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A STUDY ON THE LIVELIHOOD ASSETS AND INCOME OF THE PLANTATION-BASED REHABILITATED JHUMIAS OF TRIPURA

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Abstract

The indigenous tribes of Tripura predominantly practised shifting cultivation. However, efforts at weaning them away have been done through several developmental interventions including plantation-based rehabilitation models. The present paper attempts to examine the status of income and livelihood capital endowments among four different types (rubber, tea, horticulture & multi-croppers) of plantation-based rehabilitated beneficiaries. Using primary survey data from five districts of Tripura, it is seen that multi-croppers and rubber farmers are better placed in terms of income accruals. However, horticulturists are better endowed than rubber growers in terms of livelihood assets. The tea-based rehabilitated beneficiaries are at the bottom in terms of both income as well as livelihood assets.
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Keywords: Tribes, State Role, & Livelihood Approach.

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Introduction

The indigenous tribes of Tripura had been practising shifting cultivation (called jhum in local parlance) as the primary source of livelihood from time immemorial. The system yielded sufficient food to feed these Jhumia families when the land was fertile and its availability was not an issue (Ganguly, 1969). The minimum cost of production (Bhowmik, 2013), along with the inherent self-sufficiency (Dasgupta, 1986) of the subsistence jhum economy faced a dilemma due to the increased demand for land and subsequent decline in the jhum cycle from 27-30 years to 2-3 years. The resulting low yields and low income (Kuki, Chouhan & Bhowmik, 2018) coupled with reduced jhum production often forced the Jhumias to transfer their belongings to the moneylenders and meet the basic requirements (Dasgupta, 1991). Therefore, efforts to wean them away from the traditional jhum practice towards alternatives were on.

It may be remembered here that rehabilitation of tribal shifting cultivators has been a prominent objective of the State government since the 1950s for attaining both economic as well as environmental goals since jhuming was often viewed as harmful to ecology and environment. Efforts to improve the socio-economic condition of the jhumias have been taken up through the numerous government schemes relating to agriculture, forestry and other primary sector activities (Kuki, 2017). Schemes relating to plantations of rubber, tea and horticultural crops in the State, prominently after the 1990s, indicated cultivation of cash crops in the hilly slope as a profitable alternative. It may be noted here that, the adoption of resettlement programmes by the beneficiaries was often a challenge owing to the unfamiliarity of the crops and their associated maintenance (Choudhury, 2012). The jhumia rehabilitation projects in the northeast region often fizzled in materialising its objective of scaling up cash crop farming due to the failure of the promotional agencies in devising a friendly institutional atmosphere (Viswanathan & Shivakoti, 2006). The experience in Tripura indicates a strong institutional mechanism being the backbone of the successful projects, yet one cannot deny the fact that the promotion of a sustainable livelihood ecosystem advocates dynamism and diversification of farming (Bhowmik & Viswanathan, 2021). Livelihood diversification is the process by which households combine diverse portfolios of activities and assets to improve their welfare and rural tribal households of Tripura do adopt livelihood diversification as a strategy.

Against this backdrop, the current study stems to examine the basic socio-economic life and livelihood of the beneficiaries of the plantation-based rehabilitation programmes in Tripura.

The specific objectives of the study are to:

- Examine the status of income of the different types of plantation beneficiaries
- Examine the livelihood assets of the different types of plantation beneficiaries

Review of Literature

Rubber was introduced in Tripura by the Department of Forest in 1963 as part of the afforestation programme. The encouraging results opened up a new frontier of economic development with the State government establishing the Tripura Forest Development and Plantation Corporation (TFDPC) in 1976 and the Tripura Rehabilitation and Plantation Corporation (TRPC) in 1983; the latter had a unique mandate for resettlement of landless jhumia tribals through natural rubber plantations. The rapid growth of rubber cultivation in Tripura was accentuated by introducing the 'Block Plantation Scheme' in 1996-97, targeting an area of 1500 hectares and 1200 beneficiary households with support from the World Bank (Paribalan, 2006). The rubber-based rehabilitation projects across the State were possible mainly because of the mandate of the nodal agency for the crop - Rubber Board - to adopt an expansionist policy under its Accelerated Rubber Development Scheme for the North East in the 1980s. The Cash Subsidy-based programme helped the fiscally

starved State to pursue development objectives without the resource constraint hurdle. Further, the sincere and well-orchestrated efforts of the various implementing agencies have resulted in a significant outcome of the socio-economic parameters of the targeted tribal beneficiaries (Dey, 2009). The emergence of Tripura as the second rubber hub in India is an outcome of the coordinated efforts of the State government, the Rubber Board and other line agencies. Natural rubber plantation has altered the socio-economic profile of growers in a big way. The sector has stakeholders from all spheres of society (Bhowmik & Viswanathan, 2021) and has been quite successful to wean away the landless shifting cultivators from jhuming to a permanent and settled mode of livelihood (Bhowmik & Chattopadhyay, 2018).

