

A Study of the Influence of Livelihood Assets on Household Poverty of the Rubber Growers in Assam

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Abstract

The paper intends to explore the influence of the five livelihood assets (physical, human, natural, financial, and social) on household poverty status of the Rubber growers of Assam. A total of 11 sub-components along with two interaction terms are identified as representatives of the five livelihood assets. Household poverty levels are determined using total annual household incomes of the Rubber growers and the World Bank-devised \$1.90 poverty line. 400 households are surveyed using semi-structured questionnaires from three districts of Assam having Rubber growers of various scheduled tribe and non-scheduled tribe communities. Using logistic regression model, it is found that six sub-components of the selected livelihood assets are significantly influencing Rubber growing Household's poverty status. Relevant recommendations are made to improve the livelihood assets conditions of these Rubber growers, thereby exerting positive influence on their economic wellbeing.

Background

Assam has been known for its rubber plantation. Among the states in India Assam ranks third in respect of area under rubber cultivation and fourth in respect of rubber production (Rubber Board, 2021).

Though Assam has been known for rubber cultivation since colonial era (Majumder, 2016), the state's soil conservation department launched commercial Rubber production in the 1950s (Pradeep et al., 2017). Potentially, Assam can contribute a total of two lakh hectares of Rubber area (Maibangsa and Subramanian, 2000). As per the latest data (2020-21), the state has 57,735 hectares of land under Rubber, i.e., only 28.86% of the state's cultivable land.

The commercial success of Rubber plantation in other parts of India, especially in the states of Kerala and Tripura, has attracted several households (HH) to grow Rubber

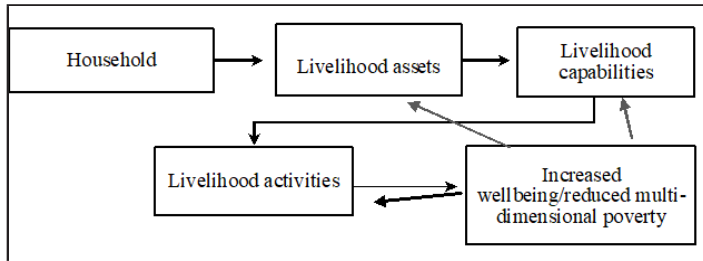
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in Assam as well. Currently, there are 48,952 Rubber growers in the state, out of which 66.44% belong to various scheduled tribe (ST) communities and the remaining growers belong to various non-ST communities (Rubber Board, 2020). Almost seven decades of commercial existence of Rubber in the state has facilitated a considerable number of households to generate livelihoods from rubber cultivation. It would be interesting to explore how the rubber cultivation and forms of endowments in these households have facilitated the income generation and addressing vulnerability issues. Several existing literatures have studied the role of livelihood assets in shaping HH livelihood strategies, poverty and vulnerability conditions (Hahn et al., 2009; Mulika and Routrey, 2016; Ding et al., 2018). The present study intends to investigate how availability of livelihood assets influence Rubber growing households' poverty status in the state of Assam.

Conceptual Framework

Poverty has been defined as a state in which an individual or a household is below subsistence level of consumption needs. However, poverty is a multi-dimensional concept. Considering an individual as poor based on the income status alone does not fully reflect the deprivations he/she faces in non-monetary spheres of life in the form of ill health, lack of access to education, inaccessibility to sanitation and drinking water, etc. among others. According to Sen's capability approach to development, poverty is being associated with the 'functioning's' and 'capabilities' of an individual, i.e., an individual is termed as 'poor' or his/her 'wellbeing' is compromised if he/she is unable to freely carry out certain 'doing and being,' such as, being nourished and comfortably clothed, being able to participate in the life of society, being healthy, etc. among others (Sen, 1987; Hick, 2012). Livelihood capabilities are a subset of Sen's broader idea of capabilities (Chambers and Conway, 1992). A livelihood is a triumvirate of capabilities, assets, and activities. In simple terms, it refers to means of living, which is earned through certain economic activities, such as agriculture, livestock rearing, business, formal jobs etc. To carry out these activities a household needs to have ownership or access to several livelihood assets. These livelihood assets generate or enhance the livelihood capabilities of a household to give it the necessary push for initiating or enhancing livelihood activities. Consequently, the household's wellbeing is enhanced and the severity of poverty declines. Increased wellbeing boosts the asset base as well as the livelihood capabilities of the household further, leading to improvement or diversification of livelihood activities and subsequently eliminates household poverty (see Figure 1). Hence, the role of livelihood assets in poverty eradication is critical. The present study intends to investigate how a set of livelihood assets influence the monetary poverty status of Rubber growing households of Assam. Relating monetary poverty to other non-monetary deprivations through ownership or access to various livelihood assets shall be useful in understanding the multi-dimensional nature of the household poverty status of these Rubber growers.

