

# Political Economy of Natural Rubber Cultivation in Tripura

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## *Abstract*

The agrarian economy of Tripura has been undergoing a process of transition from a rice producing food-crop to NR based commercial crop economy since the 1990s. The central and state governments have been promoting NR employing policy tools including discriminatory land use and crop subsidy system in the state. The emergence of Natural Rubber (NR) as a lucky crop in the international market by 2003 has also contributed to the shift in cropping pattern in Tripura. The NR being an international commodity, its price is volatile with deep troughs and sharp peaks, which the small and subsistence farmers find difficult to cope with it. It is argued that government agencies have promoted NR at the cost of the food security as well as the livelihood of people in the state to cater to the interest of capital in the automotive tyre manufacturing sector, dominated by large industrial houses in India and MNCs. For the last three years, the price of NR has been plummeting to reach its ever recorded trough in 2014, endangering the relative living standard of NR farmers as well the regional food security in the state.

Key words: Natural Rubber, Tripura, blockplanting, automotive tyres, Jhumias.

## **Introduction**

Natural Rubber (NR) has emerged as a lucky crop in the international market by early 2003 and continued till 2012 (Fox and Castella 2013). India is the fourth largest producer of NR in the world (2012-13) with a share of 8.11%. NR cultivation is traditionally confined to the hinterlands of southwest coast, viz., Kerala state and Kanyakumari district of Tamil Nadu. As area for NR expansion in traditional NR growing region has saturated, NR cultivation has been vigorously extended to agro-climatically marginal lands for NR in the north eastern states. Tripura, the land locked state in the north-east, is one such marginal land for NR where NR cultivation has been fast expanding in India particularly since the mid 1990s. The relative profitability of NR has attracted land, labour and capital to NR cultivation from other crops, particularly rice in Tripura. In this backdrop, this paper attempts to seek answers to two questions: (i) Has the observed expansion in area under NR in Tripura been a natural response of the rational farmer to its relative profitability? (ii) Is the relative profitability of NR state-managed on behalf of large capital parked in automotive tyre sector? These questions warrant analysis of crop-specific policies of state and central governments in facilitating the crop shift to NR cultivation and the consequences of the crop shift in terms of income, employment, landholding structure and livelihood of vulnerable groups in Tripura. The discussion is organised as follows: Land holding structure and shift in cropping pattern are discussed in Section One. Emergence and spread of NR is discussed in the Second Section and consequences of crop shift is analysed in Section 3, followed by a conclusion.

## **Section 1**

Every crop is not equally important to the state and the state's interest is manifested through its policies related to land use, crop subsidies, crops specific promotional schemes and extension

activities. Shift in cropping pattern from food crops to commercial crop is synonymous with agrarian transition and has been described as the cause of widening food crisis globally in the recent past (Weis 2013). The literature on crop shift falls broadly under two paradigms. The neo-liberal literature relates the area expansion of a crop to current and expected price (profitability) of the crop in question in relation to its next best competitive crop cultivable in the agro climatic zone. The technical relationship is called supply response to price change in which price is an outcome of the interplay of market forces. A major lacuna in the technically defined neo-classical production function is that it ignores the influence of non-market factors such as government policies in the price formation of agricultural commodities. There has been a sizable literature on crop shift from political economy perspective in the recent past (Plog J 2010; Akram-Lodhi and Kay 2010). The cultivation of a commercial crop like NR integrates the local economy with the domestic and international markets. In the process of integration of the local economy with the national and international markets, large capital interacts with the petty producers, particularly marginal and small farmers, workers and local government (Lenin 1967). The branch of agriculture that attracts investment from within and outside the geographical boundary prospers while other crops die down (*ibid*). Apparently, the transformation process marginalises and eventually evicts cultivators of traditional crops (fading crops). Marginalisation and eviction process is stated to be state mediated. There are different means of state mediation, *viz.*, land use policy, crop linked discriminatory subsidies, land tenure system to ensure security to the investment on land, crop specific provision for input supply and market intervention in a market economy. The market plays the role of eliminating the inefficient producers by price volatility of input and output markets. Land and crop related policies are designed to release land for the cultivation of the crop of interest to the capital. The political economy analysis of crop shift and its consequences on the livelihood of the economically and socially vulnerable groupings assume importance in the context of Tripura.

The study is based on a primary survey of 500 rural households distributed in proportion to the relative share in workforce by districts. Primary survey was administered before the district reorganisation in January 2012 and the survey was confined to South Tripura and West Tripura districts during June-September 2011. More than 70% of population in Tripura lived in West Tripura (46.97%) and South Tripura (23.84%) districts. In terms of area under NR cultivation, South Tripura accounts for 47%, West Tripura 40%, Dhalai district 11% and North Tripura 2%. The shift in cropping pattern was more prominent in the southern and central part of West Tripura district and South Tripura district. The northern side of the West Tripura district, lying adjacent to Dhalai district, was covered to represent area with little significant change in the cropping pattern. However, Dhalai and North Tripura districts were excluded from the survey frame as these districts were mostly under forest cover and further significant change in cropping pattern is yet to happen.