Economic development in rural areas is closely linked to the development of markets and participation of farmers (Bellon, Gotor & Caraccialo, 2015) and plantations like rubber supported the revival of the degraded environment of the region along with its capacity to employ a massive labour force with the assured market (Thongyou, 2014). Moreover, to be a successful project, the cropping system must be ecologically adaptable, economically profitable and physically suitable so that it could be easily accepted and integrated into the local farming pattern (Penot & Trouillard, 2002). It may be further noted that dependence on a single crop without mixed cropping would not be sufficient for the survival of small and marginal farmers as the former would not ensure the creation of enough income and gainful employment (Negi et al., 2019). The ICAR model of "Agri-horti-silvi-pastoral" introduced in Shillong was said to be technologically feasible, economically viable, ecologically sound and socially acceptable, yet, out of 1000 sample families only 300 families succeeded (Debbarma, 2010).

On the other hand, the cultivation of horticultural crops like pineapple and other fruits was often resisted due to their perishable nature. Lack of marketing knowledge and processing facilities of such crops were considered as risks and unattractive to them. Inadequacy in infrastructure facilities, processing and marketing opportunities often causes huge wastage of perishable crop production mainly pineapple in Tripura, which made pineapple less attractive than rubber (Krishna, 2012). Moreover, the decreasing importance of the tea sector and the uncertainties involves around horticultural cultivation in Tripura further boosted the expansion of rubber crops as the best option to replace the subsistence economy of jhumias (Viswanathan & Bhowmik, 2014). Rehabilitation schemes were provided by well-coordinated efforts of the different agents for the socio-economic development of the focussed groups, mainly Scheduled Tribes (ST) (Chouhan & Bhowmik, 2017). Nonetheless, the process of rehabilitation of jhumias in Tripura has been evolving over the years, starting with primary agriculture-based schemes of the 1950s to the forestry-based regrouping models of the mid-2000s (Kuki, 2017), though plantation-based rehabilitation schemes appeared to be the most prominent and popular (Bhowmik, 2013). The introduction of rubber cultivation to rural people has immensely improved small growers' incomes and eventually reduced poverty, leading to an improvement in livelihood outcomes and also fostered regional economic growth (Min, Waibel, Cadisch, Langenberger, Bai & Huang, 2017). However, the small growers are unable to produce superior quality output and miss out on the higher prices (Maraseni, Son, Cockfield, Duy & Nghia, 2017). Thus, they need to augment productivity to make plantations economically viable in the northeastern region (Goswami & Hazarika, 2016). In Tripura, the Rubber Producing Societies (RPS) and Trade Union (TU) play essential roles in supporting and cooperating through their political and lobbying efforts (Bhowmik & Viswanathan, 2015) and help the small growers; often erstwhile shifting cultivators remain free from the grasps of private traders (Mukundan & Veerakumara, 2014).

Moreover, the emerging farm-based livelihood system has been significantly dynamic and diversified with greater complexity in terms of opportunity, choice and combination, making the

approaches more persistent, feasible and sustainable (Viswanathan & Shivakoti, 2006). Ellis (2000) considers livelihood diversification as a strategy by which rural households build a dissimilar portfolio of activities and social support capacities in order to survive and upgrade their living standards. Moreover, diversification of livelihood assets becomes critical among rural households as these are capitals which growers/ planters/ farmers use to shape their approaches for their livelihood efforts. Further, policies, institutions, and processes were also a vital part of social, political, economic and environmental factors that determine farmers' choices, and standard forms of practising things, and thus, help to design livelihoods (Ayana, Megento & Kussa, 2022). Plantation growers with better assets may pursue good resource management practices such as market-based, adoption of agronomic strategies and obtaining higher productivity or winning approaches of livelihood that lead to productive outcomes (DFID, 1999).

Data, Sample and Methods

Primary data has been collected through a field survey of representative sample households using structured schedules across five districts, where our target group reside. The universe for the study was those jhumia households that had been provided rehabilitation support through plantation-based schemes and they are mostly found in these five districts. As a result, we initially identified areas of rehabilitation projects and undertook the survey accordingly in those villages and hamlets (36 in total) to obtain our desired respondents. In other words, the study areas were selected purposively while the respondents were drawn randomly since those villages also had residents who were not beneficiaries of the rehabilitation schemes. We followed Rudra's (1989) sampling technique of 'randomising the population rather than randomising the sample'. On reaching the village, we randomly picked up villagers and checked whether he/she was a beneficiary and collected information. The technique has helped in finding jhumia beneficiary families who were provided rehabilitation schemes under different plantation programmes in the State.

Regarding the sample size, we have used the formula given by Yamane (1967) regarding the minimum sample size, where

