Expansion of Natural Rubber Cultivation in Tripura: Impact on Landholding, Employment and Income

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Preface

North East Research Centre (NERC) at V.V.Giri National Labour Institute has been set up with an objective of promoting research on themes specially related to labour and employment issues pertaining to India's North Eastern Region, comprising of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim. Identifying and involving concerned institutions and individuals who are working on similar issues was the first task before NERC. It is in this context that a National Workshop was organized during 19 - 20th November, 2009 at Agartala, Tripura in which invited resource persons presented papers and proposals on their ongoing and proposed research on various dimensions of labour in North Eastern States. As a follow upto this Workshop, a set of research projects were commissioned by the NERC on select and prioritized areas/themes. The present working paper by S. Mohanakumar, titled, 'Expansion of Natural Rubber Cultivation in Tripura: Impact on Landholding, Employment and Income is an outcome of one of these projects.

This study is based on a field survey of cultivators and agricultural workers including those engaged in the cultivation of Natural Rubber in two major districts (West Tripura and South Tripura-before the reorganisation of districts in January 2012). The author has exposed the nexus between different agencies of the state in propagating the crop of interest to the state and large capital. Natural Rubber (NR) is one of the boom crops in the international market for the last two decades. The crop is used for the manufacture of tyre and non-tyre products and the tyre segment is dominated by a few large industrial capital. The NR has been vigorously propagated under the tutelage of the state and central governments by substituting traditional food crops, particularly of the socially vulnerable sections in the society. The emergence of NR as the predominant crop in the state has changed the production relations in the state economy. The study has vindicated the ways in which the land, livelihood, food security,

gender and environmental issues cropped up with the propagation of NR in the state of Tripura.

I believe the study has debunked the perception that the substitution from food crops to commercial crop is not market driven but the outcome of a deliberate policy shift of the state and central governments. I congratulate the author for the excellent and time bound work and thank Dr. Anoop K. Satpathy for skillfully coordinating this project for the NERC / VVGNLI.

V.P. Yajurvedi
Director General

Contents

Chapter 1

Introduction

Agro-climatic variations explain the spatial differences in the pattern of crop production. As the purpose of production graduates from subsistence to the market, the exchange value rather than the use value of the commodity becomes the prime determining variable of the cropping pattern. The shift to commercial crop is a natural corollary of the process of social development of the farm sector. For the last two decades, Natural Rubber (NR), which is grown as plantation crop predominantly in South East Asia, has emerged as a boom crop with price stability and significant price growth in the domestic as well as international markets (Fox J. and Castella J.C. 2013). India is the fourth largest producer of NR with a relative share of 8.52 percent of the world NR Production in 2009 (Rubber Board, 2013).

Agro-climatically suitable area for NR cultivation is classified into traditional and non-traditional region in India. The non-traditional area accounted for 22.14 percent of NR produced in India in 2011-12. Tripura is the largest NR growing state with a share of 37.64 percent (59285 hectare) in area under NR in the non-traditional region in 2011-12. In the total cultivable area in the state, NR accounted for 11.85 percent in 2011-12 and further the area is planned to be expanded to 0.10 million hectare accounting for 25 percent of the total cultivable area of the state in 2020 (Rubber Board 2020).

The area expansion of NR could be made possible by withdrawing the staple crops, *i.e,* rice and other traditional food crops, mainly of *Adivasi* community from Tripura. There is significant difference in the employment elasticity between NR and food crops, particularly rice and therefore the crop shift has its implications on food security, employment and livelihood of the people. Three major changes have occasioned in major NR growing regions in South East Asia, viz., Thailand, China, Vietnam, Malaysia, Laos, Cambodia and Myanmar since the late 1980s (Fox J. and Castella, 2013).

(i) Oil palm has substituted NR in Traditional NR growing area in Thailand, Malaysia and Indonesia and pushed NR to non-traditional and agro-climatically less suitable zones;
(ii) In Laos and Cambodia, international capital has invested in NR plantations. In such countries, cultivations and wage labour have

been struggling to retain their control over forest, garden and swidden land to the big capital. Small holders and workers have lost their source of livelihood.