In the discussion on cropping pattern and land holding structure of Tripura, phases of migration to the state is inevitable because 48% of sample households in the study area reported that they had migrated to the place mostly during 1940s through 1960s. Immigration of non-tribal population to the tribal economy of Tripura did take place under different historical junctures mostly necessitated by economic and social situations. Tripura has a geographical area of 1.05

million hectare, of which 0.45 million hectare is available for cultivation (27% of the geographical area) and 60% of the area is under forest cover. Tripura is primarily agriculture dependent economy as 46% of the total workforce ekes out living from farming either as cultivators (27%) or as agricultural workers (20%). Scheduled Tribe (ST) and Scheduled Caste (SC) labour supply major share of the labour force to farm operations. In the operational holdings, 85.17% of holdings belong to marginal farmers (< 1 hectare) and 9.75% of operational holdings belong to small farmers (between 1-2 hectare of land). Irrigated farm land constitutes only 20.90% in Tripura as compared to the national average of 48% of gross cropped area. Hills and hillocks cover 70% (Tilla land) and rice growing plain land (Lunga land) constitutes only 30% of gross cropped area. Average size of holdings in the state is 0.52 hectare and it is the lowest among seven north eastern states as well as that of the national average of 1.16 hectare in 2010-11 (Government of India, 2013). Among ST population, 5.4% and 3.7% of SCs are landless while the national average of landless rural ST households constituted only 3.6% in 2010-11. Given the landholding structure and practice of cultivation in the state, households having one Kani (local unit of land measure equivalent to 0.067 hectare of land) is as good as having only homestead. Landholding structures in sample districts (West Tripura and South Tripura districts) have shown that households with less than one Kani of land constituted 49.44% of the total sample households in South Tripura and 29.38% in West Tripura. West Tripura district has a developed south and relatively less developed north where ST and SC population predominantly live. The relative share of landless (homestead only) households from STs in Tripura is less as compared to other social groups because of restrictions on land transactions from Tribal to non-tribal population in the area under the jurisdiction of the Tripura Tribal Areas Autonomous District Council (TTAADC), which controls about 68% of land area in the state. Table 1 shows landholding structure of sample households from West and South Tripura districts in Tripura. A higher share of large, medium and semi-medium type of farms with ST population is also attributable to legal restrictions on land transaction from STs to non-ST population in the area under TTAADC.

**Table 1. Landholdings by Social Groups in South and West Tripura (percentage share)**

Land holding size (Hectare)	General	OBC	SC	ST	Total
Landless (>0.0617 hectare)	24.75	33.33	22.77	19.15	100
Marginal (< 1 hectare)	28.93	34.68	22.97	13.42	100
Small (1-2 hectare)	22.9	27.85	25.37	23.88	100
Semi- Medium (2-4 hectare)	16.37	20	25.45	38.18	100
Medium ( 4-10 hectare)	13.33	26.67	6.67	53.33	100
Large (> 10 hectare)	0	0	0	100	100
Total	24.2	31	22.2	22.6	100

Note: 1. OBC-Other Backward Caste; SC-Scheduled Caste; ST- Scheduled Tribe  
2. 0.0617 hectare stands for one Kani or 40 cents of land (local unit of land measure in Tripura)

Source : Field survey

**Crops and Land Use in Tripura :** Tripura has experienced several crop cycles over the years. Important crops grown in Tripura are rice, pulses, oil seeds, vegetables, plantation, fruit crops, potato and cotton. The NR is the second largest crop in Tripura (56000 hectare) after rice

(0.273 million hectare) in 2010-11. Table 3 shows the cropping pattern from 1980-81 to 2010-11. Three important observations emerging from Table 3 are: (i) area under rice cultivation has significantly declined over the years and; (ii) area under NR cultivation has registered phenomenal increase during the period under reference. Further, area under other traditional food crops such as wheat and mesta have declined while the area under vegetables and spices have marginally expanded; (iii) area under jute and cotton, two crops with considerable employment potential after rice cultivation, have declined over the years.

Cultivable land in Tripura falls under two types: (i) valleys or Lunga land and (ii) upland or Tilla land. Rice, pulses and vegetables are grown in lunga land. It is the plain tract laying between two hillocks. Fruit crops and wild trees are grown in tilla land, which is undulating and sloppy land on the high land. The West Tripura district accounted for more than 40% of the total cultivable land and 45% of rice fields in Tripura. Cultivation practice in Tripura can broadly be classed under four heads, viz., (i) lunga crop; (ii) tilla crop; (iii) Jhum cultivation by Jhumias in forest land and (iv) garden land cultivation where households maintain fish-pond for both own use and commercial purpose. Rice is cultivated twice a year in the valleys (April-August and August-November or December-March).

Table 2. Area under Important Crops in Tripura-1980-81 to 2010-11 (Area in 000 ha)

Crop	1980-81		2001-02		2010-11	
	Area	% share	Area	% share	Area	% share
Rice	287.62	87.56	246.09	66.29	262.32	60.68
Wheat	5.16	1.57	1.13	0.3	0.8	0.19
Jute	4.27	1.3	1.32	0.36	0.48	0.11
Mesta	9.55	2.91	1.66	0.45	0.78	0.18
Pulses	5.58	1.7	8.57	2.31	7.5	1.74
Rubber	3.59	1.09	30.58	8.24	51.3	11.87
Vegetables	NA	NA	24.61	6.63	29.75	6.88
Others	13.89	4.22	51.72	13.93	73.54	17.01
Total	328.47	100	371.25	100	432.27	100

Source: 1. Economic Review, Tripura (2010-11)

