.6 8	1.15	4.26
Grand Total	220 (53.7)	9.84	100.00	36.48	36.00	15.5 6	1.46	3.82

Source: Field Survey, 2024

ANOVA tests with post hoc tests (Duncan) on the data of above stated table (Table 5.11) revealed that (a) the villages of Salbari 1 GP had significant differences of averages (P-value < 0.001), where the villages might be grouped as (Uttar Salbari) greater than (Chanadhipa), again greater than (Madhya Salbari, Purba Duramari 1), (b) there were no significant differences of averages of the villages of Angrabhasa 1 GP and (c) there were significant difference of averages of Salbari 1 GP and Angrabhasa 1 GP (P-value < 0.001). Most of the skewness and kurtosis (excess) relating to percent of households having female earners were positive.

The villages of Angrabhasa 1 GP had around 70 percent of households having female earners. The villages Uttar Salbari of Salbari 1 GP and Hridaypur of Angrabhasa 1 GP had some households having 100 percent female earners. Above 50 percent sampled households of Salbari 1 GP and Angrabhasa 1 GP had female earners. All those findings and the interviews with respondents during survey works indicated that women in Jalpaiguri district's forest fringe areas were highly socio-economically active, primarily in agriculture (tea gardens, farming), Non-Timber Forest Produce (NTFP) collection (mushrooms, red ants), and daily wage labour, significantly contributing to household income, though often facing, extreme poverty, poor health (anemia, TB, diseases), gender discrimination, low wages and exploitation in tea gardens, limited education, prejudice, food insecurity, and challenges like wildlife crop damage and limited opportunities despite government schemes; they were crucial to the economy but experience economic hardship, necessitating initiatives like microcredit, and not empowered.



Table 5.6 provided GP, village and sex wise average and SD of yearly income (Rs) earned through farm, off-farm and non-farm livelihood activities of earners of the people of forest fringe areas of Jalpaiguri District. GP and village wise average and SD of yearly income (Rs) earned through farm, off-farm and non-farm livelihood activities of households of forest fringe areas of Jalpaiguri District have been provided in the following table (Table 12).

Table 12: GP and Village Wise Average and SD of Yly Income (Rs) Earned through Farm, Off-farm and Non-farm Livelihood Activities of Households of Forest Fringe Areas of Jalpaiguri District

Village	Farm Activity			Off-farm Activity			Non-farm Activity		
	Average	% of Family Income	SD	Average	% of Family Income	SD	Average	% of Family Income	SD
Salbari GP 1									
Purba Duramari 1	29120	25.39	34324	10320	8.49	25671	70520	66.32	38597
Madhya Salbari	29420	34.39	31616	6660	9.00	17422	54480	61.01	38914
Uttar Salbari	33920	48.78	27586	9600	10.63	25311	33520	40.19	38306
Chanadhipa	38400	40.07	29890	10160	10.37	19144	46440	49.56	31453
Salbari 1 GP Total	32715	37.16	30952	9185	9.62	22073	51240	54.27	39055
Angrabhasa 1 GP									
Uttar Kalabari Basti	42600	39.05	31649	14229	11.00	27785	83314	68.38	162261
Khairkata	100400	63.30	38043	8571	6.12	16741	21086	10.58	42876
Hridayp	4117	31.03	30559	10229	7.18	20986	79314	58.58	46462



ur	1								
Angrabha sa 1 GP Total	6139 0	51.13	43378	11010	8.10	22326	61238	45.85	104041
Grand Total	4740 2	44.31	40418	10120	8.84	22195	56361	49.96	79363

Source: Field Survey, 2024

ANOVA tests on averages of yearly incomes from non-farm activities revealed that there were significant differences among villages of both salbari 1 GP and Angrabhasa 1 GP. ANOVA tests on averages of yearly incomes from farm activities revealed that there were significant differences among (a) villages of Angrabhasa 1 GP and (b) gram panchayats.

Correlation coefficients of household total income with (a) household livelihood diversification index was 0.304 (P-value < 0.001) and (b) household income from female earners was 0.253 (P-value < 0.001).

GP, village wise distribution of households having migrant labourers in the forest fringe areas of Jalpaiguri District has been provided in the following table (Table 13).