(iii) In countries where NR has been expanded in small holdings, income of NR cultivators has increased as compared non-NR cultivating farmers.

Foreign capital has largely been invested in NR plantations during the last two decades (Fox J. and Castella J.C. 2013). In other countries, cultivators of traditional crops, mostly food crop growers substituted with NR under the state mediated land transfer for the commercial crop used in the manufacture of tyre and rubber products. More than half of the NR produced in India is used in tyre manufacture and the industry is controlled by less than 10 large industrial houses. During the last two decades, the non-tyre manufacturing sector has been under a process of consolidation characterised by the forced extinction of cottage and small scale producers from the market. Three important questions assume importance in the context of the crop shift to NR: (i) *who does NR cultivation?(ii) who takes the surplus form NR cultivation? And what does one do with the surplus? Further, what are the gender, environmental, livelihood and ecological implications of the shift in cropping pattern? Another aspect especially relevant in Tripura context is the land question between Adivasi and non-Adivasi groups.* Concretising from these questions, it is worth examining the social group which gain and loose from the crop shift. Pertinent questions in the context are: Why did the Central and State governments promote NR cultivation? What are the social and economic implications of the crop shift in Tripura? The study is an attempt to answer these two questions. The discussion is organised in four chapters. The first chapter lays out the background, theoretical framework, locale and sample of the study. The socio-economic profile of sample households is discussed in chapter 2. Chapter 3 analyses the cropping pattern and the crop-specific discriminatory policies of the state and central governments. Section four concludes the study with policy prescriptions.

1.1. Background of the Study

Tripura is the seventh smallest state in India. Prior to independence, Tripura was a Scheduled Tribe (ST) dominated state. The expansion of non-tribal population in the state was primarily facilitated by migration from Bangladesh and West Bengal and the migration has downsized the relative share of ST population into 31.75 percent in the state in 2011[1]. For

the last two decades, there has been a significant shift to the cultivation of Natural Rubber (NR). The shift in land use pattern is attributed to relative price factor of NR *vis a vis* rice and vegetables. The NR cultivation is propagated mostly in the North and South Tripura districts, where non-Adivasi people live and the NR cultivation is primarily confined to the same set of population. The experience of the socially vulnerable section elsewhere is any guide, it is logical to presume that a major share of the farm dependent population, especially the agricultural labour, are drawn from Scheduled Tribe (ST) and Scheduled Caste (SC). A crop shift favouring less labour intensive non-food crop is likely to have consequences on employment and livelihood of the socially vulnerable in the society. Following objectives are examined in the light of the observed shift in cropping pattern in Tripura.

1.2. Objectives of the Study

1. To study the cropping pattern in Tripura over time;
2. To analyse crop specific policies of the state and central governments (commodity boards) in facilitating the shift in cropping pattern;
3. To study the consequences of the spread of NR on land market, employment and food security of vulnerable sections in the society.

1.3. Literature on Crop Shift

The history of agriculture is always the story of demise, emergence and re-emergence of crops. The shift in cropping pattern from food crops for subsistence to commercial crop production for the market is synonymous with agrarian transition from a lower to a higher order of social production relations. The shift in crop production transforms the social character of production, exchange, distribution and consumption. The literature on crop shift falls broadly under two paradigms. The neo-classical literature relates the area expansion of a crop to current and expected price (profitability) in relation to the next best competitive crop cultivable in the agro-climatic zone. The relationship is established with statistical models known

[1] The ST population is comprised of 19 sub-tribes. *Tripura and Reang* are two important tribal groups in the state together accounting for 71% of the total tribal population. The Scheduled Caste (SC) accounted for 17.40% of the population in the state in 2011.

popularity as production function. The productions function is defined as simple and technical functional relationship between input and output. In neo classical parlance, the technical relationship is called supply response to price change. In supply response function, price is an outcome of the interplay of market forces. The interest of the dominate class and groups manifested through the policies of the central and state governments do influence the supply price of agricultural commodities. In sharp contrast to the stark reality, technically defined neo-classical production functions ignore the influence of non-market factors such as government policies in price formation of the commodity. In the context of the present study, supply response model has little relevance.