Figure 1: Inter-Connections of Livelihood Assets, Livelihood Capabilities and Poverty



Methodology

The study uses the concepts of five livelihood assets as described in the Sustainable Livelihood Framework (SLF) by the Department for International Development (DFID), viz, physical, human, natural, financial, and social assets (DFID, 1999). Each of these assets is represented by a few variables or sub-components. In case of the present study, a total of 20 sub-components have been taken into consideration, six under physical assets, five under human assets and three under each of the natural, financial, and social assets based on the socio-economic background of the rubber producing households in the state. (refer Table 1).

Table 1: Brief Description of Livelihood Assets to be Considered for Analysis

Livelihood Assets	Sub-components	Reference literature	Explanation of sub-components
Physical	HH gadgets/appliances	Nath et al., 2013	Availability of TV, fan and hand pump in the house
	Poultry & livestock	Nath et al., 2013	Availability of chicken, duck, pig, goat, and cattle in the HH
	Housing condition	Nath et al., 2013; IIPS and ICF, 2021	The materials with which the walls and the roof of the house are built
	Distance to market (Km)	Abbassi et al., 2020	Distance between the respondent’s house and the nearest local market from where he/she buys inputs for tapping and latex processing
	Road condition	Busono et al., 2017	The material with which the road connecting the respondent’s house with the nearest local market is made
	Ownership of vehicles	Ibrahim et al., 2018	Availability of car, bike and bicycle in the HH to facilitate transportation of inputs from and/ or Rubber sheets to local market

Human	HH size	Xu et al., 2015	Number of HH members
	Training	Nath et al., 2013	Whether at least one member in the HH have received training from Rubber Board on tapping and/or Rubber processing
	Labour type	Viswanathan and Shivakoti, 2007 (in place of availability of family labour)	Involvement of family or hired or both family and hired labour in Rubber tapping and processing
	Education	Ding et al., 2018	Highest education in a HH
	Source of drinking water	Booyesen et al., 2008	Name of the source from which the HH collects drinking water
Natural	Land under Rubber (Hectare)	Nath et al., 2013	Amount of land the HH have under Rubber plantation (in Hectare)
	Tappable Rubber tree stock	Nath et al., 2013	Number of Rubber trees which have been tapped in the previous tapping season by the HH
	Accessibility to water for Rubber processing	Aguilar et al., 2021 (in place of direct natural access to water source)	How difficult it is to get water for Rubber or latex processing
Financial	Savings	Dutta and Guchhait, 2018	Whether the HH has savings account
	Loan burden	Dutta and Guchhait, 2018	Whether the HH have any outstanding loan till the end of the last tapping season
	Subsidy status	Ibrahim et al., 2018	Whether the HH have received at least one instalment of subsidy for plantation development from Rubber Board till the end of the last tapping season
Social	Rubber Growers' Society (RGS) membership	Mohapatra (2022); Islam et al., 2021 (used in place of member of cooperative society)	Whether a HH is having membership in an RGS
	Self Help Group (SHG) membership	Viswanathan, 2008	Whether a HH is having membership in a SHG
	Selling point	Author's contribution	Where did the HH sell Rubber sheets during the previous tapping season

To compute poverty levels of the Rubber growing households, household total annual income (in Rs.) and World Bank-devised \$1.90 poverty line has been used (=average Rs.74.13 per dollar in 2020, according to <https://www.exchangerates.org.uk/>). The annual household Rubber income is obtained from multiplying average yield of Rubber of a household (Kg/hectare) and average domestic price of rubber sheets sold² in 2020-21 price of the same is 141.85/- per Kg for the, as obtained from Indian