$$n = \frac{N}{1+N\,(e)^2}$$

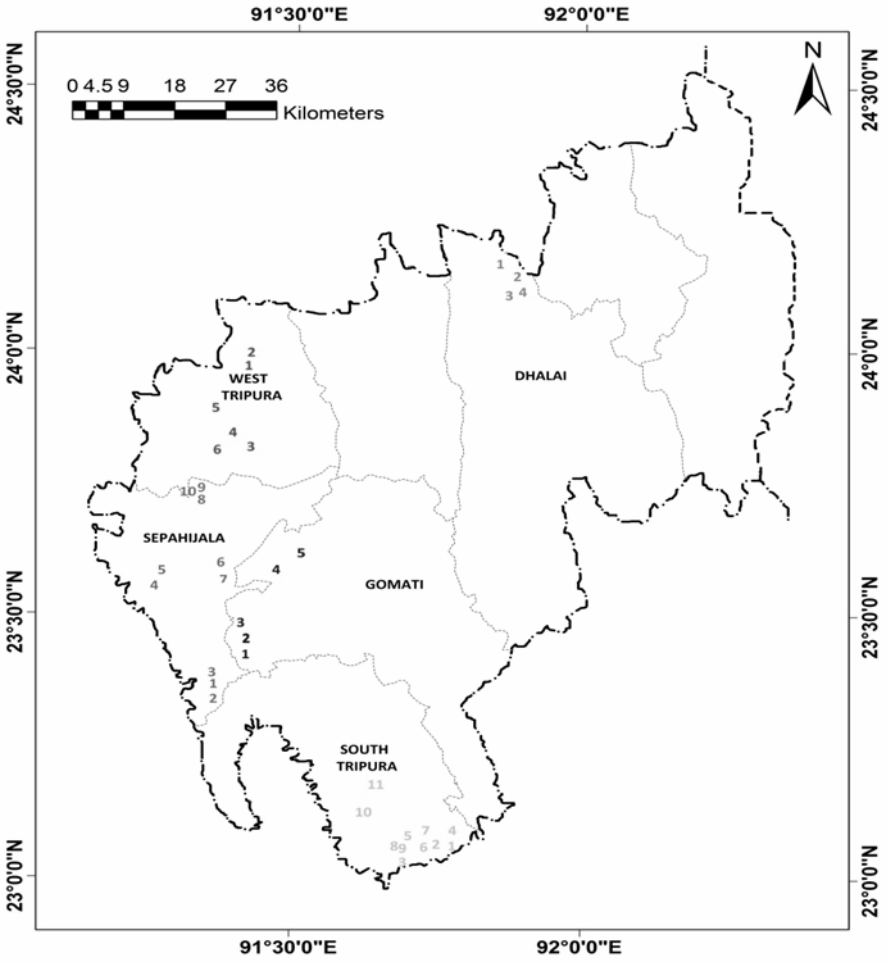
n – Sample size; N – Population size & e – Level of precision

Using N as 51265 (number of jhumias family as per Tribal Welfare Department, 1999 report) & e as 7 per cent margin of error, we get

$$n = \frac{51265}{1+51265\ (0.07)^2} = 203.27$$

Thus, a minimum sample size of 203 suffices and in the present study, the sample size is 252, of which, 162 were rubber cultivators, 39 were tea planters, 41 were horticulturists and 10 pursued multiple cropping. Horticulturists included lemon growers, orange cultivators, banana planters, etc. On the other hand, multiple croppers had some other horticulture products in addition to rubber. The field survey across the sample area was conducted between July and December 2018. The overall dominance of rubber farmers in the sample is due to the higher incidence of rubber-based rehabilitation, particularly since the 1990s. The success of the early plantations led to the replication of the scheme in different areas by the institutional agencies.

The Study Area



Methods: The present paper uses standard statistical applications and charts. For the first objective, the collected data was tabulated and processed and a one-way analysis of variance (ANOVA) was conducted to measure the differences in average income (annual households and per capita), if any. ANOVA helps in determining statistically significant differences between the means of three or more independent (unrelated) groups. In our case, we had four groups of beneficiaries.

Specifically, it tests the null hypothesis:

H0: $\mu 1 = \mu 2 = \mu 3 = ... = \mu k$;

where, $\mu 1$ = group mean & k= number of groups.

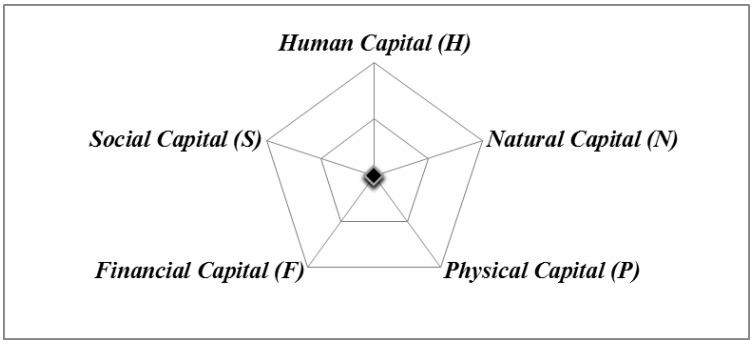
The annual income of all the members of the household was collected and aggregated for deriving the household income, while for per-capita income, the annual household income was divided by the family size for each respondent household. In this context, we may mention that there was no attempt to find out the economic returns from each crop since the objective of the study was different.

For examining the livelihood pattern of the erstwhile jhumias, the conceptual framework developed by the United States Agency for International Development (USAID) for evaluating the livelihood assets of plantation growers has been used. The choice of the five work capitals has been made in the wake of surveying the article of USAID, 2005 and fusing minor, however,

fundamental neighbourhood changes (Chouhan, 2019). The pentagon in Figure 1 has been developed to visually signify data relating to the assets of beneficiaries, thus depicting significant interrelationships between various assets. These capitals or assets determine how the participants are endowed in preparing, making, earning, accessing, securing, strengthening, and sustaining their livelihood sources even during hard times.

Figure 1

Livelihood Capitals Framework



Thus, the livelihood capitals are divided into the following categories:

(i) Human assets or human capital represents the degree of skill, knowledge and technical know-how, and the capability to execute work and sound health that support the beneficiaries to follow various livelihood approaches and attain livelihood goals. Besides, it varies on the availability of family labour, educational status, entrepreneurship quality, leadership potential, and health condition.

