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Rural Livelihood Pattern in West Tripura District, India

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Abstract

Rural livelihoods are currently undergone tremendous changes like from traditional farming to toward instant income sources but still research studies shows that 58–65% of India's rural population relies on farming as their major source of income. Tripura is second populated state in North East Region of India. West Tripura district is major hub of all economic diversity of Tripura state because of the highest rate of urbanization, highest population density, and higher presence of agrarian society. Over the decades socio-economic structure and rural livelihood have changed due to the changing weather pattern, land use changes and economic pressure on agrarians in the district. Therefore, researchers have selected this piece of work to assess the rural livelihood scenario based on crop concentration of rice, block wise factors, crop diversity, agricultural efficiency. Further with application of statistical techniques like Pearson's correlation matrix for crop production, per capita agricultural land holdings, rice crop concentration, agricultural diversity and efficiency and livelihood factors (such as per capita income, house hold crop production, total house hold food and essential purchase, per capita food purchase).

Key words: Livelihood, Rural, West Tripura.

Introduction:

Tripura is one of the smallest states in North East Region in India where the land use change scenario is very prominent. Especially in West Tripura which is the most developed district in Tripura (Chakma et al., 2023). So, a major shift in land use patterns has been observed in the last few decades. A huge amount of migrated population from the neighbouring country, faster urbanization process and plantation activities has transformed the land of the study area (Das et al., 2024). Thus, the potential agricultural land of West Tripura has gradually been converted into settlement and plantations (Panja et al., 2023). The transformation can be observed in the agricultural sector also as the demand for food in the study area has changed the cropping pattern of the district. The farmers of West Tripura are more relying on crop diversification as the potential agricultural land is decreasing (Panja and Krishnaiah, 2023). Farmers are more reliant on cash cropping for instant cash. The proportionate area for main staple crops is gradually decreasing. The agricultural reports show that during the last decades Aman, Boro (local names of rice) and Jhum paddy plantation area faces negative growth whereas the other alternative crops like Rabi pulses, Rabi oilseed, Wheat and Kharif pulses area increases. This scenario replicates the growth of alternative crops rather than the main staple crops in the study area. It means the potential agricultural land of the district is gradually decreasing and farmers are searching for alternative crops to mitigate the economic insecurity problems. The study tried to address the block wise distribution of Agricultural activity in correlation with economic indicator of rural livelihood. These are including the per-capita monthly income, agricultural land holding area, food purchasing cost and crop production. The selected indicators are correlated with block wise total population, agricultural efficiency, crop diversity, rice crop concentration (Chouchane et al., 2020; Yamane, 2006).

Study area:

West Tripura district was initiated in 1st September 1970, later it was demarcated on 21st January 2012. It is the most prosperous district in Tripura, as the capital city of Agartala is located. Physiographically, the district has a valley-ridge topography (Figure 1). Baramura hill range stretches from north to south in the eastern part of the district, so the slope of the study area is decreasing towards the west. Originating from Baramura Hill, the numerous rivers flooded the district during rainy times. The small rivers form a dendritic drainage pattern in the study area. Most floodplains are situated in the western part and are primarily used for cultivation and settlement. The district falls under the geological formations of Bokabil, Dupitila, Present Day Deposits, and Tipam Sandstone (Debbarma et al., 2025). The geological formation has determined the soil characteristics of the district. Thus, many populations are settled in the district, where the population density is 930 people per square kilometre.