² Rubber sheets sold as Ribbed smoked sheet of grade 4

Rubber Statistics, 42nd volume). The average yield of Rubber for a household is computed using average annual yield of Rubber in Assam during 2020-21³ multiplied by amount of land under tappable Rubber trees in the household (hectare). Land under tappable Rubber trees and not land under total number of Rubber trees in a household is considered to take account of the loss of Rubber produce due to some of the Rubber trees being destroyed by cyclones, pest attacks, diseases, and excessive rainfall. Around 375 to 450 trees can be grown in a hectare of land (Bhattacharjee et al., 2021). In the present analysis, 375 tappable Rubber trees/hectare is used for determining land under tappable Rubber trees in a household. To derive household's total annual income, annual income from Rubber is added with income from other sources, such as, plantations other than Rubber, small business, tapping in others' rubber gardens, daily wage labour, etc. The income of the Rubber growing households of Assam, has been estimated as follows;

Household total annual income = Annual Household Rubber income + Annual Household income from other sources

= [Annual average yield of rubber of a Household * RSS 4 average price in domestic market in 2020-21] + Annual Household income from other sources

= [(Land under tappable rubber trees for a Household * Average annual yield of rubber in Assam) * 141.85] + Annual Household income from other sources

= [{No. of tappable trees under a Household * (1/375)} * 1153 * 141.85] + Annual Household income from other sources

A household's minimum annual income threshold is required to consider income-poverty status of that household. Minimum annual income threshold of a –household is the minimum income just enough to cover the minimum annual consumption expenditure of that -household, determined by the World Bank poverty line of \$1.90. The threshold is determined as follows:

Minimum annual income threshold of a household (in rupees)

= Household size * Rs.74.13 * \$1.90 * 365 days

Households whose total annual income could not exceed the minimum annual income thresholds are considered poor in the study and those having positive difference between –household total annual income and minimum annual income threshold are considered non-poor. More specifically,

- Household is **poor** if (Household total annual income – Minimum annual household income threshold) < 0, and

³ According to Indian Rubber Statistics, 42nd volume, average annual Rubber yield in Assam for the year is 1153 kg/hecta

- Household is **non-poor** if (Household total annual income – Minimum annual Household income threshold) > 0.

The present study intends to understand the influence of the livelihood assets on Rubber growing household's poverty levels in Assam. In this regard, the logistic regression model seems fit as it can better deal with dichotomous outcome variables (poverty status in this case; considering non-poor = 1 and poor = 0) than multiple linear regression models. Out of the 20 sub-components of the five livelihood assets in consideration, 'Source of drinking water' and 'Tappable Rubber Tree stock' sub-components are dropped for being highly correlated with 'Accessibility to water for Rubber processing' and 'Land under Rubber' subcomponents respectively ($r = 0.93$ and $r = 0.88$ respectively). Finally, 11 sub-components are found to be individually significantly influencing the logit (L_i) function, i.e., the poverty levels of the Rubber growing HHs at or above 90% level of significance. The details of these individual sub-components' significance status, odd ratios (OR) and standard errors (SE) are given in Annexure 3.

Along with these 11 independent variables, an interaction term is used in the final logistic model to assess odds of being non poor among the Rubber growers, viz., the interaction of 'Training' and 'Labour type' to provide an idea of training-led labour productivity enhancement and its effect on household poverty levels.