Table 13: GP, Village Wise Distribution of Households having Migrant Labourers in Forest Fringe Areas of Jalpaiguri District

Gram Panchayat	Village	No. of Sampled Households	No. of Migrant Labourers belonged to Sampled Households	Percent of No. of Migrant Labourers per Sampled Households
Salbari 1	Purba Duramari 1	50	19	38.0
	Madhya Salbari	50	11	22.0
	Uttar Salbari	50	9	18.0
	Chanadhipa	50	18	36.0
	GP Total	200	57	28.5
Angrabhasa 1	Uttar Kalabari Basti	70	24	34.3
	Khairkata	70	13	18.6
	Hridaypur	70	40	57.1
	GP Total	210	77	36.7
Grand Total		410	134	32.7

Source: Field Survey, 2024

Percent of number of migrant labourers were maximum in Chanadhipa and Hridaypur villages of Salbari 1 GP and Angrabhasa 1 GP respectively and Angrabhasa 1 GP among two sampled gram panchayats of forest fringe areas of Jalpaiguri District.

GP, village wise minimum, maximum, mean, median, SD, skewness and kurtosis (excess) of yearly income (Rs) earned by migrant labourers per sampled households of Jalpaiguri District have been provided in the following table (Table 14).

Table 14: GP, Village Wise Minimum, Maximum, Mean, Median, SD, Skewness and Kurtosis (Excess) of Yly Income (Rs) earned by Migrant Labourers per Sampled Households of Jalpaiguri District

Village	Yly Income (Rs) earned by Migrant Labourers per Sampled Households						
	Minimum	Maximum	Mean	Median	SD	Skewness	Kurtosis (Kurtosis)
Salbari GP							
Purba Duramari 1	24000	72000	51444	55500	11957	-0.59	0.07
Madhya Salbari	48000	72000	66545	72000	8251	-1.32	0.98
Uttar Salbari	48000	120000	84000	72000	24000	0.48	-0.42
Chanadhipa	48000	120000	67882	60000	20645	1.38	1.75
Salbari 1 GP Total	24000	120000	64872	60000	19843	1.09	1.88
Angrabhasa 1 GP							
Uttar Kalabari Basti	60000	180000	100174	120000	31461	0.61	-0.12
Khairkata	60000	132000	96000	96000	27555	0.00	-2.21
Hridaypur	40000	150000	89700	72000	30499	0.60	-0.97
Angrabhasa 1 GP Total	40000	180000	93920	72000	30329	0.51	-0.78
Grand Total	24000	180000	81631	72000	30000	0.81	-0.09

Source: Field Survey, 2024

ANOVA tests on averages of yearly income (Rs) earned by migrant labourers per sampled households of Jalpaiguri District revealed that there were significant differences (a) among villages of Salbari 1 GP and (b) among gram panchayats (in both cases P-values < 0.001). Most of the skewness relating to averages of yearly income by migrant labourers of households having female earners were positive, but negative in cases of kurtosis (excess).

GP, village wise minimum, maximum, mean, median, SD, skewness and kurtosis (excess) of percents income earned by migrant labourers per sampled households of Jalpaiguri District have been provided in the following table (Table 15).

Table 15: GP, Village Wise Minimum, Maximum, Mean, Median, SD, Skewness and Kurtosis (Excess) of percent of Income earned by Migrant Labourers per Sampled Households of Jalpaiguri District

Village	Percent of Income earned by Migrant Labourers per Sampled Households						
	Minimum	Maximum	Mean	Median	SD	Skewness	Kurtosis (Excess)
Salbari GP							
Purba Duramari 1	3.03	71.43	45.98	50.00	19.56	-0.55	-0.45
Madhya Salbari	38.46	100	63.33	54.55	21.30	0.77	-0.38
Uttar Salbari	66.67	100	85.06	83.33	15.12	-0.11	-2.14
Chanadhipa	44.44	100	68.41	60.00	20.23	0.67	-0.95
Salbari 1 GP Total	3.03	100	62.88	62.50	23.38	0.01	-0.23
Angrabhasa 1 GP							
Uttar Kalabari Basti	42.86	100	68.41	70.59	20.49	0.49	-1.21
Khairkata	29.51	100	48.02	46.51	18.76	2.07	5.62
Hridaypur	30.61	100	65.23	63.96	24.74	0.22	-1.34
Angrabhasa 1 GP Total	29.51	100	63.45	58.14	23.40	0.41	-1.13
Grand Total	3.03	100	63.21	60.61	23.30	0.24	-0.76