There has been a sizable literature on crop shift from political economy perspective in the recent past. The political economy forwards certain empirical outcome of the shift in cropping pattern to commercial crops. Such propositions are applicable to the shift from food crops to NR too. The cultivation of a commercial crop like NR integrates the local economy with the national 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. The special branch of agriculture that attracts investment from within and outside the geographical boundary prosper and other crops die down. Apparently, the transformation process marginalises and eventually evicts cultivators of traditional crops (fading crops). Marginalisation and eviction process is state and market mediated. The state mediation is effected mainly through land use and tax policies. There are different means of state mediation, viz., land use policy, allotment of land to vulnerable sections, crop linked subsidies, land tenure system to ensure security to the investment on land. 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. In a study, Cout de et al has made the following observation on the introduction of agro fuel crop:

> Several governments have taken steps to identify 'idle' land and to allocate it for commercial agro fuel production. Yet growing evidence raises doubts about the concept of 'idle' land. In many cases, land perceived to be 'idle', underutilised, marginal or abandoned by government and large operators provide a vital basis for the livelihoods of poor and vulnerable groups. The tenure status of such lands may also be complex,

> with governments asserting land ownership but exercising little control at local level and local groups claiming resource rights bases on local tenure systems that may lack legally enforceable status (citing White and Dasgupta, 2010).

The observation by Nyari and quoted in White and Dasgupta (2010) on state mediated crop shift reads as follows:

> Look at all the sheanut trees you have cut down already and consider the fact that the nuts I collect in a year give me cloth for the year and also a little capital. I can invest my petty income in the form of a ram and sometimes in a good year I can buy a cow. Now you have destroyed the tress and you are promising me something you do not want to commit yourself, where then do you want me to go? What do you want me to do? (White and Dasgupta, citing Nyari 2008).

The promoters of the *lucky* crop paint rosy the relative profitability, employment potential and rural development of the crop. The last two attributes of the crop depend on the post-harvest value addition and its retention in the rural area. For crops of commercial use, the value addition often takes place in core while the role of rural peripheries is confined to supplying raw material. The state, capital and crop nexus work out tacitly. The crop is introduced as solution to several pressing concerns of the society including rural development, livelihood of the vulnerable food security and energy related concerns. It helps the state justify its land and crop discriminating policies. Eventually, the government declares huge subsidies, tax concession, and other implicit benefits for the crop to attract investment.

Further, the uneven development of the farm production sector intensifies the process of social peasant class differentiation. The likeness in the interest of the newly formed class help land acquisition, forest conversion and finally the introduction of newer technologies particularly oriented towards the production and processing of the sunny glow of new boom crop, which is the alternative to the livelihood of workers and cultivators. The shift in cropping from food crops to commercial crop for the national and international market transforms the social production relations, agrarian structure and the dynamics of capital accumulation.

The classical agrarian question of the 18th and 19th century pre-supposes that the displaced peasantry declassed into wage labour are directly employed in capitalistic agriculture and therefore the peasantry does not

encounter the crisis in social reproduction (Bernstein, 2006). The process of making available land through non-market measures or state mediation is called primitive accumulation (Marx, 1984). It has been argued that state mediated primitive accumulations have considerably reduced under the neoliberal regime, giving rise to different forms of land transfer through non market measures (Byre, 2005). Agriculture has been made a non-remunerative and unreliable source of livelihood for peasants. Peasants loose their tiny patch of land as means of production and are pushed into wage labouring. Unlike in the past, the declassed peasantry are in a crisis of social reproduction as the declassed peasantry do not get sufficient days of employment and income for subsistence and reproduction.