The logit (L_i) function for the study therefore is:

$$L_i = \ln [P(\text{Poverty status} = 1) / \{1 - P(\text{Poverty status} = 1)\}]$$

The functional form of the final logistic regression model stands as follows,

$$L_i = \beta_0 + \beta_1 \text{Poultry and livestock} + \beta_2 \text{Housing condition} + \beta_3 \text{Householdsize} + \beta_4 \text{Training} + \beta_5 \text{Labour type} + \beta_6 \text{Training\#Labour type} + \beta_7 \text{Education} + \beta_8 \text{Land under Rubber} + \beta_9 \text{Savings} + \beta_{10} \text{Subsidy} + \beta_{11} \text{RGS membership} + \beta_{12} \text{Sellingpoint}$$

Where,

Poultry and livestock = 1, if household owns at least one of poultry and livestock
= 0, if household owns none

Housing condition = 1, if pukka wall and tin roof
= 0, otherwise

Household size = No. of individuals included in a household
= 1, if size ≤ 4 ,
= 0, if size > 4

Training = 1, if household has trained members

= 0, no trained members in household

Labour type = 1, if only family labour used

= 0, if hired or both family and hired labour used

Training#Labour type = Interactive effect of training and labour type

= 1, if trained family labour used in plantation

= 0, otherwise

Education = 2, highest education in the household is secondary or above education

= 1, highest level of education in the household is primary education

= 0, no education

Land under Rubber = 1, if landholding size > 2 Hectares

= 0, if landholding size <= 2 Hectares

Savings = 1, if yes

= 0, if no

Subsidy = 1, if yes

= 0, if no

RGS membership = 1, if membership exists

= 0, if membership does not exist

Selling point = 1, if grower sells in RGS

collection = 0, if grower sells in local market or to private dealers through home

Intercepts and coefficients of respective independent variables are represented by β_i 's, where $i = 0, 1, 2, \dots, 12$.

The household level data on income levels as well as the 20 sub-components mentioned were collected from three districts selected purposively due to their prominent contribution in the state's Rubber area, production and employment generation, viz., Goalpara, Kokrajhar and Karimganj (Annexure 2: District wise contribution). Goalpara and Kokrajhar are chosen as Tribal Rubber growing households' representation while Karimganj is primarily a non-Tribal area. A total of 24 villages (10 in Goalpara, 8 in Kokrajhar and 6 in Karimganj) were selected randomly from the list of Rubber grower-intensive villages, collected from the Rubber Board Regional Offices in Agia (Goalpara), Kajalgaon (for Kokrajhar) and Silchar (for Karimganj). Total 400 Rubber growing households selected at random have been surveyed using a semi-structured questionnaire. The sample size was selected based on Yamane's formula (Yamane, 1973);

$$n = N / [1 + N (e^2)]$$

where, n = desired sample size, N = Population size and e^2 = level of precision.

Considering $\pm 5\%$ precision level in the present study (e^2), Yamane's formula gives a sample size of 396.75, which is rounded off to 400. Following the Tribal-non Tribal distributive share in the Rubber growers' population in Assam, 264 growers (164 from Goalpara and 100 from Kokrajhar) (66%) are chosen from Tribal communities while the remaining 136 Rubber growers belong to various non – Tribal communities like scheduled caste (SC), other backward caste (OBC) and general (from Karimganj district).

Findings

General Characteristics of Surveyed HHs

Some of the general features of the Tribal Rubber households and non-Tribal household are shared in Table 2. Table 2 also describes the intra-Tribal Rubber households general characteristics. Tribal growers in the sample are found to belong to three major communities, viz., Rabha (72.34%), Bodo (20.45%) and Garo (7.19%) while the non-Tribal growers mostly belong to the general caste (97.05%), followed by OBC (2.20%) and SCs (0.73%).

It is observed that among the Tribal households, better educational outcomes with larger share in higher secondary and above level of education, larger mean Rubber land size and higher income from Rubber as well as total household income is more among the Bodos compared to Rabha and Garo households. Most Garo households among the Tribal Rubber households are involved in Rubber monoculture and consequently, higher proportion of them depend on Rubber only as a source of income compared to the other two Tribal groups.

Prominent differences between Tribal and non-Tribal Rubber growing households are observed in terms of household size, highest educational attainments in households, share of households practicing Rubber monoculture only and Rubber as well as total household income levels. The non-ST growers' mean household size (8.02) is almost double the size of the ST households (4.80). The lower mean household size among the Tribal is expected to benefit them in terms of per capita land availability compared to their non-Tribal counterparts despite larger average Rubber land of the non-Tribal's.