(ii) Natural assets or natural capital represents the availability of natural resources from where much-desired livelihood ends are derived. It comprises a wide range of land-use patterns, access to ownership, total land size and actual area under cultivation used directly to produce economic goods available to beneficiary households.

(iii) Physical assets or physical capital are considered access to basic infrastructure and public goods essential for livelihood support which help people meet their basic requirements and become more productive. This incorporates better housing, household assets, healthier sanitation and livestock, thereby forming the crux of rural livelihood assets.

(iv) Financial assets or financial capital means financial resources that help people meet their livelihood ends. It includes bank savings, cash in hand, and receiving financial assistance while undertaking plantation cultivation and borrowing from institutional and non-institutional financial institutions for maintenance purposes. Their financial capability will determine the possession of livelihood assets by the households.

(v) Social assets refer to social capital that an individual enjoys to pursue their livelihoods. These capitals are developed through social networking like participation in NGOs, social and cultural interaction, and building relationships among employers and employees while generating revolving funds within the organisations such as self-help groups and Rubber Producers Society.

Constructing the Livelihood Index:

Table 1

The Detailed Components of the Indicators

Livelihood	Indicators
Human Capital	Total Labour ability of a family
	Education level of the beneficiary
Natural Capital	Access to ownership of land
	Area under jhum
	Plain lands area for non-farm use
	Actual area for plantation
	Land area under other crops
Physical Capital	Housing instance
	Household assets
Financial Capital	Access to loan
	Financial Support
	Household annual income
	Crop insurance
	Kisan Credit Card
	Bank account
	Access to SHG
	NREGS work
Social Capital	Financial assistance
	Capacity building assistance
	Participation in social activity
	Inputs support

(1) Assessing human capital: The skill and quantum of human capital available to the farmers decide their livelihood status. The first component represents the total labour ability of a household, while the second component indicates the education level and years of schooling of the beneficiary.

(2) Assessing natural capital: land resources are the most vital natural assets in the rural part of Tripura. The study considered the average household land ownership area and actual in-used land resource area to calculate the natural capital. This provides the total land area possessed by the households.

(3) Assessing physical capital: This includes basic infrastructures and tools/ implements used in the production process and day-to-day life to boost beneficiary household capability to enlarge livelihood base. These assets are meant for households and include machinery and consumer durable commodities. Monetary values were considered for aggregation.

(4) Assessing financial capital: Financial assets refer to access to loans and credit facilities from institutional agents, income earned by the beneficiary household, possession of crop insurance, and unpaid financial support, including subsidies provided by government entities. The

measurement indicates the financial strength of the household. Since some of the indicators were qualitative in nature, binary values were used to capture incidence.

(5) Assessing social capital: Social assets in the present study relate to the involvement in a community-based social organisation through which financial assistance and other support are obtained by way of existing social networks of cultivators. The beneficiary receives training on cultivation, manure, process, and tapping the crops while getting inputs free of cost. Binary values for qualitative indicators were used here also.

The estimation of livelihood capital indexes is as follows:

The indicators are calculated by incorporating the scores assigned for each capital using dummy variables of zero and one in line with the procedures used by Su and Shang (2012). Firstly, an index has been calculated by incorporating the scores assigned for each capital. Secondly, the formula of the United Nations Development Programme (UNDP), (2015) Max-Min approach, i.e. [Actual-Minimum]/ [Maximum-Minimum], has been used for all the beneficiaries to normalise the scores. The index score for each capital is obtained by averaging the scores of each beneficiary. Finally, once the component indices are estimated, a simple average of all the indices will give the aggregate livelihood capital index, i.e.,

LCI= [HCI+NCI+PCI+FCI+SCI]/5.

Results

Basic Profile of the Beneficiary Households: The primary characteristics of the respondent household show that among the sample households, 88.49 per cent were headed by males, and the incidence of female-headed households was marginally more among rubber growers (12.96 per cent). The minimum age of the head of household (HOHH) was 28 years, while the oldest HOHH was a 100-year-old tea grower. The average age of the beneficiaries of horticulture schemes was the lowest at 50.8 years, while multiple crops were the highest at 60.7 years. Hinduism is the most prominent religion, followed by Christianity and Buddhism. The incidence of Christianity is relatively more among horticulture beneficiaries. Of the total respondent households, 39.28 per cent were BPL ration cardholders, and 37.7 per cent were APL cardholders. Antyodaya card was in possession of 21.03 per cent of respondents, and such cardholders were in sizeable numbers (41 per cent) among the tea beneficiaries. The incidence of BPL cardholders is more among horti-croppers, whereas APL was relatively more among rubber beneficiaries. The average size of the household was 4.8 among rubber and horticulture beneficiaries, whereas it was 4.4 and 4.6 among tea growers and multiple croppers, respectively.