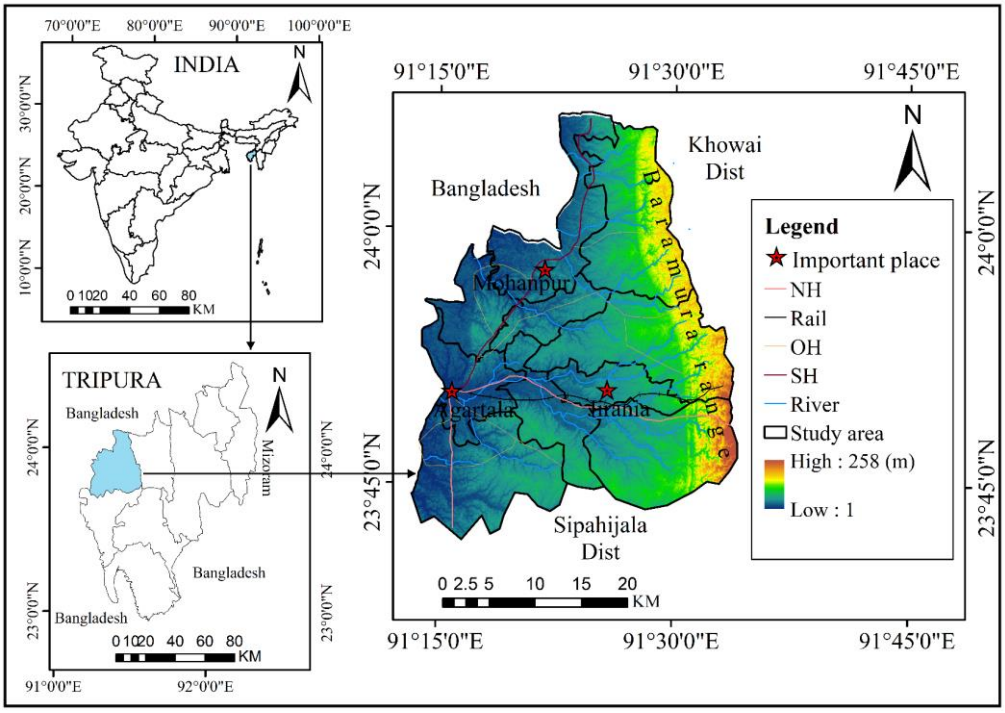


Figure 1: Location map of West Tripura District

Data:

The agricultural data sets such as block wise cultivatable land was collected from Agricultural Department, Government of Tripura. The population data has been collected for years 2021-2022 from Block Development Offices of West Tripura. Interviewers based primary field survey was conducted to aggregate the food purchasing power, land holding and ground troughing of secondary data analysis.

Methodology:

Primary field survey was conducted to gather essential information about pre-capita monthly income, agricultural land holding area, food purchasing cost, crop production has been collected using a standardized questionnaire. The sample size selection has been made according to Cochran's (1975) formula of 95% confidence levels and 5% margin of error (Onyeka et al., 2015). The sample size is 384 out of 1,35,519 households supplied by each Block Development Office of West Tripura for 2021-22. The study follows random sampling method and the number of households has been selected based on village-wise percentages in secondary data and the physical settings of the blocks (plain, lunga (low lands), and tilla (high lands)).

Crop concentration is a relative distribution or concentration of a specific crop of has been calculated through Location Quotient, which is expressed as

LQ= {(X*i* / ∑X*i*) / (N*i*/ ∑N*i*)} Where**, LQ**=Location Quotient of ***i*** *;* **X*i*=** Count of subset items at place ***i*** **;**
Ni*=** Count of items at place ***i

Crop diversity measures the different types of crops in agricultural land. The Simpson's method of diversity has been adopted (Adjimoti et al., 2018). to compute the crop diversity for the year 2018-20 crop data.

D = 1- ∑ (ni * (ni-1)) / (N * (N-1)) where, ni= Proportionate area of the 'i'th crop in the gross cropped area;
N= Gross cropped area in the community.

Agricultural efficiency has been calculated by following Bhatia's method (1967). The formula for agricultural efficiency is

E*i*= ∑Iij * Cij / ∑Cij

I*ij*= (Yij / Y*i*) *X 100* where, **Ei** = agricultural efficiency; **Iij** = Ratio between the yield of any crop **(yij)** of the individual area **'i'** under the total area and the average yield rate (yi) of the entire area

'y' of any crop multiplied by 100; Cij is Area in % for the individual crop in individual area unit

Analysis of block-wise cropping pattern in West Tripura district (2018-20)