The Non-STs fall behind in overall educational attainments compared to their ST counterparts. Higher proportion of Tribal households are found with higher secondary or above level of education than the non-Tribal households. Moreover, unlike some of the non-ST households, illiteracy is not observed among the ST households.

The share of households growing only Rubber (monoculture) is much smaller among the STs (2.65%) than the non-STs (28.67%). Among the rest of the households, most ST households engage in poultry and livestock farming (90.15%), paddy cultivation (80.68%) and other plantations like betel nuts, betel leaves and bamboo (6.8%), etc., whereas, the non-STs do paddy cultivation (50%), wage labour (16.91%) and petty businesses viz. grocery shop, and small-time work as car drivers, electrician, etc. (7.35%).

Table 2: General Profile of Tribal and Non-Tribal Communities Growing Rubber

HH characteristics	Tribal				Non-Tribal
	Rabha (n=191)	Bodo (n=54)	Garó (n=19)	Tribal average	
Religion (%)	Hindu (82.72) Christian (17.27)	Hindu (100)	Christian (100)	Hindu (80.30) Christian (19.69)	Muslim (93.38) Hindu (6.61)
Mean HH size	4.75	4.83	5.15	4.80	8.02
HHs with highest education (%)	Primary and less (1.57) Secondary (55.49) Higher secondary and above (42.93)	Primary and less (1.85) Secondary (48.14) Higher secondary and above (50)	Primary and less (15.78) Secondary (36.84) Higher secondary and above (47.36)	Primary and less (2.65) Secondary (52.65) Higher secondary and above (44.69)	Primary and less (18.38) Secondary (63.97) Higher secondary and above (17.64)
HHs practicing Rubber monoculture (%)	2.09	1.85	10.52	2.65	28.67
Mean landholding under Rubber (hectare)	0.61	2.08	0.60	0.91	1.58
HHs earning from Rubber only (%)	80.62	75.92	89.47	80.30	68.38
Mean annual income from Rubber (Rs.)	90,603.25/-	3,97,131.04/-	98,889.34/-	1,53,543.30/-	2,01,635.30/-
Mean annual total HH income (Rs.)	1,01,984.45/-	4,12,953/-	1,18,099.87/-	1,65,685.50/-	2,39,248.50/-

Source: field survey

The lower Rubber incomes of the ST households can be attributed to their lower Rubber landholding size and lesser tappable trees (mean tappable Rubber trees under ST households' are 352.04) compared to those of the non-STs (466.35 mean tappable trees). On the other hand, lesser total annual household income on the part of the Tribal Rubber growers compared to the non-Tribal growers can be attributed to the lower Rubber landholding sizes by the STs as well as the lower proportion of these households deriving income from multiple sources (80.30% ST households earn from Rubber only as against 68.38% of the non-ST households).

HH Poverty Status

Table 3 shows that most Rubber growing households are poor (85.50%). Social group-wise, more Tribal households are found to be poor than the non-Tribals (87.12% and 82.35% respectively). However, the difference in poverty status between the two social groups is insignificant despite the later having higher total annual incomes. This again can be explained by the contrasting household sizes of the two communities (ST mean household size is 4.80 and non-ST mean household size is 8.02), benefitting the STs by reducing their minimum annual household income thresholds compared to the non-STs.

Table 3: Rubber Growing HHs' Poverty Status

Community	Poverty status
ST (No. of HHs)	Poor = 230 Non-poor = 34
	Total = 264 (87.12% poor and 12.87% non-poor)
Non-ST (No. of HHs)	Poor = 112 Non-poor = 24
	Total = 136 (82.35% poor and 17.64% non-poor)
Total	Poor = 342 Non-poor = 58
	Total = 400 (85.5% are poor and 14.5% are non-poor)
Two sample t test	Ho: No difference between poverty status of ST and non-ST Rubber growers.
	t = 1.2825 Pr (T > t) = 0.2004 (Not significant)

Source: Author's calculation based on field survey data

Influence of Livelihood Assets on HH Poverty

In the final logistic regression model, which intends to study the influences of the 11 individually significant sub-components and an interaction term on the household poverty status, five sub-components are found to be significant, viz., 'Householdsize' and 'labour type' of human assets, 'land under Rubber' of natural assets, 'savings' of financial assets and 'selling point' of social assets (refer Table 4).