Source: Field Survey, 2024

ANOVA tests on averages of percent of income earned by migrant labourers per sampled households of Jalpaiguri District revealed that there were significant differences among villages of Salbari 1 GP as well as Angrabhasa 1 GP (in both cases P-values < 0.001). There were some households in all villages of Salbari 1 GP and Angrabhasa 1 GP having migrant labourers except in the village Purba Duramari 1. Uttar Salbari of Salbari 1 GP had the maximum percent of migrant labourers among all the sampled villages. Most of

the skewness and kurtosis relating to averages of yearly income by migrant labourers of households having female earners were positive, but negative in cases of kurtosis (excess).

Females and migrant earners in Jalpaiguri District's forest fringe areas were vital to the economy, contributing through Non-Timber Forest Products (NTFPs), agriculture, and labour, but face challenges like de-agrarianisation, low wages, and economic distress, necessitating empowerment through schemes like Anandadhara and better employment, as men often migrate for work while women manage households, making their financial independence crucial for broader development.

A factor analysis (FA) of the livelihood push and pull factors for people in the forest fringe areas of the Jalpaiguri District may reveal a transition from traditional forest dependence and agriculture towards more diversified, non-farm activities, often driven by economic hardship and the search for better opportunities.

Push factors (factors forcing people to leave traditional livelihoods) may be (a) unsustainable agriculture, (b) declining agricultural income, (c) limited customary rights & forest access, (d) human-wildlife conflict, (e) poverty and lack of local job opportunities and (f) land issues etc.

Pull factors (factors attracting people to new or alternative livelihoods) may be (a) non-farm employment opportunities, (b) proximity to urban areas, (c) better wages and income improvement, (d) Availability of Education and Information, (e) government initiatives and eco-tourism and (f) livestock rearing etc.

Primary data have been collected from the 410 sampled households of the forest fringe areas of Jalpaiguri District using Likert scale coding (very unlikely- 1, somewhat unlikely – 2, neither likely nor unlikely – 3, somewhat likely – 4 and very likely -5) on the following push and pull factors. Factor analysis coupled with reliability analysis had been employed separately on push and pull factors. The results of factor and reliability analyses of the factors associated with the livelihood push factors have been presented in the following table (Table 16).

Table 16: Factor and Reliability Analyses of Factors associated with Livelihood Push Factors

Factor (Component) No.	Name of Factor (Component)	Variable (Push Factor)	Factor Loading	Communality (h^2)	Eigen Value (% of Variance Explained)	Reliability (Cronbach's α)
1	Economic	Lack of jobs	0.895	1.089	9.891 (39.56)	0.812 (Good)
		Low wages	0.889	0.905		
		Low farm income	0.884	1.025		
		Poverty	0.879	0.801		
		Indebtedness	0.875	1.045		
		Poor financial conditions	0.829	0.864		
		Lack of credit access	0.807	0.747		
		Non availability of forest resources	0.799	0.748		
		Limited access of non-forest resources	0.791	0.689		
		Sinking of livelihood opportunities in forest fringe areas	0.790	0.689		
2	Social & Human Capital	Lack of access to quality education/healthcare	0.812	1.001	7.478 (29.91)	0.903 (Excellent)
		Social discrimination	0.805	0.852		
		Family conflict	0.798	0.802		
		Lack of personal development opportunities	0.784	0.758		
		Young Age	0.773	0.748		
		Potential of experiences	0.769	0.758		
		Large household size	0.761	0.811		
3	Environmental &	Adverse agro climatic conditions	0.796	0.978	5.259 (21.04)	0.867 (Good)



	Physical	Natural disasters (floods, droughts)	0.787	0.911		
		Land degradation/scarcity	0.780	0.847		
		Depletion of natural resources	0.777	0.805		
		Erratic rainfall	0.771	0.799		
		Poor infrastructure	0.764	0.785		
		Political and other disturbances	0.759	0.708		
		Hazards due to animals attacks causing damages of crops, livestock, properties, even people	0.752	0.99		
% of Total Variance explained by Factor Analysis			90.51			
KMO Measure of Sampling Adequacy			0.892 (Meritorious)			
Bartley's Test of Sphericity Approx. χ^2 :			371.89	df:	300	P-value:
0.003						

Source: Field Survey, 2024

Factor analysis on abovementioned 25 livelihood push factors (variables) constructed three factors (components): economic, social & human capital and environmental & physical with percentages of total variance explained 39.56, 29.91 and 21.04 respectively (% of Total Variance explained by Factor Analysis: 90.51).