2. Rubber Board, Govt. of India

3. Debajit Chakraborty (2011)

Rate of growth in area under rice had been positive till the mid 1990s and it started declining since then. Rice is grown in wet land (*lunga*) whereas NR is planted in upland (*tilla*). Taking cue from the experience of traditional NR growing regions where area under rice cultivation has significantly fallen, crop shift to NR take place in different phases and it is governed primarily by economic as well as non-economic crop specific reasons. The crop specific reasons are: (i) NR has thick and widely spread out canopy which prevent sunlight underneath. As rice is grown in valleys, NR trees from bordering upland of rice fields shade and prevent rice plants from its potential yielding; (ii) NR is a drought resistant tree and its roots go deep in the ground leading to ground water depletion; (iii) rubber leaves takes longer time to dissolve into the soil and it therefore prevents rain water accumulated on NR leaves from absorption in the soil; (iv) Farmers in West and South Tripura district reclaimed their traditional fish-pond, a staple food item of

the people in Tripura, to plant NR. The economic reason is that (as it happened in Kerala and Kanyakumari district of Tamilnadu) capital, labour and small patch of land were withdrawn from less remunerative rice to more profitable NR crop. Moreover, as employment available from rice fields decline, a section of them (able bodied male workers) migrate to other occupations causing shortage of labour for rice cultivation leading to leaving fallow the rice fields or grow crops of less employment elasticity mostly for the sake of keeping the land under cultivation. It is rather difficult to bring the rice fields back into cultivation of rice once it is partially reclaimed.

Agricultural map of Tripura can be divided into NR crop dominated West Tripura (South and central region), South Tripura districts and non-NR districts (North Tripura and Dhalai districts). The northern part of the West Tripura district grow mostly vegetables, rice and other food crops while the southern part of Dhalai district has started growing NR in the recent past. The change in cropping pattern over the years in Tripura is measured with Simpson Index (SI) (Joshi et al 2004). The SI ranges between '0' to '1' representing two extreme scenarios. The '0' represents a scenario of skewed land use pattern while '1' indicates an ideal situation of total crop diversification or equal land distribution for all crops grown. The Simpson Index of Diversification is given as:

$$SID = 1 - \sum_{i=1}^n P_i^2$$

Where:  $P_i$  is the proportion of area under  $i^{th}$  crop in the Gross Cropped Area.

The SI has increased from 0.35 to 0.60 between 1980-81 and 2009-10. The NR has carved out substantial area by 1980s and the crop has established as the most remunerative crop in the state by 1990s. It shows that the land use is fast changing from a rice based food crop to an NR based commercial crop system. Crop diversification takes place either by bringing in uncultivated fallow land under crop (land augmentation) or by way of crop substitution. For a perennial crop like NR, cropping intensity does not change significantly as net and gross cropped area remain the same. The observed increase in SI is contributed more by land augmentation than crop substitution in the 1970s and 1980s. It indicates that the geographical potential to expand area under NR through land augmentation was saturated by early 1990s and crop substitution was the only feasible option to expand area under NR for the last two decades in Tripura.

### Occupation

The share of agricultural workers from SC and ST in the workforce is higher than general population. Engagements in gainful economic activity of sample households are classified into eight groups representing broadly the 9 fold National Industrial classification. Following observations can be made from Table 2: (i) relative share of part-time farmers in the workforce is higher than the share of full time farmers; (ii) 21.76% of NR growers reported as part-timers as they spend less time on management of NR plantation and their main source of income is from the non-farm activities while 9.76% of farmers reported NR cultivation as their main source of livelihood; (iii) NR cultivation provides wage employment to only 1.49% of the workforce

in tapping or harvesting of NR. Tapping of NR is a skilled job requiring apprenticeship for 3-6 months. However, there is no female wage labour doing tapping work or engaged in manual work in NR plantations. Tapping is a male and younger age group centred occupation. A social group wise analysis of the occupational structure revealed that only 5% of cultivator households from ST were engaged in NR cultivation.

Table 3. Primary and Secondary Occupation (Relative Share)

Occupation	Primary status	Secondary status
Cultivators (excluding Plantation crops)	27.54	57.94
Wage labour (farm sector)	32.40	11.74
Natural Rubber cultivation	9.79	21.76
Natural Rubber Tapping	1.49	0.04
Tea plantation workers	2.20	0.00
Industry, Trade and commerce & Transport	9.78	6.76
Service sector	16.96	1.76
Total	100	100

Source: Primary survey

In the light of the observed expansion in area under NR, it is important to examine the change in primary occupation during the last one decade in Tripura. The issue of memory lapse is rather minimal in this case because cultivators and wage labour do remember the type of crops they have grown in the recent past. The relative size of cultivator and wage labour has remained more or less unchanged while the percentage of full time farmers engaged in NR plantations has increased from 3% in 2001 to 9.76% in 2011.

## Section II

### Emergence of Natural Rubber Cultivation in Tripura

Tripura is the second largest NR growing state in India. The state accounted for 7.5% of the area under NR in the country in 2010-11 (Rubber Board 2012). Although NR was introduced in Tripura in the 1950s, state government has started the propagation of NR only in 1963. It is envisaged that area under NR will be expanded to cover 0.10 million hectare accounting for about 25% of the total cultivable land in the state by the end of the 12th Plan period. In terms of rate of growth in area, Tripura ranks first among prominent NR growing states in both traditional and non-traditional regions in India. The productivity of NR was 1146 kg/ha in 2012-13 against the national average of 1867 kg/ha and of Kerala 1949 kg/ha (ibid). A distinguishing feature of NR production sector in Tripura *vis a vis* Kerala and Tamilnadu is a higher share of large holdings (23%) as compared to the national average of 10% in the total NR area in 2010-11 (ibid). The factors, which have pushed NR into prominence in the agricultural map of Tripura need to be located from its supply and demand side factors. The supply side factors are intended to attract land and capital to NR from other crops, particularly rice. The supply side factors included a comprehensive package comprising: (i) input subsidy, (ii) land use policy favouring NR, (iii) vigorous extension services for NR, and (iv) institutional support for post-harvesting process. The crop specific demand side factors were: (i) establishment of Rubber Producers Societies for

