TRANSFORMATION OF TRADITIONAL AGRICULTURE TO COMMERCIAL AGRICULTURE: A CASE STUDY OF NATURAL RUBBER IN TRIPURA

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Although Indian economy is growing rapidly, however there has been widening of income disparity in the society. The present study highlights the relevance of comprehensive policy approaches in transformation of the economically and socially marginalized groups engaged in *Jhumming* to commercial cultivation of natural rubber (NR) in Tripura. The better livelihood pattern of the NR growers has been reflected in terms of self-sustaining occupational shift. The previous land use pattern of the surveyed NR cultivators revealed that majority of the area presently under NR cultivation was previously barren land (66 %). The study suggests replication of the NR model in North and Dahalai districts of Tripura. This success model of Tripura could also be replicated in other regions of the country having similar socio-economic and agro-climatic conditions to ensure rural upliftment and livelihood security of rural peasantry.

Key words: Economically and socially marginalized groups (ESMG), *Jhum*, Land use pattern, Livelihood security, Natural Rubber (NR)

INTRODUCTION

Though the Indian economy is growing rapidly in recent decades, there has been widening income disparity in the society. In particular, India's rural sector has been struggling to shake off the legacy of poverty, low per capita income, and poor human development indices. The International Food Policy Research Institute (IFPRI), in its 2016 Global Hunger Index (GHI) ranked India 97th among 119 countries with GHI score of 28.5 (IFPRI, 2016). Thus, there is an urgent need for policy interventions at the grassroots to revive the rural economy by empowering the rural community with access to requisite livelihood. In this background, the present study is an attempt to analyze and highlight the transformation of the economically and socially deprived marginalized groups (ESMG) engaged in *Jhumming* to commercial cultivation of natural rubber (NR) in Tripura.

Tripura is the third smallest state of India located in the North East and whose 84 per cent of its boundary is encircled by Bangladesh. The state has varied topography, about 70 per cent consists of hills and small hillocks, the latter being called as tilla. The state being away from main land India, lacks basic infrastructure facilities. According to

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the 2011 census 73.8 per cent of the population belongs to rural section and primary sector contributes 27 per cent of the Net State Domestic Product (GOT, 2016). Thus for inclusive development of the state, it is mandatory to have innovations at grassroots level in rural area. In this regard, various administered attempts were made to uplift the unorganized farmers. The literature reveals the first attempt was made in 1931 by late Maharaja Bir Bikram Kishor Manikya Bhadur when he implemented *Jhumia* Settlement Scheme. Thereafter, many agricultural and horticultural based schemes by public sector agencies were implemented, but none of the schemes was successful in delivering the desired results of social and economic upliftment of the rural poor (Bhattacharya, 1992). In 1963, Forest Department of Tripura planted NR as a soil conservation measure and presently NR is the most viable industrial crop in Tripura (over 71,370 ha), cultivated by small growers who are mostly tribal people (Rubber Board, 2013-14). Although the valuable contributions of NR to the regional economy are widely acknowledged (Joseph *et al.*, 2009, 2010, 2012; Majumder *et al.*, 2014 and Sharma *et al.*, 2011, 2013, 2014a, 2014b), there has been an unsettled debate on the implications of the growing popularity of this cash crop in Tripura. An important allegation is centered on the alleged replacement of food crops by NR and the increasing dependence of the landlocked state on food brought from outside the state. Thus the present study was taken up to examine the trends in livelihood and land use pattern of NR growers in Tripura and to assess the factors responsible for large scale adoption of NR cultivation by the farmers in the state.

MATERIALS AND METHODS

The present study was conducted in Tripura. All the four districts (pre-bifurcated) namely West, South, North and Dhalai were selected for the study. As more than three fourth of the area under NR in the state is concentrated in the West and South districts, a sizable portion of the samples was selected from these two districts. The remaining two districts (North Tripura and Dhalai) are in the initial phase of NR expansion, hence they were also selected for understanding the transition phase in expansion of NR. A total of 158, 261 and 125 NR growers were randomly selected from South Tripura, West Tripura and North-Dhalai district/region, respectively based on the share of area under NR in each district, making the total sample size to 544 growers. The relevant primary data was collected by personal interview method during the period 2012-2015. Descriptive statistics was employed to analyze and interpret the data.