Although the crop change has always been a part of the development of agriculture, yet the pace of shift, commodity characteristics, scale and purpose of production assume special significance particularly in the neoliberal era. The political economy paradigm analyses the crop shift in terms of social relations of production, reproduction, structures of accumulation and class differentiation. In a society where there exists marked difference in the purpose governing production between Adivasi and Non-Adivasi community, the relations of production include within the broad contours of production, distribution, consumption and exchange, other concerns related to gender, livelihood of the vulnerable, food security, ethnicity and marginalisation. What has not yet been sufficiently explored is the social change and its different dimensions related to crop shift from traditional food crops to commercial crop for the domestic and international market. In the context of Tripura, livelihood and food security concerns are equally important.

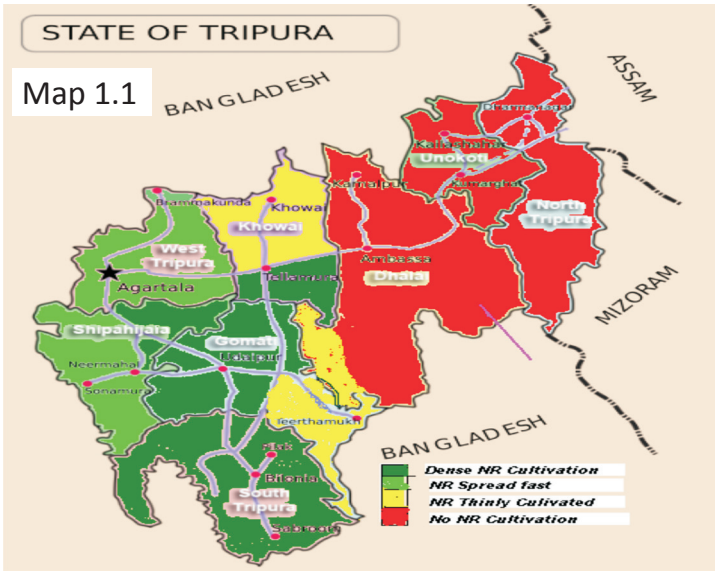
1.4. Data Collection, Method and Tools

The study approaches the shift in cropping pattern in Tripura from the political economy perspective. Political economy refers to the science which studies social relations that evolve between people in the process of production, distribution, exchange and consumptions. Political economy analysis of a social phenomenon involved three major actors, viz., politics (the state), society and economy. In the context of the present study, the shift in cropping pattern is analysed with respect to the policies of the state aimed at protecting the interests of dominant social classes. Further, it lenses the process of change than the outcome of the shift in cropping pattern.

The study is based on a primary survey of 500 rural households distributed between wage labour and cultivators[1]. A multistage stratified random sampling method was used to select sample households. In the multistage sampling, Gram Panchayat was the first unit and village was the ultimate one. The geographical region is surrounded by the deltaic basin of Bangladesh except for a small part in the north east adjoining to Catcher district of Assam. In the low lying and flat terrain land, people practice permanent cultivation while a certain section in the ST community still practice *Jhum* cultivation. The primary survey for the study was held in June-September 2011. The state of Tripura had only four districts when the survey was held[2]. (The state was reorganised in January 2012), 15 civil sub-divisions, 31 Development Blocks, 183 Taluks and 874 Revenue Villages. The primary survey for the study was designed with the administrative structure existed prior to the reorganisation of the state in January 2012. The Tribal District Council, administer directly 67 percent of the total area in Tripura and the Council has power of administration and control pertaining to matters such as land allotment, use of canal for irrigation, *Jhum* cultivation, village health and dispensaries, sanitation, policing, markets and transports. The council is responsible for the management of protected forest under its jurisdiction. The data for the study has been elicited from the primary survey of 500 rural households covering farm workers and cultivators distributed in proportion to the population size of respective groups from South and West Tripura districts of the state. The shift in cropping pattern appeared to be more prominent in the southern and central part of West district and South district while the northern side of the west district, lying adjacent to Dhalai district is covered to represent area with no significant change in cropping pattern. However, Dhalai[3] and Northern districts have been excluded from the survey as the area is mostly under forest cover and there is little change in cropping pattern. It is worth mentioning in this context that the secondary data on different aspects of the agrarian economy of Tripura is hard to come by and the scanty data is less reliable too.