processing and marketing of NR under the initiative of the Rubber Board and (ii) regulation on the foreign trade of NR, particularly its imports. During the 1990s through 2000s, barring a few years in the second half of 1990s and early 2000s, the boom in the price of NR in the international market driven by the multiple effect of boom in the export market for automotive tyre sector has pushed up the domestic and international market for NR in India.

The NR price grew at the rate of 18.20% per annum during 2005-06 to 2011-12 while the rate of growth in the price of rice (9.2%) and vegetables (8.80%) were half of the price rise of NR during the reference period. Moreover, the market for rice remains slack during its peak production season when farmers make the maximum sale whereas NR production is more or less uniform round the year barring 2-3 months during winter season in Tripura. There has been a marked crop shift to NR since the middle of 1990s. Relative share of NR growers in the total sample size of cultivator households has increased from 18.48% to 41.40% during the last 5 years (2007-11). Conversely, proportion of rice cultivators has declined from 72.28% to 50% during the reference period. However, there has been a marginal increase in vegetable and banana growers and it is attributable to various incentives of the state as well as central governments for area expansion of horticulture crops. Important reasons for the crop shift to NR as reported by farmers were the following: (i) 75% of farmers who had shifted to NR reported that higher income, (ii) vigorous extension programme of the Rubber Board; (iii) attractive subsidy schemes of the Rubber Board; (iv) lukewarm response of the State's Department of Agriculture particularly towards rice and other traditional crops growing farmers'; (vii) relative profitability, steady market and stable price supported with institutional mechanism of the Rubber Board; (viii) provision of employment with minimum wages for the first seven years of NR plantation under the Block Planting Scheme for ST farmers; (ix) no government intervention in the market for rice in the peak production season and non-remunerative price of rice.

The area expansion of NR in Tripura can be categorised under three distinct phases. Those phases are partly linked to the development of capital in the rubber goods manufacturing sector, particularly automotive tyre manufacturing (Table 4). The 1960s through 1970s marked the first phase of NR plantation in Tripura. In this phase, the Forest Department of Government of Tripura took initiative to plant NR in forest land as part of its afforestation drive in the first half of the 1960s. NR cultivation was extended further as a means to rehabilitate the Jhumias in Tripura during the 1970s. The first phase of NR propagation had therefore been not vigorous enough to attract private land and capital to NR for the following reasons: (i) compared to rice and other traditional crops in Tripura, return from NR was not impressive enough to attract farmers during 1960s and 1970s; (ii) extension of NR by the Rubber Board was more rigorous as compared to rice and other crops in Tripura; (iii) domestic production of NR was more or less sufficient enough to meet the domestic demand for it as there had been restrictions on the production of vehicles, tyres and its foreign trade in India during this period;

The second phase of NR cultivation was commenced from early 1980s and ended in 1991. Unlike the Phase 1, farmers had largely been attracted to NR cultivation, particularly small and medium farmers. During the 1980s, NR in private land had increased by 569%. The Rubber Board and other state agencies strengthened their intervention in the NR sector and preferred

Table 4. Expansion of Natural Rubber Cultivation in Tripura and Development of Automotive Tyre Industry

Period	Major Interventions	Impact on NR Production Sector	Development in the Automotive Tyre sector
Phase-1	1. Forest Department of Tripura introduced NR in the forest land in 1963.	Total area under NR upto 1979 was only 1965.25 hectare.	Out of seven automotive tyre manufacturing companies, first four companies were MNCs accounting for 80% of total installed capacity (Mani, S. 1993).
1960s & 1970s	2. The Rubber Board initiated propagation of NR in 1967.	The response from the private sector to NR cultivation including small farmers was indifferent.	NR consumption was more or less equal to its production.  Rice cultivation was remunerative.  There was adequate state's support for rice and other crops..
	3. Formation of Tripura Forest Development and Plantation Corporation (TFDC) as joint venture between the Government of Tripura and Ministry of Environment and Forest, Govt. of India in 1976. Rehabilitation of Jhumias was the objective of the programme.	Only 23.09 hector of area could be attracted to NR cultivation from private sector.	
Phase-11	4. The Rubber Board set up a regional office at Agarthala in 1979 with a demonstration plot of 85 hectare at Taranagar.		
	1. Formation of Tripura Rehabilitation Plantation Corporation Limited (TRPC Ltd) in 1983. Rehabilitation of 3977 tribal families in 5094.80 ha rubber plantations was the objective.	1. From 1981 to 1990 area under NR increased by 569%.	1. Tyre Industry was delicensed in 1988.  2. NR production was short of its consumption by 10% to 20%
1980s	2. Established demonstration plot at Tulakona (14.32 ha) and Surendra Nagar (100 ha) in 1985.	2. Phenomenal increase in area under NR in the private sector from 74 hectare to 2604 hectare (3418% increase). Small and medium level farmers from other crops were attracted to NR.	3. Administrative regulation on the production of tyre and vehicles were withdrawn.  4. MNCs have been forced to withdraw from Indian market and the influence of domestic capital on policy became more prominent.
	3. The Rubber Board established Nuclear Rubber Estate and Training Centre (NRETC) in 1984 at Agarthala.		
Phase-III	Rubber Board introduced Block Planting Scheme in 1992 under the auspices of the World Bank.	1. Land allotted to tribal was planted with no crop other than NR.	1. Domestic demand for automotive tyre has significantly increased during 1990s and 2000s.
1990s and 2000s	Formed Rubber Producers' Society (RPS) and established group processing facility at the village level.	2. NR was propagated very vigorously among farmers of all types and crops. Area under NR has increased from 2604 hectare in 1991 to 11079 hectare in 2005 (325%).	2. Export of tyre has increased as percentage of domestic production from 2% in 1992 to 30% in 1997 (Mohanakumar and Geoge 2002).
	Opened up branches of M/s Manimalayar Rubbers (A joint venture with the Rubber Board) for the purchase of NR from farmers through RPS and for the uninterrupted supply of inputs including chemical fertilisers to NR farmers during 1990s.	3. NR has emerged as the dominant crop in Tripura	3. MNCs have started setting up manufacturing units in India.
	Established a Regional Rubber Training Centre under the World Bank Scheme in Agathala.	4. NR price has become highly volatile.	4. Influence of automotive tyre manufacturers in government policies.
	Formation of Tripura Rubber Mission by the state government for the extension of NR cultivation		