RESULTS AND DISCUSSION

Trends in livelihood earning pattern

The results of the study showed that the rural economy of Tripura is predominantly agrarian. Table 1 shows that 73.2 per cent of the sample households lead their life as cultivators and agriculture was their primary source of livelihood. It provided employment to a majority of the working population of the region and gave them their primary identity. In North Tripura and Dhalai, half of the households were having agriculture as their primary occupation while only 17 per cent of the households was found engaged as manual labourers. However, prior to inception of NR cultivation in the region, the livelihood of the rural population was mainly from manual labour. Although majority of the rural households was engaged in agriculture, the low returns from agriculture had forced the growers to look for alternative sources of income.

Table 1. **Occupational pattern of the respondents**

Primary occupation	District			Total
	South	West	North/Dhalai	
Cultivator/ Farmer	139 (88.0)	196(75.1)	63(50.4)	398(73.2)
Labourer	6 (3.8)	10(3.8)	21(16.8)	37(6.8)
Shopkeeper/ Businessman	5 (3.2)	23(8.8)	6(4.8)	34(6.2)
Job	7 (4.4)	31(11.9)	35(28.0)	73(13.4)
No clear arrangement	1 (0.6)	1(0.4)	-	2(0.4)
Total	158(100)	261(100)	125(100)	544(100)

Note: Figures in the parentheses are per cent of the total

The livelihood pattern of the growers prior to NR cultivation, presented in Table 2 reveals that the major occupation of the surveyed households was manual labour (44.5 %) and only 16.5 per cent was primarily dependent on agriculture. Among the sample households 14 per cent had no regular employment. Thus prior to NR cultivation, the rural economy of the state was incapable of providing sustainable sources of livelihood for the rural poor. As the state was landlocked, the rural masses had only few options available for a sustainable livelihood. Across the four districts covered, it was found that manual labour was the primary source of livelihood for majority of the households.

Natural rubber cultivation has brought a huge shift in the livelihood pattern of the rural population. The primary occupation of rural community has shifted from manual labour to cultivation of NR (73.2%). According to study conducted by Joby *et al.* (2010) in Tripura, NR cultivation has brought an overall increase of 112 per cent in the income of the farmers in the region. Apparently NR has brought about considerable socio-economic upliftment in the area. District/ region-wise analysis of livelihood earning pattern revealed that the shift was higher in districts having more NR cultivation. The highest share of growers earning from manual labour in West and South Districts (45 and 56%) shifted to growers earning from cultivation (75 and 88%). But in two districts (North/Dhalai) where NR cultivation is in the initial stages, the shift of livelihood is in a transition stage. The North/Dhalai region currently has 50 per cent households engaged in agriculture

Table 2. **Primary occupation of respondent household prior to NR cultivation**

Primary occupation	South	West	North/Dhalai	Total
Cultivator/ Farmer	27(17.1)	44(16.9)	19(15.2)	90(16.5)
Labourer	88(55.7)	116(44.4)	38(30.4)	242(44.5)
Shopkeeper/ Businessman	11(7.0)	49(18.8)	6(4.8)	66(12.1)
Job	10(6.3)	29(11.1)	31(24.8)	70(12.9)
No clear arrangement	22(13.9)	23(8.8)	31(24.8)	76(14.0)
Total	158(100)	261(100)	125(100)	544(100)

Note: Figures in the parentheses are per cent of the total

whereas prior to NR cultivation it was only 15 per cent.

The underlying fact revealed is that prior to NR cultivation the source of income in the rural economy of the state was characterized by uncertainty as majority of the households was labourers with fluctuating seasonal income. The subsistence agriculture followed in the area prior to introduction of NR failed to ensure sustainable livelihood to the rural community. With the introduction of NR in the state the rural mass got a new option for income. The institutional interventions of the Rubber Board and the State Government have provided good infrastructure and marketing network enabling the NR farmers to fetch good price for their produce (Sharma *et al*., 2013).

According to FAO (2009, 2013) "food security exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritional food which meets their dietary need and food preferences for an active and healthy life". In the light of FAO description, NR cultivation in Tripura is instrumental in ensuring food security by enhanced economic access to food among the rural tribes by enhancing their income. The low return trap in the state's *Jhum* based subsistence agriculture has changed with the introduction of NR.