The data elicited through primary survey was supplemented with the following: (i) interaction with officials in the state agriculture department, (ii) research and extension staff in commodity boards; and (iii) Focus Group Discussion (FGD) and interviews with political leaders and social activists.

It may be noted that NR cultivation started in the south Tripura district, followed by the southern part of the West Tripura District[4] . This part of the state represents food crop substitution with NR ranging from 50



percent to 75 percent. Based on the spread of NR (as in ferred from the data furnished by the officials of the Rubber Board in Agarthala office), Grama Panchayats (GPs) were classed as Intensive NR cultivation GPs, Moderately NR cultivation GPs and No or Minimum NR cultivation GPs. From the survey frame, North Tripura and Dhalai districts were excluded for following reasons: (i) those two districts are mostly hilly and covered under reserve forest areas where NR cultivation is banned in forest land by the Ministry of Environment of Government of India in 2005; (ii) the districts are sparsely populated and the cultivation is mostly confined to subsistence farming; (iii) field survey in the area is compounded further by issues related to insurgency.

Chapter 2

Socio-Economic Profile of Sample Households

2.1. Social Profile

The society is an expression of the specific character of social life of people. It is rather a well accepted fact that there is no mono-system anywhere and the traits of worn out production relations remain along with the dominant mode of production. The socio economic formation is therefore defined as a society at a certain definite stage of historical development and further every socio-economic formation has its formative elements known as basis and superstructure. Table 2.1 shows the composition of sample households by social group.. The proportion of ST population in the sample is 24 percent as compared to the state average of 31.75 percent in 2011 . It is primarily on account of the bias in the sample. The study was confined to non-adivasi dominant districts in the state, viz., West and South Tripura districts while ST population is concentrated more in North Tripura and Dalai districts. A broad categorisation of sample population in terms of religious groups revealed that 2.5 percent of the sample population were Christian, 1.5 percent were Muslims and the rest belonged to Hindu religion.

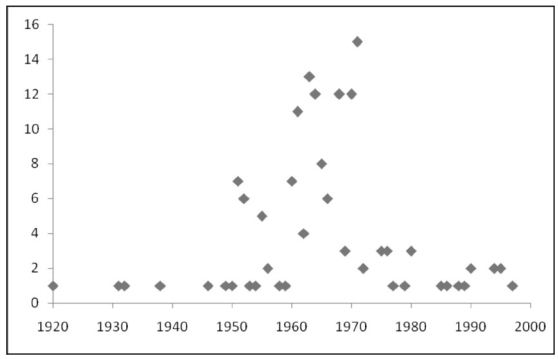
Table 2.1
Sample Households by Social Group

Social Group	Relative share
General	25.60
OBC	31.00
SC	19.20
ST	24.20
Total	100.00

Source: Primary Survey

The NR cultivation in private land is propagated in non- adivasi population of the state, who are mostly migrants from Bangladesh and other parts of India (West Bengal). The economic status of households may be analysed in the backdrop of whether the household is a migrant or not. It is reported that 48 percent of sample households are migrants mostly from Bangladesh. Figure 2.1 shows the period of migration from Bangladesh to Tripura. It is found that major part of the migration took place in the 1950s through 1970s.

Figure 2.1
Migration of people from Bangladesh to Tripura



The incidence of migration from Bangladesh to Tripura had left its consequences on the life and culture of aboriginals in the state. The political, cultural and social life of people of adivasi population in Tripura did clash with the migrant population resulting in insurgency and related violence in the state. As the flow of migrant population gained control over the polity of the state, the migrant population did command over the polity and economy of Tripura. It is rather natural that the political power and the constituents of the state were over represented by the interest of the migrant mob and was apparently detrimental to the very means of livelihood of the native population in the state. The shift in cropping pattern and advancement towards state mediated commercialised agriculture may be viewed against the backdrop.