Sources of Rehabilitation Support: Table 2 addresses the first objective of the study and lists out the various agencies that provided support mechanisms to the beneficiaries in course of their rehabilitation process. In panel A, among the 162 rubber-based respondents, we observe that the Rubber Board has rehabilitated 66 households (40.74 per cent) and thus, played a significant role in restoring the jhumias. Moreover, the Tripura Rehabilitation and Plantation Corporation (TRPC) have also settled 48 families (29.63 per cent). The Department of Tribal Welfare (DTW) and the Tripura Tribal Areas Autonomous District Council (TTAADC) have rehabilitated 13 beneficiaries each (8.02 per cent) through rubber plantations. The Tripura Forests Development and Plantation Corporation (TFDPC) Ltd. accounted for the rehabilitation of seven rubber beneficiaries. There are five beneficiaries, each rehabilitated through rubber-based models by the Department of Panchayat and the respective Rural Development Blocks. The Rubber Board and TRPC are responsible for the rehabilitation of three beneficiaries while one beneficiary was supported by both Rubber Board and DTW. In panel B, we find that among the horticulture-based beneficiaries, the major support base has been the Department of Agriculture (DoA) with 19 beneficiaries (46.34 per cent), followed by the Department of Horticulture (DoH) with six

beneficiaries. The Department of Panchayat (DoP) had rehabilitated six sample respondents through horticulture-based schemes while the DTW and DoA worked in tandem for two beneficiaries. The collaboration among various line departments has been of great support to these rehabilitated jhumias.

Table 2

Share of Performance of the Entities

Rubber (A)		Horticulture (B)		Tea (C)		Multiple crops (D)	
Agencies	No.	Agencies	No.	Agencies	No.	Agencies	No.
Rubber Board (RB)	66	Dept of Agriculture (DoA)	19	Tea Board (TB)	16	RB& TTAADC	3
TRPC	48	Dept. Of Horticulture (DoH)	6	DoP	10	DoA & DoP	2
TTAADC	13	Dept of Panchayat	6	TTAADC	5	TTAADC	1
Dept. of Tribal Welfare (DTW)	13	DTW & DoA	2	TTAADC & TB	4	TRPC &DoA	1
TFDPC	7	TTAADC	1	RD Block (s)	2	DoA & TTAADC	1
RD Block (s)	5	DoH & DoP	1	World Vision (NGO)	1	DoA & DTW	1
Dept of Panchayat (DoP)	5	Dept. of Tribal Welfare (DTW).	1	DoH	1	DoH & DoP	1
RB &TRPC	3	Dept. of Science, Tech& Env (STE)	1				
RB& DTW	1	Dept . of Forest (DoF)	1				
TTAADC&World Vision	1	DoH & DoF.	1				
		TTAADC &DoP	1				
		DoA & STE	1				
Total	**162**		**41**		**39**		**10**

Source: Compiled from Field survey, 2018.

Similarly, in panel C, we find that Tea Board has been instrumental in ensuring tea-based rehabilitation for 16 beneficiary respondents. The DoP has helped 10 beneficiaries, while TTAADC itself and also in collaboration with other line departments have also popularised tea-based models. The last panel D shows that there has been collaboration across several agencies under the Central and State governments in extending the resettlement schemes to the tribal beneficiaries. The joint efforts for the coordination and contribution of these departments are certainly remarkable in the process of development of landless tribal jhumia households.

Occupation Pattern: The livelihood source of the people is determined by their occupational nature. Table 3 shows that cultivation (71.43 per cent) is the predominant occupation among the respondents, and such incidences are more among the horticulturists and relatively less among rubber growers. Several household heads survived working as day labourers. The incidence of day-labourer is highest (27 per cent) among rubber beneficiaries, while such occurrence is very low among the horticulturists. Interestingly, day labourers were not found among the multi-croppers. Among other primary occupations is the service sector including trading (2.77 per cent). Almost 5 per cent of the households are found to be headed by government servants, which can be explained by the fact that the jhumia rehabilitation scheme had been bestowed to the father or ancestor of the present head of the household; nonetheless, the predominance of rural cultivators among the beneficiaries indicates the primarily agrarian character of the State.

Table 3

Occupation of the Head of Household

	Rubber [N=162]	Horticulture [N=41]	Tea [N=39]	Multiple crops [N=10]	Total [N=252]
Cultivator	103(63.58)	38(92.68)	31(79.49)	8(80)	180(71.43)
Labour	44(27.16)	1(2.44)	5(12.82)		50(19.84)
Trader	4(2.47)	1(2.44)	1(2.56)	1(10)	7(2.77)
Govt. service	9(5.55)	1(2.44)	2(5.13)	1(10)	13(5.16)
Private job	1(0.62)				1(0.4)
Retired	1(0.62)				1(0.4)
Total	162(100)	41(100)	39(100)	10(100)	252(100)

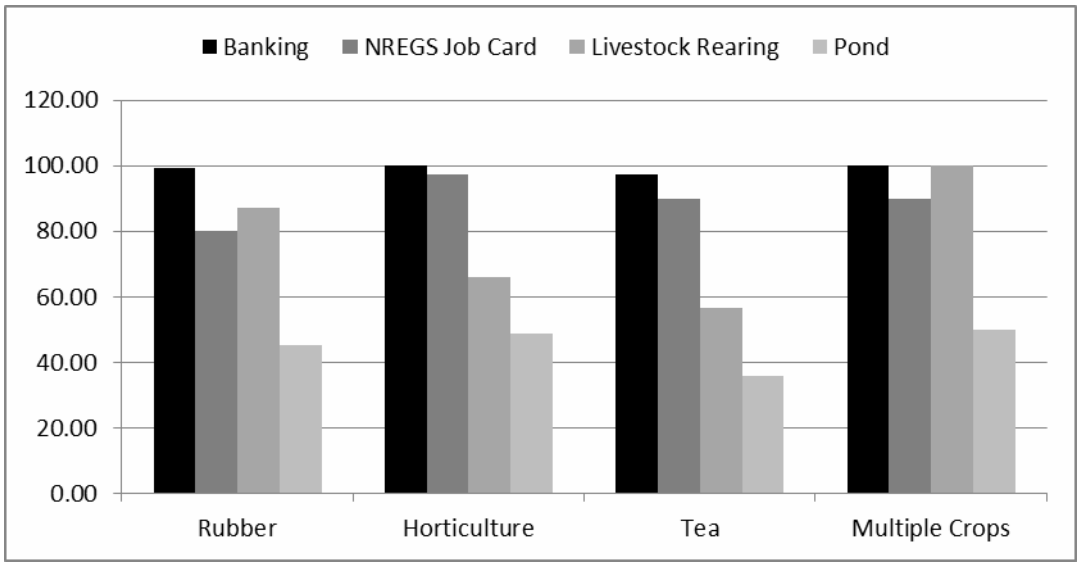
Source: Compiled from Field Survey, 2018.