The analysis of block-wise cropping pattern to collected cropping data for the three years from 2018 to 2020 and estimate an average of three years cropping pattern for nine blocks in west Tripura district, India. The nine blocks are Lefunga, Hazamara, Old Agartala, Dukli, Mohanpur, Bamutia, Jirania, Belbari, and Mandwi. The highest paddy field (Aman) is situated in Jirania, Bamutia and Dukli block. Whereas the maximum jhum practiced in Mandwi followed by Belbari and Hazamara. The blocks which are not only capable to support the rice productions their dominancy of Rabi crops are introduced such as in Lefunga, Mohanpur, and Mandwi. The blocks which are less capable to homogeneous cultivation due to exiting terrain condition and lack of irritability, they found for triple cropped agricultural practices (such as in Mandwi, Hazamara, Lefunga blocks). Three main crops have been cultivated in the West Tripura district where rice is the main staple crop cultivated in Kharif and Rabi season. The Aman paddy is cultivated in 48.06% area whereas the Boro paddy is cultivated in 25.66% area. The third important crop Kharif-maize is cultivated in 6.10% area. The other important crops cultivated in the district are Kharif-pulses (4.51%), Rabi-pulses (4.24%), Rabi-oilseed (3.26%), Aush (2.91%) and Jhum (1.52%) (Table 4.2). Jhum has been practiced in the hilly area of the district (Table 1).

Table 1: Block-wise cropping (%) in West Tripura district (2018-20)

Block		Lefunga	Hezamara	Old Agartala	Dukli	Mohanpur	Bamutia	Jirania	Belbari	Mandwi	West Tripura
Crops (%)	Aush	2.45	3.68	0.91	0.34	4.78	4.74	0.7	0.67	1.33	2.19
	Aman	29.82	47	48.93	52.27	47.93	55.36	56.69	47.01	34.09	48.06
	Jhum	0.17	2.11	0.26	0.1	0.25	0	0.44	2.79	7.3	1.52
	Boro	17.71	12.82	32.58	36.66	24.12	24.39	29.41	26.59	19.25	25.66
	Maize (K)	14.21	13.66	3.67	1.44	3.43	1.8	2.94	8.45	12.77	6.1
	Pulses (K)	9.06	7.98	3.26	2.73	3.36	1.87	2.74	6.21	7.57	4.51
	Oil seed(K)	4.61	3.95	2.88	1.62	2.59	2.03	1.49	3.42	4.5	2.8
	Jute	0.11	0.07	0.3	0.08	0.12	0.1	0.2	0.29	0.13	0.14
	Mesta	0.23	0	0.18	0.08	0.1	0.08	0.08	0.12	0.11	0.09
	Cotton	0.23	0.09	0.22	0	0.1	0	0.12	0	0.08	0.08
	Sugarcane	0.23	0.12	0.18	0.38	0.12	0.2	0.08	0.21	0.22	0.2
	Wheat	0.17	0.02	0.03	0.03	0.28	0	0.02	0.04	0.11	0.07
	Maize (R)	1.28	0.54	1.36	0.71	0.78	0.6	0.88	0.84	2.66	1.04
	Pulses (R)	7.42	3.9	3.94	2.68	5.62	4.03	2.84	2.33	7.13	4.24
	Oilseed (R)	12.22	4	1.21	0.81	6.34	4.74	1.31	0.97	2.68	3.26

Source: Cropping area collected from Agricultural Department of Tripura, later calculated cropping pattern.

Spatial analysis of rice crop concentration (2018-20)

The relative distribution or concentration of rice crops has been calculated through Location Quotient. The Location Quotient for the main staple crop is rice crop concentration is calculated in the West Tripura district. The result shows that Jirania (1.12), Bamutia (1.09), and Old Agartala (1.06) blocks have a high concentration of rice crop cultivation. A moderate concentration of rice is found in Belbari (1.00), Mohanpur (0.99), and Dukli (0.93) blocks followed by a low concentration of rice in Hezamara (0.84), Mandwi (0.80) and Lefunga (0.64). The concentration of rice crops is high in the plain and floodplain areas but low in uplands and hilly areas. Most of the areas of Hezamara and Mandwi blocks are under hilly terrain, so rice crop concentration is low, but Jirania, Old Agartala, Bamutia blocks area is under floodplain and plain land, which is suitable for cultivation, so the crop concentration is high in those areas. As the main staple crop production is insufficient for some blocks, farmers accept crop diversification in the agricultural field for sustenance. It represents that Jirania, Old Agartala, Bamutia have self-sufficiency in crop production (Figure 2a).