The results of factor and reliability analyses of the factors associated with the livelihood pull factors have been presented in the following table (Table 17).

**Table 17: Factor and Reliability Analyses of Factors associated with Livelihood Pull Factors**

Factor (Component) No.	Name of Factor (Component)	Variable (Pull Factor)	Factor Loading	Communal ity (h^2)	Eigen Value (% of Variance Explained)	Reliability (Cronbach's α)
1	Economic	Better employment opportunities	0.889	1.104	6.409 (40.06)	0.911 (Excellent)
		Higher income/wages	0.884	1.005		
		Job security	0.799	0.921		
		Opportunities to save	0.798	0.900		
		Better standard of living	0.789	0.754		
		Potential for higher farm activities	0.766	0.756		
		Earn-burn markets	0.761	0.777		
		Better infrastructure	0.759	0.699		
2	Social & Human Capital	Access to better education/health care	0.805	0.745	4.952 (30.95)	0.876 (Good)
		Personal development	0.745	0.601		
		Presence of friends/relatives (social networks)	0.721	0.701		
		Improve living	0.704	0.688		



		conditions				
3	Environmental & Physical	Favorable environment/climate	0.725	0.832	3.432 (21.45)	0.804 (Good)
		Access to more fertile land	0.723	0.542		
		Better infrastructure (roads, electricity, water supply)	0.701	0.512		
		Availability of natural resources	0.699	0.501		
% of Total Variance explained by Factor Analysis			92.46			
KMO Measure of Sampling Adequacy			0.884 (Meritorious)			
Bartley's Test of Sphericity Approx. χ^2 :			155.67	df:	120	P-value:
0.016						

Source: Field Survey, 2024

Factor analysis on abovementioned 16 livelihood pull factors (variables) constructed three factors (components): economic, social & human capital and environmental & physical with percentages of total variance explained 40.06, 30.95 and 21.45 respectively (% of Total Variance explained by Factor Analysis: 92.46).

5.0 CONCLUSIONS

Empirical study on livelihood diversification of the people of forest fringe areas of Jalpaiguri District has been performed through data from the sample households. Main results of the study were that there were gram panchayats, villages and sex wise significant differences of livelihood indicators: percentages of earners and shares of earnings belonging to female and migrant labourers. There were some households solely financed by female earners or migrant labourers. Most prominent livelihood activity was non-farm.

Factor analyses coupled with reliability analyses of 25 push and 16 pull livelihood

factors have been constructed.

For the forest fringe areas of Jalpaiguri District, policy should focus on empowering people particularly females and migrant labourers through skill development in eco-tourism, NTFP processing, and small-scale farming (mushroom, poultry, livestock rearing etc) with access to credit and market linkage etc.

Improving the livelihoods of people in forest fringe areas, often tribal or marginalized communities, requires a diversified strategy that transitions them from subsistence-based, forest dependency to sustainable, income-generating activities. This approach focuses on strengthening farm, off-farm, and non-farm sectors, often supported by government initiatives like the National Rural Livelihoods Mission and Joint Forest Management etc.

Self-Help Groups and micro-financing act a transformative role in forest fringe areas by converting traditional, often unsustainable, subsistence activities into organized, income-generating ventures. By facilitating access to formal financial services (loans, savings, insurance), these initiatives empower marginalized, predominantly female, rural residents to transition from dependency on local moneylenders to economic self-sustainability.

The Indian government has several schemes aimed at livelihood diversification for communities in forest fringe areas, with a primary focus on tribal populations who share a symbiotic relationship with forests key schemes include the Pradhan Mantri Van Dhan Yojana and the National Mission for a Green India etc.

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