NR is cultivated in Tripura for last five decades and improved the living standards of the local peasantry. But recently there has been some debate regarding encroachment of food crops area by NR and hence the land use pattern in the state and respondent households is discussed below. Before discussion on land use pattern, it is essential to first understand the topography of the state and impact of agro-climatic factors on it.

Agro-climate and topography of Tripura

Table 3 shows the profile of agro-climatic topography of the state. The state has varied topography and about 70 per cent of the land consists of hills and small hillocks, the latter being called as *tilla*. The altitude varies from 15 to 940 m above mean sea level. Moreover, the state experiences a very high rainfall ranging up to 2500 mm annually. Apparently, with high slope and rainfall duration for about six months, the agriculture in the area has to be developed in a precise manner to get good returns. The crops must be selected to withstand the adversities of the climate. The problem becomes more acute with the infrastructural bottlenecks. Even if a farmer sustains the adversity of climate in producing a crop he has to transport his produce to distant places like Guwahati to get better

Table 3. **Topography and agro climate in Tripura**

Classification of terrain	Area (Lakh ha)	Seasons	
High area	4000	Winter	December- February
Tilla land with moderate steep slopes	1600	Pre-monsoon	March-April
Tilla land with gentle to moderate slope	700	Monsoon	May – September
Rolling topography	2149	Post monsoon	October-November
Plain land	2042	Annual rainfall	1500 to 2500 mm
Total geographical area	10491		

Source: agritripura.in

return (as the state has limited demand). In this backdrop, NR got popularity because it could withstand the sloppy tracts of Tripura and its processed produce can be stored for a period of six months. With the marketing support of Rubber Board, Tripura Forest Development and Plantation Corporation Ltd. (TFDPC), Tripura Rehabilitation Plantation Corporation Ltd. (TRPC) and numerous dealers network, the growers receive comparatively good farm gate price (Sharma *et al*., 2014a). Thus the popularity of NR in the state is based on its adaptability to the local climate and topography and also on the institutional interventions/innovations to tackle the infrastructural bottlenecks.

Land use pattern of the state

The land use pattern/area under major crops sown in Tripura showed that rice is the major crop in the state with about 2.6 lakh ha covering 53 per cent of gross cropped area (Table 4). The horticulture section specifically fruits and vegetables are the second most important sector within agriculture contributing 1.1 lakh ha (23% of gross cropped area). Although rubber ranks third in terms of area it provides a stable livelihood to around 50,000 small growers in the state. The demand for crops like rice, fruits and vegetables is stable as the demand for these items are based on the local market and the scope of increasing area under these food crops is limited due to infrastructural bottlenecks. Moreover, raising these crops may ensure food security at the macro (state) level, but the fortune of the poor farmers will depend on the returns received, which according to present trends is very low. Das *et al*. (2011) in their study in Tripura revealed that during peak season pineapple farmers in the state receive non-remunerative price affecting their livelihood. Thus in order to fetch a comfortable livelihood, either infrastructure bottlenecks have to be removed or already successful crops like NR may be encouraged strategically as a tool of poverty alleviation and ensuring food security among the rural tribes by improving economic acess to food.

Table 4. **Area under major crops in Tripura (in hectares)**

Crops	2000-01	2005-06	2009-10	2014-15
Rice	241165	256078	244853	257273
Maize	1580	2150	1918	4519
Wheat	1065	2610	701	135
Pulses	10020	8544	6170	11664
Oilseeds	6260	3384	3422	6249
Sugarcane	1040	874	859	793
Cotton	910	1143	965	904
Vegetables	31300	25600	32500	39110
Fruits	28300	36500	36900	71180
Rubber	29737	36596	53769	70295

Source: Tripura Statistical Abstract, 2007; Tripura Economic Review 2011, 2015 and National Horticulture Board handbook

Terrain use pattern by NR farmers

Farmers in the state preferred plain lands with irrigation facilities to cultivate food crops like rice, fruits and vegetables etc. and *tilla* land (hillocks) for cultivation of NR. As the *tilla* land lacks proper irrigation facilities, they are uneconomical for cultivating food crops. NR being a perennial crop with well-developed tap root system can easily sustain in high rainfall zones where artificial irrigation is not required. Thus with the passage of time a symbiotic structure has been developed in the state where food crops are cultivated in the plain lands and NR in *tilla* lands. This point is well reflected in the survey results on the pattern of terrain use by the farmers in the state (Table 5). It was observed that 96 per cent of the surveyed

Table 5. **Terrain used for NR cultivation by the respondents**

Terrain of the land	Number of respondent growers cultivating NR in the specific terrain	Total area under the terrain group (Lakh ha.)
Tilla land (Hillocks)	521 (96.0 %)	2.30 (21.7 % of total area)
Plain land	15 (3.0%)	2.04 (19.8 % of total area)
Both	8 (1.0 %)	-
Total	544 (100 %)	

NR growers cultivated it on *tilla* land. Around 2.3 lakh ha *tilla* land is available in the state, giving a greater scope for further expansion of NR in the state.