Among the significant sub-components of the five livelihood assets, smaller 'HHsize,' larger 'land under Rubber,' 'savings' and RGS as the 'selling point' wield positive influence on household poverty as reflected by their respective ORs (>1). Smaller households require lesser minimum household annual income threshold to escape or remain free from poverty. Households' larger Rubber holdings (in this case >2 hectares) imply that they will own more tappable Rubber trees, more Rubber product, and ultimately earn higher income. Savings, along with providing monetary support in economic (crop damage) and/or non-economic distress (health emergency) to the households, also provide investment opportunities in additional livelihood-generating sources and improve economic solvency of the households. Moreover, when these growers sell their Rubber produce in RGSs instead of local markets or through home collection to private dealers, they enjoy unified price for their product, unlike the latter case where differential pricing is observed.

Table 4: Result of Logistic Regression Model

Asset	Sub-component	Odds ratio (OR)	Standard error	
Physical	1.Poultry and livestock	0.7074125	0.3437482	
	1.Housing condition	1.370339	0.613476	
Human	1.HHsize	6.762432 ***	3.273644	
	1.Training	2.11933	1.390708	
	1.Labour type	0.1211392 ***	0.0872942	
	1.Training#1.Labour type	1.121281	0.9726623	
	Education	1.Primary	2.557981	3.837973
		2.Secondary and above	1.207002	1.530448
Natural	1.Land under Rubber	6.113844 ***	3.282511	
Financial	1.Savings	8.783282 ***	4.572453	
	1.Subsidy	1.289167	0.6023047	
Social	1.RGS membership	0.4962801	0.2181683	
	1.Selling point	9.645537 **	8.379811	

Source: Author's calculation based on field data

Note: *Significant at 0.10, **Significant at 0.05, ***Significant at 0.01

In contrast, the family 'labour type' is found to aggravate the poverty conditions of the Rubber growing households significantly ($OR < 1$). By providing family labour in the plantations, the households save on tapping related labour cost of 200/- to 250/- per head per day or 40% to 50% of daily Rubber sheets produced as foregone labour cost. Despite this advantage, households using family labour do not benefit economically due to labour inefficiency ascribed primarily to lack of training. Though insignificant, trained family labour is found to improve households' economic condition ($OR = 1.12$). In fact, training, regardless of the labour type, can increase the likelihood that households are not poor ($OR = 2.11$).

Among the insignificant livelihood assets sub-components, except owning 'poultry and livestock' and having 'RGS membership', the remaining sub-components increase the possibility of the Rubber-growing households reaching non-poverty status. Currently, poultry and livestock farming serve nutritional requirement of these households throughout the year. Alongside household consumption, a few households also sell the livestock for meeting emergency credit requirement. Thus, it may be regarded as an easy-to-liquidate asset that allows poor households to negotiate in the credit-crunch situation. Lack of government support, together with ineffective or nonexistent self-help groups have led to rubber growers' ignorance of the financial benefits of commercial livestock production and hence full realization of its potentiality in income-generation in the study area.

The RGSs function as self-help groups and collectives in several ways, such as, supporting the delivery of subsidized planting materials and inputs, providing training in tapping, plantation management, and rubber processing, giving member growers more negotiating power over Rubber production prices than they would otherwise have when selling to private dealers through home collection or in local market and more. These societies boost the social capital status of the member Rubber growers through promoting networking, bonding and linking among the grower members. However, the RGSs in the study area, in many cases, tend to operate inefficiently. Rubber Board is supposed to oversee the formation, selection of president from the member growers by rotation and smooth functioning of the society within a compact area of 2-3 Kms radius. However as observed, the Board has not been proactive in promoting and supervising the formation and functioning of the RGSs in the study area. RGS leadership is found to comprise of representation from economically well-off people or large Rubber garden owners of the locality and non-rotation of leadership positions like presidentship within the designated timeframe using influence. Consequently, small Rubber growers who partake in RGSs with the hope of reaping collective benefits like free training, collective processing and selling of Rubber sheets at fixed yet higher than market price, fail to obtain so.