relatively peaceful, fertile and plain land (*Tilla*) in West and South Tripura districts for NR expansion. The Rubber Board established Nuclear Rubber Estate and Training Centre (NRETC) at Agarthala for the propagation and extension of NR in 1984. Moreover, the newly created Tripura Rehabilitation Plantation Corporation (TRPC) had considerably expanded its activities for NR in the 1980s. Factors facilitated NR expansion in private land was: (i) foreign capital in the automotive tyre industry in India was in its withdrawal phase on account of State's regulations on foreign capital in the 1970s; (ii) relative profitability of NR (with respect to rice and other traditional crops) supplemented with vigorous extension programme of the Rubber Board facilitated the spread of NR from the supply side. Delicensing of automotive tyre industry in 1988, relaxation of restrictions on export of automotive tyre, emergence of large monopoly houses in the automotive tyre manufacturing sector, a relatively higher growth of the national economy in the 1980s, spurt in tyre production resulting to a deficit in NR supply had further boosted up the domestic demand for NR during the second phase.

Introduction of the World Bank aided Block Planting Scheme or Tripura Block Plantation Project (BPS) in 1992 marked phase III of NR expansion in Tripura. The objective of phase III was to attract marginal and small farmers of other crops to NR cultivation and expand the area under NR to one lakh hectare by 2020. The BPS funded by the World Bank and implemented jointly by the Rubber Board and Government of Tripura (Department of Tribal Welfare). Under the BPS, the Rubber Board planted NR either in own land or government allotted land to tribal population in Tripura and nursed the plantation for 11 years until it is handed over to the original owner of the land. A Block constitutes 50 hectare of contiguous land. The stipulation of 50 hectare of compact patch of land to constitute a Block Planting of NR ensures that the government allotted land to STs is used only for NR cultivation. Under the scheme, title holder of the government allotted land enters into a legal agreement with the Rubber Board through the Tribal Welfare Department of Tripura. By the agreement, the government allotted land is kept under possession of the Rubber Board to plant NR for a minimum period of 11 years. The cost of raising the NR plantation (first seven years) is shared between the Rubber Board (40%), Tribal Welfare Department of Tripura government (50%) and the title holder of the land (10%). The contribution of owner farmer (title holder of the land) is notional and the amount is adjusted against the family labour services supplied to the plantation. An institutional mechanism viz., Rubber Producer Cooperative Society (RPS) has been created for farmers of Block Plantation for primary processing and marketing of NR. The RPS is entrusted with the responsibility of arranging of high yielding planting materials to farmers and other inputs to NR growing farmers. Under Phase III, NR has emerged as the first preferred crop by farmers in Tripura and NR became the second largest crop after rice in terms of area. Another distinguishing feature of the Phase is that the Rubber Board has become the single agency to propagate NR while other state level agencies including forest department have partially or fully withdrawn by setting up Rubber Mission for the expansion of NR in Tripura.

#### **Discriminatory subsidy for NR in Tripura**

The area under NR cultivation recorded 89% growth in Tripura between 2000-01 and 2010-11 and it was the highest rate of growth in any state including traditional and non-traditional area of

NR. The discriminatory crop subsidy scheme for NR cultivation clearly showed that the Central Government through the Rubber Board had vigorously promoted NR in Tripura. The amount of subsidy per hectare of NR cultivation in Tripura is 48 percent higher than the subsidy for traditional NR growing states, viz., Kerala and Kanyakumari district of Tamilnadu (traditional NR growing regions). The NR friendly subsidy policy exists not only in the amount of subsidy per unit of land, but land sealing as well. NR growers in Tripura avail subsidy for NR upto 5 hectare of land whereas the land sealing for availing subsidy in traditional NR growing region is limited to two hectare of land (Table 5). It was found that the price of NR grew at an annual rate of 18.20 percent while the price of rice and vegetables grew by 9.20 percent and 8.80 percent respectively between 2005-06 and 2010-11. Alongside, there has been a substantial decline in the schemes and fund for general agricultural sector during the last one decade in Tripura. For rice, allocation is made for different schemes in the budget every year but kept unspent. Further, the extension work for rice cultivation had been virtually stopped or paralysed. In the words of an agricultural officer in Tripura "the government allot funds for schemes under rice in annual budget but kept unspent and returned to the state exchequer at the end of the financial year. There is severe shortage of technical personnel to undertake extension activities of rice and other traditional crops. Seed for rice cultivation has not been made available on time for the last many years.