Land use prior to shifting to NR cultivation

The results of the land use pattern of the surveyed NR cultivators, prior to shifting to NR, presented in Table 6 reveals that maximum area under the present NR plantations were previously barren lands (66%), followed by bamboo cultivation (16%) and *Jhum* (11%). The shift to rubber from food crops like rice and fruits and vegetables was 0.6 per cent and 3.1 per cent, respectively. Across different caste categories, it is seen that majority of the present NR plantations were previously barren lands. In a recent study using satelite-based remote sensing techniques, it was shown that there has been practically no conversion happened from food crops to NR in Tripura (RRSC & RRII, 2012).

Reasons for adoption of NR cultivation

The study also tries to understand the reasons/factors responsible for the shift in favour of NR cultivation. In order to understand the reasons for the transformation the sample farm households were asked few specific questions on the factors which have encouraged them to take up NR cultivation. The factors as mentioned by the respondents are presented in Table 7.

It is evident from Table 7 that majority of the respondents (79.6 %) shifted to NR cultivation for better income. While higher income was the prime motive for 45.4 per cent of the respondents, 34.2 per cent of the

Table 6. **Category of land brought under NR cultivation by the respondents according to their castes prior to NR cultivation**

	General	OBC	SC	ST	Total
Barren land	96	73	75	116	360(66.1)
Jhum cultivation	11	7	6	34	58(10.7)
Rice	2	0	1	0	3(0.6)
Fruits and vegetables	9	3	2	3	17(3.1)
Forest Trees/ Timber	3	1	2	5	11(2.0)
Bamboo	20	28	24	17	89(16.4)
Cotton	1	3	2	0	6(1.1)
Total	142	115	112	175	544(100)

Note: Figures in the parentheses are per cent to total

Table 7. **Reasons for adoption of NR cultivation by the respondents**

Category	Good source of income	Failure of other crops	Income of fellow farmers	Others	Total
General	64	20	45	13	142
OBC	49	14	45	7	115
SC	58	14	29	11	112
ST	76	24	67	8	175
Total	247 (45.4)	72 (13.2)	186 (34.2)	39 (7.2)	544 (100)

Note: Figures in the parentheses are per cent of the total

respondents shifted to rubber due to the demonstration effect *i.e.,* having convinced of the better fortune realised by the fellow farmers from NR cultivation. Failure of other crops was cited as the reason for the shift by 13.2 per cent of the respondents.

CONCLUSION

The study revealed the transformation of the agricultural sector of Tripura from a primitive *Jhum* based subsistance system to a highly commercial NR based system due to the better livelihood ensured by the crop and the requisite institutional interventions. Five decades ago NR was introduced in Tripura as a soil conservation measure and presently it plays a key role for the sustainable livelihood and nutritional security of the rural economy.

The study revealed that the rural economy has transformed from a labour based subsistence agricultural economy to a commercial plantation based economy. The primary occupation of the rural community has currently shifted to commercial agriculture (73.2%) while prior to introduction of NR the primary occupation of these growers was manual labour (44.5%). The maximum area under the present NR cultivation was previously barren land (66%), followed by bamboo (16%) and *Jhum* cultivation (11%).

Tripura is a landlocked state. For inclusive development of the state it is mandatory to develop the primary sector of the state. The success story of NR shows the transformation of a primitive society to a commercial high income group, which has multiple effects. In the present context, the two districts or zones of the state *i.e.*, West and South have adopted NR to a large extent while NR cultivation in other regions is still in the early stages. Hence, to extend the economic benefits of NR cultivation to the resource poor rural farmers, it is important to encourage cultivation of the crop in the North and Dahalai regions also. This success model of Tripura could also be replicated in other regions of the country having similar socio-economic and agro-climatic conditions to ensure rural upliftment and nutritional security of the downtrodden.

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