Note: Figures in parentheses indicate the percentage.

Subsidiary Livelihood Strategies of Beneficiaries: The livelihood facilities possessed by the beneficiaries determine their livelihood flexibility; diversification of farming households combines dissimilar portfolios of activities and assets to make living.

Figure 2

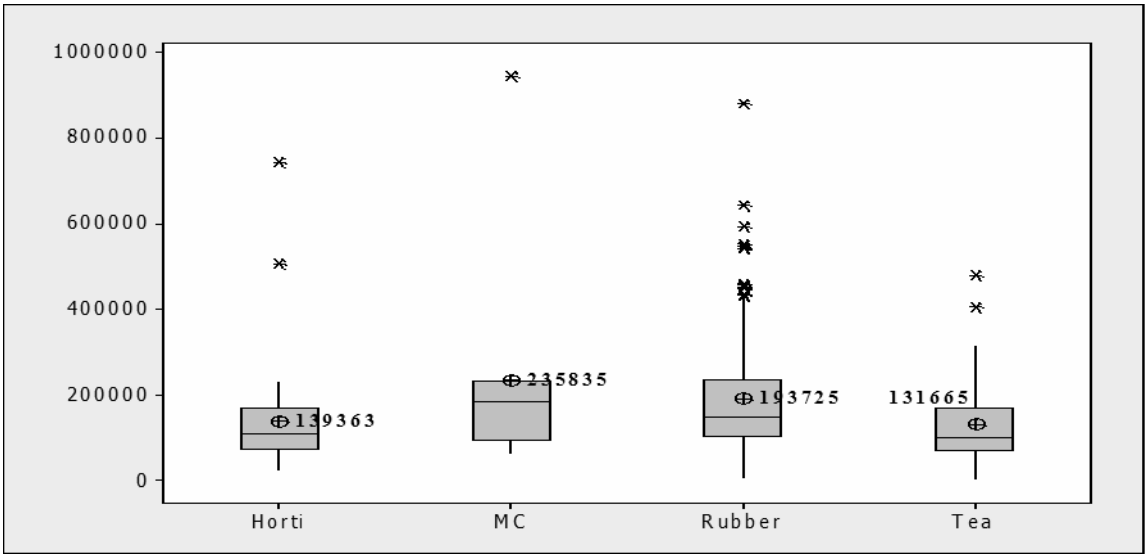
Livelihood Interventions Enjoyed by the Beneficiaries (in %)



Source: Compiled from Field Survey, 2018.

The results show that the bulk of the respondents across all types of rehabilitation have access to banking services (Figure 2). Only two respondents, one each from rubber and tea schemes, do not have access to banking. Almost 85 per cent of the total respondents possess NREGS job card which is used as supplementary sources of livelihood efforts. The possession rate of the NREGS job card is highest among the horti-croppers and lowest among rubber beneficiaries. Livestock rearing is a traditional component in the livelihood effort of jhumias and almost 70 per cent of the respondents attest it with support being highest among the multiple croppers and rubber growers. More than 40 per cent of the respondents possess pond which is also used at times to supplement their livelihood activities. The incidence of the pond is lowest among tea growers and highest among multiple croppers.

Household Income: The annual household income of the respondents ranged from Rs. 5000 to Rs. 9,46,000 per annum. The lowest income is found to be for a tea grower while the highest income accrues to a multi-cropper. The average income for multi-cropper, Rs. 2,35,835 per annum is the highest among the lot. The average income of rubber beneficiary households is Rs. 1,93,725 per annum. The mean income of horticulturist and tea-grower households are Rs. 1,39,363 per annum and Rs. 1,31,665 per annum respectively. Conducting one-way ANOVA among the four categories of beneficiaries, we find that the F-value is 3.73, and p= 0.012 suggesting significant differences in the mean income levels. Figure 3 shows that all four categories of income indicate upper outliers that create an upward pull for the mean. However, the median values for all the categories are lower than the mean suggesting a greater presence of households with lesser than average income. Further, median incomes for multiple growers are also the highest and that of tea growers is the least.