Table 5. Comparison of Subsidy to NR cultivation in Tripura and Traditional NR growing states

Item	Tripura (Non-Traditional NR growing region)		Kerala & Tamilnadu (Traditional NR growing regions)	
	Land ceiling (in hectare)	Subsidy amount per hectare (Rs)	Land ceiling (in hectare)	Subsidy amount per hectare (Rs)
Planting grant	Upto 20	22000	Upto 2	19500
Planting material grant and cost of transportation	Upto 20	8000		No subsidy
Irrigation	Upto 20	3000		No subsidy
Fencing	Upto 20	12500		No subsidy
Supply of rubber seeds, bud woods, budded stumps, budding tape and polythene bags for raising nurseries free of cost	RPSs, RGSS, SHGs, NGOs	No upper limit	RPSs, RGSS, SHGs, NGOs	No subsidy
Rubber sheeting rollers	Nil	10000		No subsidy
Smoke house	Nil	20000		No subsidy
Effluent treatment plant	nil	8000		No subsidy
Primary processing and marketing	Provide subsidised inputs and buy rubber from farmers	A joint venture company under the initiatives of Rubber Board and RPSs has been formed (M/s.Manimalayar Rubber Pvt Ltd)	Provide subsidised inputs and buy rubber from farmers	Only processing and buying (no input subsidy)
Exposure visits	All farmers	Free of cost to Traditional areas	All farmers	No subsidy

Source: Compiled from Rubber Growers' Companion 2012

### **Crop Substitution and Employment Effect**

Employment effect of the crop shift from rice to a perennial crop like NR has been studied in greater detail in the context of Kerala (Mohanakumar and Chandy 2004). For rice fields, female agricultural workers from ST and SC supply 70% of the labour requirement. Moreover, female members of cultivator households do work with hired labour in own rice fields during peak agricultural operations in Tripura. Conversely, tapping is a male oriented work and female work participation is limited to weeding operations in the immature phase of NR plantations accounting for less than 3% of total man days required in NR plantation over its life cycle. During the first six years of NR cultivation (immature phase in NR plantations), 1041 man days of employment are generated from a hectare of land, of which 578 days are required in the first year of planting (Rubber Board 2011). From second year to sixth year of planting of NR, employment days fall significantly from 168 days to 44 days per hectare of land. In the 7<sup>th</sup> year of NR cultivation, employment days would increase to 162 days including 140 days of tapping (harvesting NR trees), 15 days for weeding and 7 days for manuring in a hectare of NR plantation. The employment effect of NR substituting rice can be summarised as: (i) rice field is operated twice a year and the minimum days of employment (estimated under the assumption that tiller and thrasher are used) from a hectare of rice field in a season or six months is 250 man days or 3500 man days for seven years (under the assumption that the crop is grown twice a year) while NR provides only 1203 man days for 7 years; (ii) in rice cultivation, 78% of total workers are females whereas NR cultivation provides only 3% of its total employment days to female workers; (iii) man days available in a plantation progressively declines over the years while man days in paddy field remain constant; (iv) in mature NR plantation, male workers of the age group 18-50 are employed, while no such gender-age constraint operate in rice cultivation. In rice fields, between two seasons, seasonal vegetables and pulses are grown providing additional man days to wage labour. The fall in employment days due to the substitution of rice with NR particularly for female workers in the SC and ST category may be viewed in the backdrop of the recently observed trends in rural labour market in Tripura (Government of Tripura, 2009). The farm dependent population is as high as 55% in rural Tripura and a higher percentage of female agricultural workers is attributable to the rice dominated cropping pattern in the state. Further, among STs, 77% of the workforce depends on rice farm related activities for livelihood. It is a matter of concern that the extent of decline of ST workforce in agriculture is minimal from 78% to 70% during the last inter-censal period. It was found that a male worker is employed for 17 days and a female worker for 15 days in a month in the agricultural sector in Tripura. In the NR growing area, there was a shortage of labour for agricultural work and the daily wage rate was also a little higher than the rice producing area. The daily wage rate for agricultural labour was Rs 120 and Rs 200 for female and male labour respectively in NR dominated West and South Tripura districts in 2011. It was Rs 70 and Rs 120 respectively for female and male labour respectively in 2008. However, the hike in wage rate does not compensate for the loss in the days of employment.

## Income Effect of NR Cultivation

Table 6. Gross Income form NR and Paddy in Tripura in 2011

Crop	Production (kg/hectare)	Price (Rs/kg)	Income (Rs)
Natural Rubber	1219	210*	255990
Paddy (one season)	4800	9.5	45600
Hey (by- product of paddy)-one season	Gross income from kani of paddy land		Rs 2500
Annual income from rice cultivation (two seasons)	9600	9.5	96200

Note: 1. Paddy production per Kani (40 cents) is 800 kg in a season. There are two rice season in year. In the first season paddy fetched a price of Rs 7.5/kg and in the second season, Rs 11.5/kg (boiled paddy) in 2011. The average price is estimated as Rs 9.5 kg. There is no significant difference in productivity between seasons.