Spatial analysis of agricultural efficiency (2018-20)

Agricultural efficiency has been calculated by following Bhatia's method (1967) for the year 2018-20. The low agricultural efficiency is found in the Hezamara (89.13) Belbari (89.62) and Mandwi blocks (93.61), moderate agricultural efficiency was observed in Dukli (97.90), Mohanpur (105.23), Lefunga (103.59), and Jirania blocks (102), whereas high agricultural efficiency has found in Bamutia (113.61) and Old Agartala blocks (111.01) (figure 4). The Old Agartala, and Bamutia blocks have high agricultural efficiency but the crop diversity is low which indicates that the agriculture of these two blocks largely Crop Yield Growth (%)

Crops 73 depends on monsoon. In high moderate agricultural efficiency was found in Mohanpur block. However, the block possesses moderate agricultural diversity, which reveals that the block has a higher percentage of net irrigated area among the total net shown area. Mandwi, Hezamara, and Belbari have low agricultural efficiency but the blocks have moderate to high crop diversity. It reveals that other factors like soil fertility, water availability, terrain characteristics, and management in the agricultural sector need to be developed for better agricultural production in those blocks (Figure 2b).

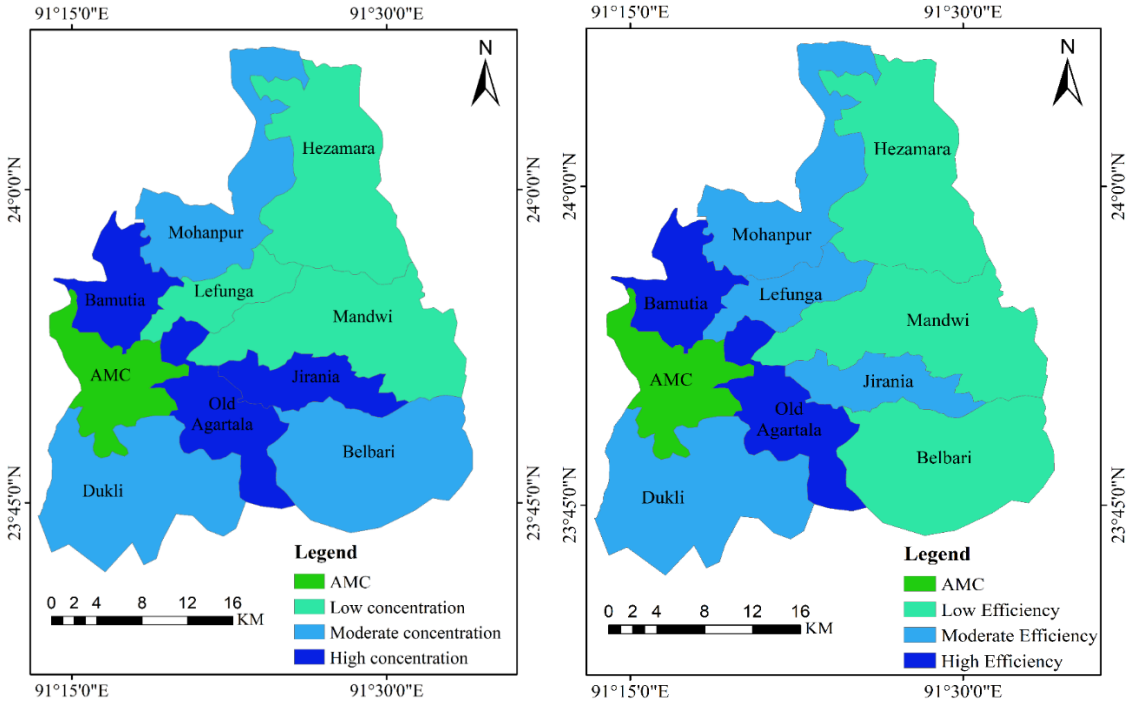


Figure 2: Block wise Rice Crop Concentration and Agricultural efficiency of West Tripura district (2018-20)