2.2. Economic Profile and Landholding Structure

Economic profile of sample households assumes special significance in the context of the study. As the economic impact of the shift in cropping pattern vary across economic groupings in a socio-economic formation, economic profile of different social groupings are important. The land holding structure in West and South Tripura districts of the state revealed the following: (i) proportion of landless households (below 1 *kani* or 0.40 acre in rural are considered as landless or households with homestead land or no significant agriculture) accounted for 49.44 percent in South Tripura district and 29.38 percent in West Tripura district. The NR cultivation is more developed in the South Tripura and it has left its impact on the development of land market in the district. The West Tripura district has

a southern and a northern part. The southern part is occupied more by non-adivasi population whereas the northern part is adjacent to the Dalai district, where Adivasi population is dominant. The NR cultivation in the southern part of West Tripura is more developed than northern part. In the northern part, vegetables and traditional food items are cultivated. It could be a manifestation of the relative difference in the spread of NR between these two districts in the state; (ii) marginal farmers constituted 32.22 percent and 37.81 percent in South and West Tripura districts respectively; (iii) large farmers are absent in South Tripura while 0.31 percent of farmers owned more than 10 hectare of land in West Tripura. In West Tripura district, land holdings are more skewed in the northern part than in the southern part where NR spread is higher.

Table 2.2 shows the distribution of land by social groups in Tripura. The average size of land holdings of ST in Tripura is on a higher side as compared to other social groups. Restrictions on land transaction in the Tribal District Autonomous Council for *Adivasi* (ST) people in the state have greatly contributed to the skewed land holding structure in the state. Landless category or households with less than 1 *kani* (0.40 Acre) of land is more among Other Backward Caste (OBC) as compared to SC, STs and others..

Table 2.2
Landholdings by social groups in Tripura (percentage Share)

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

Source: Primary survey

There are four types of land ownerships in Tripura, viz., (i) purchased, (ii) inherited; (iii) government allotment (to ST population and SC population) and (iv) land exchange. Land came under possession by means of exchange is very particular to the state of Tripura. During partition and thereafter, Muslim households from Tripura migrated to Bangladesh (Erstwhile East Pakistan) while Hindu population from Bangladesh migrated to Tripura. The cultivable land owned by Muslims in Tripura exchanged for the land

owned by Hindu population in East Pakistan during the time of migration. The land was exchanged mutually between the two religious groups. The exchange of land became necessary because the land market was equally underdeveloped in East Pakistan and Tripura in the 1950s and 1960s and agriculture was the main source of income for these two religious groups.

2.3. Occupational Structure

The exposure to advanced use of science and technology is always associated with the state of development of the socio-economic formation. It is usually the case that the social life of Adivasi community is less exposed compared to *non-adivasi* community in terms of adoption of modern practices of cultivation and livelihood experiments. The influx of *non-adivasi* community in an area of *adivasi* domination would herald a hurricane of change, which may or may not be one sided development of productive forces. However, the intrusion of the mainstream community into the less advanced Adivasi community leaves space for the latter totally with the players of the state power. The crop of interest to the state is cultivated where more domicile population live. NR cultivation was propagated in areas where the land is under non-adivasi population or under the direct administrative control of the state.

There is notable difference in the livelihood sources between Adivasi and non-adivasi communities in Tripura. It is found that 32.35 percent of the Adivasi households and 35.98 percent of the non-Adivasi households are engaged in agriculture for livelihood. More than 10 percent of households in non-Adivasi are engaged in rubber plantation for livelihood while only 5 percent households from Adivasi community are engaged in NR cultivation. The relative share of wage labour is higher (45.58 percent) in Adivasi community as compared to non-Adivasi community (32.58 percent).