2.\* The price of NR (Grade IV) for the period April to December 2010 is considered. The price during the reference period was Rs 213.84. The average price of NR has declined to Rs 100/kg during the last six months. If the income from NR is estimated with reference to the price during the last six months in 2014 will be half of the price prevailed in 2011. Farmers in Tripura get Rs 3-4 less than their counterpart in Kerala. For estimating income from NR plantation, Rubber wood is not accounted for. From a hectare of land, rubber wood fetch about Rs 4.5 lakh at the terminal stage of NR plantation, i.e., on completion of 25-30 years of NR planting.

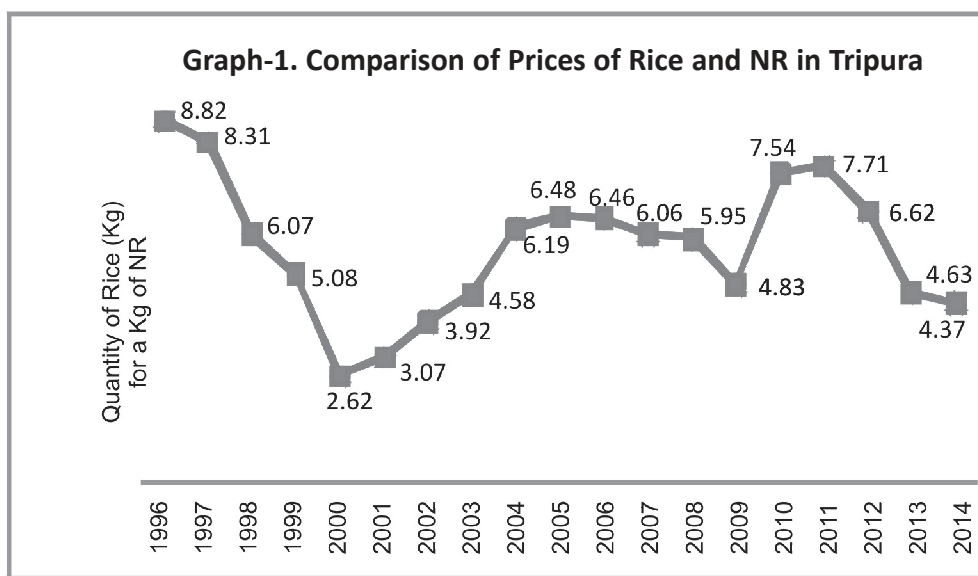
Source: Primary survey

Analysis of income from a hectare of land of NR and rice showed that NR commands income advantage over the cultivation of rice. Moreover, subsidy for NR amounts to Rs 30000 per hectare of land while no such support system exists for rice farmers in the state. Annual net income of NR farmers from a hectare of land in West and South districts in Tripura was 920% higher than its income from rice cultivation. It is clear that a higher return for NR crop is not attributable to market determined price difference, but largely the result of state intervention in reducing the supply price of NR over rice.

Food security issue in Tripura assumes significance primarily on account of its demographic profile. However, food grain production in the state still hovers around 6.5 lakh tone (2011) with a deficit of 1.26 lakh MT of food grains including pulses, corn and wheat. A recent study on nutrition level and food security has revealed that there was difference in nutritional intake between the tribal and non-tribal population in Tripura (Government of Tripura, 2007). The shift in cropping pattern in Tripura assumes significance in this context. The questions posed in this context are: (i) how would the income be distributed from NR cultivation? (ii) what would be the exchange ratio between rice and NR? (iii) who would benefit from increased NR spread and who would be the loser?

In the rural area, the cultivator households make only essential purchase from the market and the demand for rice, vegetables and fish are met from home production. In West Tripura, for almost every house, there is a fish pond in the homestead and fish is the staple food of the people. There are areas where NR cannot be planted and people from such area may find a depletion in their relative living standard as rice and vegetable price do not increase as much as the increase in NR price (till 2011-12). It implies that farmers with NR cultivation would be able to purchase more quantity of rice than they used to consume because of the advantage of relative price of NR *vis a vis* rice. However, NR being an international commodity and its price is highly

volatile and the price of NR has plummeted to Rs 100/kilogram in November 2014 from Rs 238 in April 2011. The price of NR has been on the decline for the last three years. What would happen to farmers and workers who do not have any other source of income to survive other than NR. Graph 1 compares the price of rice, the staple food of Tripura and NR from 1996 to 2014.



Source: 1. The Indian Rubber Statistics  
2. Ministry of Agriculture, Government of India

The degree of volatility in NR price Since 1993 is such that the price remains remunerative for 4-5 years with mild fluctuations followed by sharp decline for 6-7 years. It was found that one Kilogram of NR could buy 8.82 kg of rice in 1996 while the purchasing power of NR declined to three Kg of rice in Tripura in 2014. The substitution of rice with NR has reduced the employment days for casual workers especially for the ST and SC population and further, the fall in NR price consecutively for the last three years have cut back the buying capacity of the NR farmers who are left with little alternative source of livelihood.