Most Rubber growing households in the study region are income-poor (refer table 3). The asset-poverty or asset-scarcity of the Rubber growers has led to low income and monetary poverty to a large extent. Table 5 reflects the poor livelihood assets conditions of these growers.

Table 5: HHs' Ownership/Access Status of Select Livelihood Asset Sub-Components

Items	Share of HHs (%)
Owning poultry and/or livestock	60
Keeping poultry and/or livestock for nutritional requirement only	97.5
HHs not having pukka housing	41.25
HHs having more than 4 members	60
HHs not received training on Rubber tapping and/or plantation management and/or processing	46.25
HHs having more than 2 hectares of Rubber land	12
HHs not having savings account	52.75
HHs not received subsidy from Rubber Board	37.5
HHs with no RGS membership	57
HHs selling Rubber sheets to RGSs	3.25

Source: field survey

The incidence of high share of Rubber households not commercializing livestock farming has been discussed earlier. Lack of decent housing among households, flooding and crop damage during rainy season which lasts for maximum duration of the year in Assam add to their woes. Considerable share of these households accommodates

large families (> 4) which puts pressure on the households in terms of increased income thresholds for survival.

Role of training is another important factor for these households. Unfortunately, 46.25% of Rubber households are untrained, causing damage to the Rubber plants while tapping as well as compromising the quality of the Rubber sheets produced.

Very few households own more than 2 hectares of Rubber land. In some cases, the lands where Rubber is grown by the households are under the ownership of forest department and are illegally occupied by the Rubber growers. These households in absence of legal ownership rights, remain ineligible for subsidy and other benefits like trainings and planting support from Rubber Board.

As shown in Table 2, most Rubber households earn from Rubber only and lack additional livelihood generation sources. Without additional income, possibility of savings shrinks. Not having savings accounts can also be attributed to non-receipt of subsidy from Rubber Board. Savings accounts are also necessary to receive subsidy from the Rubber Board. It has been observed that 37.5% of surveyed households have not received subsidy till the last tapping season. One of the reasons for non-receipt of subsidy is non-availability of land ownership documents with the growers. Without financial assistance from the Board, the growers lose interest in Rubber plantation.

The functioning of the RGSs remain the biggest challenge and the Rubber growers also fail to sell Rubber sheets through RGSs and enjoy unified pricing. Only 3.25% of Rubber households could sell Rubber sheets through RGSs during the last tapping season.

Concluding Remarks

Commercial Rubber plantation was initiated Assam as a permanent settlement-based livelihood generating avenue for the hill-dwelling ST communities. Rubber's commercial viability has also attracted various non-Tribal communities into plantations. However, as seen from the findings of the current study, most of the Rubber growing households of Assam have remained poor. The study also explored the influence of the livelihood assets on the Rubber growing households' poverty status. Some of the identified problems associated with existing asset bases of the growers are limited number of households opting for livelihood diversification, non-commercialization of poultry and livestock farming, inadequate training on plantation management, large HH size, land ownership issue, overall poor social capital status, etc.

To reduce the risk associated with monoculture, households may develop Rubber integrated farm livelihood systems, agro forestry and/or intercropping. There is urgent need for the Rubber Board to take up organisation of a greater number of free of cost training programmes relating to tapping, plantation management and diversification opportunities available with Rubber, etc. in the interior most Rubber-dense areas.

Improvement of the financial assets status of the Rubber growing HHs is expected to enhance HH wellbeing. Local Government along with the Rubber Board should encourage the Rubber growers to open or maintain savings accounts in financial institutions like Grameen Bank, Post office, etc. to receive the necessary subsidy and other supports from the government. Since most of these households are economically backward, Rubber planting or re-planting should be assisted by the Rubber Board through subsidy and other monetary benefits, training, disbursal of poly bags, fertilizer, seeds, intercropping support, etc. At the same time, households which intend to start planting or re-planting in illegally occupied land should be discouraged to do so to avoid irregularities in receiving financial benefits from the Rubber Board.