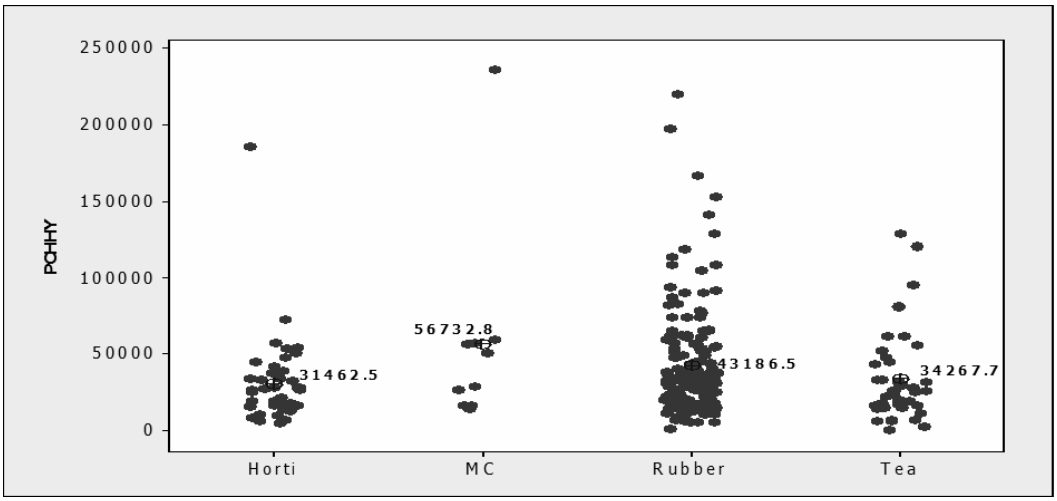
Source: Compiled from Field Survey, 2018.

Figure 4 shows that alike household income, there are wide differences in the average per capita income of the beneficiaries across categories. The top two positions, multi-cropper (Rs. 56,732.8 per annum) and rubber (Rs 43,186.5 per annum) are similar to that of household income but the average per capita income of tea-growing households (Rs.34,267.7 per annum) are more than that of the horticulture beneficiaries (Rs.31,462.5 per annum). The extent of the difference in mean for the four

categories is statistically significant at a 10 per cent level of confidence (F= 2.36; p=0.072). The adjacent figure, however, allows us to understand that majority of the respondent households lies below the mean of their category. The per capita income of the respondent households is an indication of the meagre level of sustenance for many of the participatory households. It may also be noted that significant differences in the household income level, both annual as well as per capita, are visible among the various types of rehabilitated beneficiaries.

Figure 4

Spread of Household Per Capita Income



Source: Compiled from Field Survey, 2018.

The Component Capital Indices: Table 4 provides the status of five livelihood capitals in the form of an index. In terms of HCI, the average score for horticulturists and multi-croppers is the highest (0.353) and that for the tea beneficiaries (0.328) is the least. However, the F value indicates the non-existence of significant variation among the mean scores of the four groups. Conversely, the mean values of the four types of beneficiaries are found to be statistically different at a 1 per cent level of significance for both NCI and PCI. The average NCI scores are highest for horticulture farmers (0.452) while it is least for tea growers (0.138. The rubber growers (0.416) have the highest mean indices and the horticulturists (0.300) indicate the least average index.

Table 4

Scores of the Component Indices & Their F value

	HCI	NCI	PCI	FCI	SCI
Rubber	0.338	0.229	0.416	0.475	0.624
Horticulture	0.353	0.452	0.300	0.409	0.634
Tea	0.328	0.138	0.306	0.414	0.667
Multi Crops	0.353	0.338	0.366	0.463	0.833
F value	0.2	19.98	8.88	3.09	2.24
	(0.895)	(0.000)	(0.000)	(0.028)	(0.084)

Source: Computed from field survey, 2018.

Figures in parenthesis indicate p-value.

Similarly, the average FCI scores are maximum for rubber growers (0.475) and lowest for horticulturists (0.409). However, the F value for FCI is significant at a 5 per cent level of significance unlike that of NCI and PCI. The SCI scores are highest for multiple croppers (0.833) and lowest for rubber growers (0.624), and the mean difference is significant at 10 per cent levels only. Of the five livelihood capitals, ranking is done based on the richness of the index. As a result, multiple crop-based rehabilitated jhumias enjoy a better position in terms of social capital, whereas the horticulture beneficiaries are better endowed in human and natural capital. The rubber growers lead in terms of physical and financial capital. On the contrary, tea growers are at the bottom in terms of human capital and natural capital. The horticulturists have the least score for physical and financial capital while the livelihood strength in terms of social capital is least for rubber growers. Considering all the respondents as a single group, the average score for SCI is the highest and that of NCI is the lowest. Thus, it can be said that the respondents are least endowed in terms of natural assets, while social assets among them are much stronger.

Determining Livelihood Diversification: It may be noted that among the horticulturists, the LCI score lies between 0.4 and 0.5 for most of the respondents. Similar is the trend among the rubber growers too. The frequency distribution for the tea growers indicates the highest concentration for the score range of 0.3 to 0.4, while for multiple growers, the frequency for various categories is almost the same, primarily due to a limited number of respondents.

Table 5 highlights the average LCI of the various categories of beneficiaries. The average is highest for the multiple croppers and lowest for tea growers. However, the standard deviation is highest for rubber cultivators. The coefficient of variation is maximum for tea growers and minimum for multiple croppers. The minimum value of LCI across various types of beneficiaries is 0.0566 for a tea grower, while the maximum LCI value is 0.7429 for a rubber grower. Table 5 also allows us to infer that the range for LCI is highest for rubber growers and least for multiple croppers. It may be noted here that the average LCI scores for the four categories are significantly different (F=3.46; p=0.017).