Block wise distribution of socio-economic condition in west Tripura district

Block wise maximum population are settled into Dukli, followed by Mohanpur, Bamutia, and blocks with lowest population are Lefunga and Belbari. The field survey reveals that the Bamutia and Jirania have maximum per-capita agricultural land where as the low land holding are observed in Belbari and Hazamara block. The primary survey shows that the Hezamara block has an average agricultural land of 0.82 hectares per agrarian family, and the average production of main staple crops is 1244.44kg. Whereas the high per capita land holding blocks such as Jirania, Bamutia, Old Agartala ranked top in terms of total and per capita crop (mainly stapple crop) production. The livelihood scenario has been reflecting by computed total per capita spendings to collect / purchase the food products. It is assumed the high monthly income and monthly ability to spending money for food indicates higher livelihood standard and vice versa. In this study shows higher average monthly family income blocks are Old Agartala, followed by Jirania, Lefunga, Bamutia, Dukli, Belbari, Mohanpur, Hazamara, Mandwi. These high income villages and situated in the periphery of Agartala state capital and facilitated by plainlands and have option for non-primary sectors of employments. Whereas the people of Mandwi, Belbari, Hazamara are low-income blocks struggle to earns and spend money for buying foods and essential commodity for their survivals. In terms of per capita for food spending are highest in Old Agartala and Jirania blocks (table 2).

Table 2: Block wise distribution of socio-economic conditions in west Tripura district

Name of the Block	Lefunga	Hazamara	Old Agartala	Dukli	Mohanpur	Bamutia	Jirania	Belbari	Mandwi
Population	5000	12037	15652	28678	18867	18279	15108	7819	14079
Agricultural land (Hectare)	0.84	0.82	0.91	0.88	0.89	1.14	1.05	0.81	0.9
Crop production (kg)	2340.2	1244.4	3557.8	2738.2	2779.7	3780.4	3884.3	2151.8	1224.4
Per capita crop production (kg)	461.50	309.12	941.62	667.91	654.66	1020.36	1063.5	438.19	266.85
Agricultural diversity	2.14	1.5	2.54	2.45	2.26	2.52	2.61	2.28	1.95
Monthly income (Rs.)	9500	7617.6	10022	8530.8	8185.2	9264.15	9500	8200	7275

Total food purchase (Rs./month)	3239.1	2446.1	3896.1	3336.	3146.8	3442.7	3721.3	2567.6	2171.1
Per-capita food purchase (Rs./month)	648.5	609.5	996.36	897.74	732.37	878.32	981.57	553.15	522.77
Rice crop concentration	0.64	0.84	1.06	0.93	0.99	1.09	1.12	1	0.8
Agricultural efficiency	103.10	89.13	111.1	97.9	105.2	113.6	102	89.62	93.61

Discussion

West Tripura district tried to depict the situation of rural livelihoods in-terms of agrarian dominancy and livelihood status. It denotes the inter-relationship between the agricultural diversity and economic indicators in rural population among the blocks (Jeeva, 2006). From the overall discussion, it has been found that agricultural activity is much developed in Old Agartala, Jirania, Bamutia, and Mohanpur blocks, moderately developed in Dukli, Lefunga, and Belbari whereas less agricultural development is found in Mandwi and Hezamara. The primary survey reveals that most of the household in the Lefunga, Mandwi, Hazamara blocks has compromised with food quantity and the average essential spending for the households. Which indicates moderate to low economic and livelihood conditions in these blocks. On the other hand, Old Agartala, Jirania, Bamutia blocks having the higher arable land, produce maximum number of crops, which help to generate higher income and support the moderate to high rural livelihood standards (Orsango et al., 2023). Whereas the blocks are found moderate livelihood in Dukli, Mohanpur, Belbari. These areas are characterized by an average of two crops cultivation system in the agricultural field. The main staple crop of these blocks is rice, cultivated in the rainy season. Still, where water is available, rabi crops (Paddy, Maize, Pulses, Vegetables) are cultivated in winter season. The cropping intensity is high in plain land but less in tilla. The interaction between economic and livelihood variables show that the agriculturally developed blocks are more food secure than the agriculturally less developed blocks. Jirania, Old Agartala, and Bamutia blocks are in relatively better condition in food security than the Mandwi and Hezamara blocks.