2.4. Primary and Secondary Occupation of Households

The primary occupation of households is given in Table 2.3. Occupations are categorised broadly into farm and non-farm related. Farm related occupations are sub-divided into the following: (i) cultivators; (ii) wage labour, (iii) plantation labour (tea), (iii) Rubber planters and others. The earning strength of the family defined as number of wage/salary earners in the family. The earning strength of the family varied between one and four. For the analysis, occupations of two members were analysed. Table 2.3 shows the primary and secondary status of employment of first two earning members of sample household. Following observations can be made from

Table 2.3: (i) there is not a single female worker in NR plantations; (ii) more cultivators are engaged in NR plantations as their secondary occupation. It points out to two aspects of agriculture in Tripura. Small and marginal farmers are unable to earn sufficiently even with NR cultivation. Apparently, NR farmers earn relatively higher income and therefore opt it; (iii) cultivators with other substantial source of income could afford to invest for seven years in NR plantations. It implies that relatively better off section within small and marginal farmers could benefit from the subsidy and incentives for NR cultivation from the government.

Table 2.3
Primary and Secondary employment (Relative Share)

Employment	Working Member -1				Working Member -I1			
	Primary Status		Secondary Status		Primary Status		Secondary Status	
	Male	Female	Male	Female	Male	Female	Male	Female
Cultivators	24.46	22.22	25.97	20.59	38.46	17.20	25.00	26.88
Wage labour (Farm sector)	35.62	27.78	5.58	0.00	26.92	44.09	10.26	5.38
Workers in (Tea estate)	3.65	38.89	1.29	2.94	3.85	9.68	0.64	2.15
NR Planters and workers	9.66	0.00	14.38	0.00	12.00	0.00	4.38	0.00
Other workers	26.61	11.1	5.37	2.94	16.39	29.03	25.00	26.88
No Secondary occupation	0.00	0.00	47.42	73.53	0.00	0.00	34.68	38.71
Total	100.0	100.00	100	100	100	100	100	100

Source: Primary survey

The theoretical construct of the labour regime stems from the recent debate that the rural labour market is fragmented. The fragmentation refers to a distress situation of workers which compel them to engage in different odd jobs to eke out a living as the single occupation is unable to provide subsistence for the family. Further, engagement in part time jobs in different vocations loose workers their identity and capacity to collectivisation and bargaining. An important observation emerging from the disaggregated occupational structure is that certain jobs like bamboo weaving, widely used in works associated with rice cultivation, have more or less ceased to exist as area under rice cultivation declined sharply over the years. Avenues of employment have not sprang up commensurate to the employment loss from rice cultivation. For instance, bamboo pan and bamboo mat used for drying paddy in the sun, paddy and rice storage jar called *Gola* and other articles used mainly for

processing of paddy and other agricultural produce were made by wage labour of Scheduled Caste and Scheduled Tribe communities during the off-farm seasons. They are engaged in the making of such articles during the lean season. The fall in area under rice deprived them off their livelihood. The size of a *Gola* could vary found 300 kg to 3750 kg paddy container. Accordingly, it fetched a price between Rs. 500/- and Rs 4000/- per piece. In other words, a *Gola* embodied about 15 to 20 labour days depending on its size. Bamboos used in the making of Gola could be collected from forest land or other common land of the village in the area helped them earn and survive during lean seasons. The decline in area under rice reduced the demand for labour in rice fields and related work. On the contrary, NR related work is age specific and gender biased. Women workers are neither preferred to work as tapping labour nor do woman want to work, because the worker has to remain bented for about 5 minutes to tap a tree) For a minimum of subsistence, one has to tap not less than 300 trees daily. Tapping is a process of controlled wounding on the bark of the rubber tree. It is necessary to commence tapping early in the morning as late tapping reduces the exudation of latex. For a reasonable sum of daily income, 300-400 trees have to be tapped daily and the task is difficult for the aged, particularly for women.