Table 5

Descriptive Statistics of Livelihood Capital Index

Index	Rubber	Horticulture	Tea	Multiple crops
Mean (LCI)	0.4163	0.4295	0.3706	0.4703
SD	0.1096	0.0898	0.1073	0.0931
CoV	26.32	20.90	28.96	19.80
Min	0.1102	0.1854	0.0566	0.3268
Max	0.7429	0.5891	0.5887	0.5981

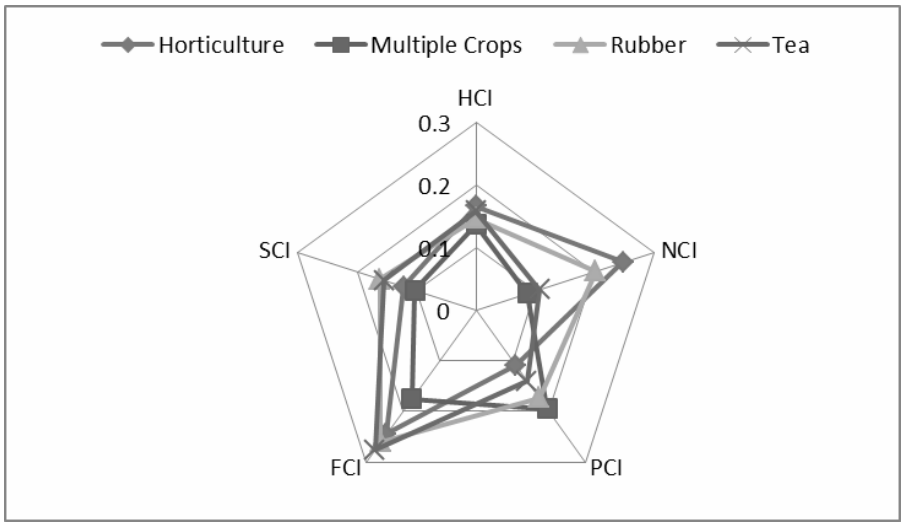
Source: Computed from Field Survey, 2018.

Relationship between Livelihood Capitals: Figure 5 indicates the dispersion among the beneficiaries in terms of their livelihood endowment strength. The livelihood capital index seen here is reflected in its present form owing to the variability in the component indices. From Figure 5, we can see that in terms of human capital, all the categories are similarly spread out, while in terms

of natural capital, the dispersion among horticulturists and rubber growers is much higher than that of the two other categories. In terms of financial capital, the spread among multiple croppers is less than the other three categories, whereas, for physical capital, the horticulturists appear to have similar status as compared to the rest. In terms of social capital, tea growers and rubber growers have higher variability than horticulturists and multiple croppers.

Figure 5

Standard Deviation of the Components of LCI



Source: Compiled from Field Survey, 2018.

Conclusion

Shifting cultivation has been a primary source of livelihood for the jhumias of Tripura, but with the increased population and land pressure, the system became unsustainable and non-feasible. Thus, economic development programmes for the jhumias have emerged as a priority of the State government. The introduction of plantation crops like rubber, tea and other citrus crops is an attempt towards ensuring livelihood security, offering both employment and regular cash inflow.

Thus, based on the above analysis, we find that the rehabilitation efforts saw support from several government agencies which worked in tandem with one another for the objective of improving the livelihood efforts of the beneficiaries. However, sole dependence on the rehabilitated schemes is not feasible for them and most of them adopt diversified strategies based on their primary occupational structure, associated livelihood mechanisms and of course, the nature of support available from the intervening agencies. The households indicate significant variations in the annual income level as well as per capita levels. The multi-croppers and rubber growers are better off as compared to the horticulturists and tea planters.

Moreover, the endowment of various livelihood capital varies significantly across the categories. The multiple croppers possess better livelihood strength than the rest. The rubber cultivators have the highest score in terms of financial capital and physical capital; however, they are placed third in terms of the aggregate livelihood index because of the lowest score for social capital. The horti-growers have the highest score in terms of natural and human capital, thus having a higher opportunity to diversify livelihood patterns. The rich

endowment of human resources among the horti-croppers should be harnessed to augment better cultivation skills to increase their household income. However, they are placed at the bottom regarding per capita income resulting in lower physical capital endowments. The tea growers are placed at the bottom of the pyramid in terms of both annual income and livelihood capital, thus making them the most vulnerable group.

Nonetheless, State government efforts at rehabilitation through plantations have provided a certain basic level to the erstwhile jhumias, but they sustain at a very paltry level. Therefore, future efforts should focus on diversified strategies based on the strength of their livelihood assets. Also, as a policy decision, integration among the line departments regarding the implementation of the scheme has to be ensured to extract the maximum possible outcome of the investment in rehabilitation projects. Proper monitoring and follow-up are to be prioritised for ensuring success. For holistic development, the rehabilitation schemes can be integrated with educational programmes for the children of the beneficiaries and can be tied up with the fulfilment of basic health and nutritional check-up of the children of the households.

Author's Contribution

Vanlalrema Kuki: Conceived and designed the analysis, collected data, contributed data/ analysis tool, wrote the paper

Indraneel Bhowmik: Conceived and designed the analysis, contributed data/analysis tool, performed the analysis

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