Correlation between crops and food consumption in West Tripura district

The regression analysis shows a significant association between the variables of agricultural activity (such as the crop production, per capita agricultural land holdings, rice crop concentration, agricultural diversity and efficiency) and livelihood factors (such as per capita income, house hold crop production, total house hold food and essential purchase, per capita food purchase). Pearson's correlation reveals a strong correlation between crop production and per capita production (0.79), income (0.44), and agricultural diversity (0.59) and efficiency (0.67) and food purchase (0.61). family wise and individual spending foe essential commodity are high positively associate with Income (0.92), crop production (0.90) agricultural diversity (0.80) and agricultural efficiency (0.81). On the other hand, only population and per-capita income are negatively correlated. The concertation of rice crop is moderate to low correlation with income and food purchase capacity. Whereas the vice versa corelation were exist with crop diversity in West Tripura district (Table 3).

Table 3: Correlation matrix among the determinant factors of rural livelihood in west Tripura

	population	Agricultural land (Hectare)	Crop production (kg)	Per capita crop production (kg)	Agricultural diversity	Monthly income (Rs.)	Total food purchase (Rs./month)	Per-capita food purchase (Rs./month)	Rice crop concentration	Agricultural efficiency
population	1.00	0.33	0.33	0.39	0.38	-0.03	0.32	0.56	0.43	0.26
Agricultural land (Hectare)	0.33	1.00	0.73	0.79	0.59	0.44	0.52	0.61	0.61	0.67
Crop production (kg)	0.33	0.73	1.00	0.98	0.90	0.84	0.93	0.89	0.73	0.81
Per capita crop production (kg)	0.39	0.79	0.98	1.00	0.84	0.78	0.90	0.92	0.78	0.79
Agricultural diversity	0.38	0.59	0.90	0.84	1.00	0.72	0.80	0.76	0.76	0.67
Monthly income (Rs.)	-0.03	0.44	0.84	0.78	0.72	1.00	0.92	0.76	0.34	0.76
Total food purchase (Rs./month)	0.32	0.52	0.89	0.90	0.80	0.92	1.00	0.93	0.52	0.81
Per-capita food purchase (Rs./month)	0.56	0.61	0.89	0.92	0.76	0.76	0.93	1.00	0.66	0.71
Rice crop concentration	0.43	0.61	0.73	0.78	0.66	0.34	0.52	0.66	1.00	0.40
Agricultural efficiency	0.26	0.67	0.81	0.79	0.67	0.76	0.81	0.71	0.40	1.00

Conclusion

A changing cropping pattern has been observed in the west Tripura district during the last decades. Crop diversification is gradually increasing in the agricultural field. The growth rate for main staple crops became low. On the other hand, the growth rate for Rabi-oilseed, Kharif-oilseed, Rabi-pulses and Kharif-pulses recorded highest. These are indicating diversification of crops and emergence of alternative and cash crop (such as maize, pulses, oilseed and rabi crops and vegetable) are outperformed for the development of rural livelihood in the district. A new crops like Rabi-maize were introduced in the agricultural field after 2010. Crop diversification is the outcome of land modification. Therefore, in West Tripura district, Mandwi, Hezamara, and Lefunga blocks practiced high crop diversification as the production of main staple crops is relatively lesser than the other block. The scarcity of potential agricultural land for cultivation is another reason for crop diversification. In the last two decades, the land of the district has been drastically modified by urbanization, developmental activities, and plantation, which has an impact on the cropping pattern of the district. In few hill areas, under jhum cultivation practicing paddy cultivation, and in the plain land area are replaced by plantation activities, especially for rubber. As a result, crop diversification in the agricultural field will help to maintain food balance and sustainably support to the rural livelihood in the district.

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