To improve social assets of the households, there is need for the Rubber Board to engage the Rubber growing communities in making the RGSs more active in facilitating smooth input delivery, price moderation, output sales, etc. Smooth functioning of the RGSs will also provide these households to sell their Rubber sheets through these societies at unified price and at lower transportation cost, thereby improving their financial wellbeing. Similarly, the growers, especially the women of the households may be encouraged to actively build and participate in self-help groups (SHGs) to learn additional livelihood generation skills like piggery etc., to save small amounts of money to develop new livelihood sources such that in the event of distress the diversified income basket help save the Rubber growing households from slipping into adversity.

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Annexure 1.

Area, Production, and Average Yield of Natural Rubber in Major States of India During 2020-21

State	Area (hectare)	Production (tonnes)	Average yield (kg/hectare)
Kerala	5,50,650	5,19,500	1534
Tripura	86,270	73,780	1277
Assam	57,735	34,130	1153
Karnataka	51,370	43,860	1275
Tamilnadu	21,260	19,710	1500
Meghalaya	16,610	9540	1100

Source: *Indian Rubber Statistics, 42nd Vol*

Annexure 2.**Area, Production, and Employment Generation under Rubber Plantation Sector in Top Five Districts of Assam**

Area (Hectare)				
District	2016-17	2017-18	2018-19	2019-20
Karimganj	(18746.00)	(16394.00)	(16429.00)	(16429.00)
Goalpara	(8895.84)	(9610.50)	(9610.50)	(9610.50)
Karbi Anglong	(8092.25)	(8589.85)	(8601.01)	((8601.01)
Kokrajhar	(2930.65)	(3390.04)	(3390.04)	(3390.04)
Kamrup	(3028.54)	(3181.54)	(3184.54)	(3184.54)
Production (Metric Ton)				
District	2016-17	2017-18	2018-19	2019-20
Goalpara	(4983.00)	(6789.00)	(6809.00)	(8615.00)
Karimganj	(3260.00)	(4194.00)	(3436.00)	(4365.00)
Karbi Anglong	(2518.00)	(2925.00)	(4867.00)	(5964.64)
Bongaigaon	(1206.00)	(1285.00)	(1805.00)	-
Chirang	-	-	-	(1685.00)
Kokrajhar	(1031.00)	(1667.00)	(2206.00)	(2206.00)
Employment generation (no.)				
District	2016-17	2017-18	2018-19	2019-20
Karimganj	(58488)	(51149)	(52572)	(63932)
Goalpara	(27755)	(29985)	(29990)	(28832)
Karbi Anglong	(25248)	(26800)	(26835)	(27770)
Kamrup	(9449)	(9926)	(9961)	-
Cachar	-	-	-	(9988)
Kokrajhar	(9144)	(10577)	(10606)	(10760)

Source : Compiled from Statistical Handbooks of Assam 2018, 2019 and 2020

Annexure 3.

Individual Sub-Components' Independent Influence on HH Poverty

Livelihood Asset	Sub-component		Odds ratio	Standard error
Physical	HH gadgets	1	2.4	3.056796
		2	2.117647	2.269632
		3	3.73913	3.892365
	Poultry and livestock		0.6208531*	0.1770666
	Housing condition		1.975594**	0.6090038
	Distance to market		1.672222	0.5353425
	Road condition		1.376977	0.6126207
	Vehicles	1	0.6959707	0.295258
2		2.068966	1.070709	
Human	HH size		4.519525 ***	1.401063
	Training		1.771186*	0.5254967
	Labour type		0.0816234***	0.025972
	Education	Up to primary	0.12*	0.1406272
		Secondary or above	0.2579618	0.2385326
Natural	Land under Rubber		11.81818***	4.064684
	Access to water for Rubber processing		0.7205527	0.2049974
Financial	Savings		10.77019 ***	4.500512
	Loan burden		1.203822	0.6674619
	Subsidy		1.691105*	0.5309637
Social	RGS membership		0.500236**	0.1541936
	SHG membership		0.898374	0.2794312
	Selling point		5.521978***	3.180485

Note: *Significant at 0.10, **Significant at 0.05, ***Significant at 0.01