#### **Impact of NR cultivation on Land Market**

Like any other commercial crops, NR cultivation has helped develop land market in the state. In the total sample households, 21.82% reported that they had possessed land by purchase and 64.20% had inherited land. A higher proportion of sale than purchase by a particular section of the society is indicative of the gain and loss from the newly emerged crops and its consequential developments in land distribution. The distribution of sample households by social groups and sources of land under possession has revealed the following: (i) STs have made the minimum purchase of land during the last five year period; (ii) STs owned land mostly through government allotment. A district-wise comparison of land under possession by type has revealed that land market is more developed in South Tripura as 26.11% of the land possessed was from purchase

against 19.38% in West Tripura. General community recorded minimum sale and maximum purchase of land during 2006-2011. In the sale of land, West Tripura district accounted for 41.94% and South Tripura recorded 58.06%. The purchase of land in West Tripura is on a higher side as compared to South Tripura because the land in the northern part of the district was bought mostly for NR cultivation and the higher land purchase was also on account of fast development of NR cultivation.

## Conclusion

The agrarian economy of Tripura has been undergoing a process of transition from a rice producing subsistence state to NR based commercial crop economy. The central and state governments have been promoting NR in Tripura employing discriminatory land use policy, crop- subsidy system for NR, step-motherly policy to non-NR crops including partial or full withdrawal of financial assistance and near total withdrawal of extension service to rice and other traditional crops. The supply price of NR is kept low with the subsidy as compared to next best alternative crops in Tripura. The Rubber Board along with the state government have started vigorous extension schemes for NR since the early 1990s. The period coincided with the unprecedented expansion in the domestic and international markets for automotive tyres in India. The rigorous expansion of area under NR was rather essential for the large capital parked in automotive tyre manufacturing industry. The NR has emerged as the second largest crop in terms of area under cultivation in Tripura by 2012. However, NR being an international agricultural commodity, its price is subjected to higher order of volatility resulting in virulent ups and down in the purchasing power of NR in terms of rice. Further, the introduction of NR has tilted the land distribution in favour of the rural rich including tribal groups while non-NR growers find sharp decline in their relative living standard. As rice land could be converted to NR farms, the reverse is impossible to rice and, therefore, the state sponsored shift in cropping pattern favouring a particular commercial crop for the large industrial houses at the cost of employment, livelihood and food security of people has serious consequences on social and economically vulnerable groups in a land locked state like Tripura. The experience of Tripura underlines the importance of ensuring food security and income to its people by the state under the neo-liberal economic regime.

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- i Agro-climatically suitable land for Natural Rubber (NR) cultivation in India is classified into traditional and non-traditional regions. The traditional region is optimal for NR cultivation while non-traditional is agro-climatically sub-optimal or marginal land for NR cultivation. The state of Kerala and the Kanyakumari district of Tamilnadu state are the traditional rubber growing tract. Non-traditional areas so far identified as suitable for NR cultivation are hinterlands of coastal Karnataka, Goa, Konkan region of Maharashtra, hinterlands of coastal Andhra Pradesh and Orissa, certain areas in the northern parts of West Bengal, and seven states in the north east. Among non-traditional tracts, Tripura is considered to be the optimal area for NR
  - ii There were only four districts in Tripura until January 2012. For administrative convenience, the state of Tripura has been divided into eight districts, 23 subdivisions and 45 development blocks - with effect from 21st January 2012. The four new Districts are Khowai Unakoti, Sipahijala and Gomati. Unokotti is the new district formed by slicing and joining together the northern parts of north Tripura and Ambassa districts. The primary survey for the study was conducted in June 2011 and there were only four districts in 2011. From the study, Ambassa and North Tripura districts were excluded primarily because these two districts are scarcely populated and virtually the NR cultivation and cropping pattern remained more or less unchanged in those districts
  - iii The land came under possession of households in the state by way of following channels: (i) purchase, (ii) inherited; (iii) government allotment (to ST population) and, (iv) mutual land exchange or Exchange System. Land ownership by means of Exchange is particular to the state of Tripura. During partition and thereafter till 1960s, Muslim households from Tripura migrated to Bangladesh (erstwhile East Pakistan) while Hindu population from Bangladesh migrated to Tripura. Muslims who had migrated from Tripura to Bangladesh exchanged their land in Tripura with the Hindus in

East Pakistan who had migrated to Tripura during the eve of Independence. Mutual exchange of land was the only option as the land market was equally underdeveloped in East Pakistan and Tripura in the 1950s and 1960s and further agriculture was the main stay of livelihood for these migrant population.

- iv Only 6% of the population in Dhalai district is classified as urban. It was rather difficult to administer primary survey in the area and NR cultivation has just started spreading in the area adjacent to South Tripura district of Dhalai. In North Tripura district, NR cultivation has not started in any significant scale
- v It could be observed during the field survey that farmers from India cross guarded Indian fencing in the morning and return after the farm work in the evening and there exist a card system with which the armed force monitor the entry and exit. The land lying between fencing and actual line of control belong to farmers in the boarder of India and the land cannot be sold as there is little demand for such land.
- vi Harvesting of NR plant is called tapping. Tapping is done with a specially made knife. The cycle of tapping task starts from morning 4 am and ends by 12 noon. The daily wage rate in Tripura for tapping is the same as the wage rate for other agricultural workers (Rs 150-175 daily) for a task of 300 trees. In other states, particularly Kerala and Tamilnadu, tapping task is performed on piece rate basis and a worker earns about Rs 450 for tapping 300 trees which is even on lower side as compared to the daily wage prevailing in Kerala for casual labor (Rs 550/daily).
- vii The expansion programme of the National Bureau of Soil Survey and Land Use Planning has identified 0.45 million hectare of land in north east region including 0.10 million hectare of land in Tripura as ideal for NR planting.
- viii The estimation is based on the statistics supplied by the Rubber Board office (NRETC) in Agarthala, Tripura

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**S. Mohanakumar**

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