Table 2.4
Occupation- Past and Present (percentage)

Occupation	Present	5 years ago	10 years ago
Cultivators	34..80	44.20	46.00
Wage labour (Farm sector)	33. 70	35.01	37.93
Workers in Tea estate	2.20	2.40	2.20
NR Planters and workers	11.70	7.59	3.00
Others(non- farm activities	18.60	15.80	10.87
Total	100.00	100.00	100.00

Source: Primary survey

Table 2.4 shows the change in employment in five year spell for the last one decade. Following observation can be made from table 2.4 (i) cultivators, wage labour in the farm sector, self-employed in non-farm occupation have followed the commonly found pattern in occupational change; (ii) relative share of cultivators in the total workers has declined from 48 percent to 34.80 percent during the last one decade. On the contrary, relative share of wage labour has not made marked progress; (iii) number of workers engaged in NR plantations as workers and cultivators has substantially increased during the last decade

Chapter 3

Cropping Pattern in Tripura: Emerging Trends

3.1 Profile of the Farm Sector

Although the farm dependent population comprising cultivators and agricultural labour in Tripura is relatively less (46 percent) as compared to the national average (58 percent), farming continues to be the mainstay of livelihood for majority of ST and SC population in the state. The, contribution of the primary commodity production sector in the Net State Domestic Product (NSDP) has declined from 46.7 percent in 1980-81 to 23 percent in 2009-10 while the relative size of the dependent population has failed to register a decline commensurate to the fall in the share of agriculture in GDP. Cultivators constituted 27 percent of the total work force in the state, of which 96 percent belonged to small and marginal farmer's category or owning less than two hector of land. About 60 percent of the geographical area of the state falls under reserve forest and the cropped area is only 20 percent. The reserve forest area in the state is concentrated in Dhalai and North Tripura districts. The cropping intensity defined as gross cropped area as percentage of net cropped area has significantly increased from 118 percent to 176 percent between 1960-61 and 2007-08. Area under irrigation in the state is much on a lower side of 20.90 percent of the gross cropped area as compared to the national average of 42 percent. The net area sown in the state has marginally declined because the farm land has been increasingly used for non-agricultural activities. The hills and hillocks cover 70 percent (*Tilla* land) and 30 percent of the cultivable land falls under plain (*Lunga)* land. Major crops grown in Tripura are rice, vegetables, wheat, pulses, oilseeds, jute, mesta, tea and natural rubber. The cultivation practice of tribal community used to be *Jhum or Hook*, which was a variant of shifting cultivation. *Jhum* cultivators grew cereals, pulses, oilseeds, vegetables, spices and fibre for subsistence and the extent of commercialisation in the livelihood cycle of the *Jhumias* was rather limited.

3.2 Cropping Pattern

As compared to traditional rubber growing regions in the country (Kerala and Kanyakumari district of Tamilnadu) spell of winter for 60-70 days dampen NR productivity in Tripura. The shift from subsistence food crop to NR based commercial crop cultivation did take place in the relatively better developed regions of the state economy- southern part of South

Tripura and West Tripura districts. These two districts accounted for 70 percent of the population in the state (Government of Tripura 2010).

Table 3.1
Cropping pattern in Tripura 1951-52 to 2009-10 (as percentage of GCA).

Crop	1950-51	1970-71	1980-81	1989-90	2001-02	2009-10
Rice	75.00	77.70	70.21	56.18	52.39	49.32
Wheat	NA	0.10	1.26	0.81	0.24	0.14
Jute	3.63	2.28	1.04	0.56	0.28	0.09
Mesta	NA	2.49	2.33	1.36	0.35	0.15
Potato	0.30	0.77	0.59	0.68	1.14	1.14
Pulses	NA	0.96	1.36	2.45	1.82	1.24
Oil Seeds	3.92	2.11	1.74	3.23	0.65	0.69
Sugarcane	NA	0.80	0.40	0.45	0.20	0.17
Cotton	4.39	0.70	0.37	0.21	0.27	0.20
Rubber	0.00	0.00	1.14	3.05	5.90	10.08
Others	12.76	12.10	19.56	31.01	36.74	36.68
Total	100.00	100.00	100.00	100.00	100.00	100.00

Notes: Data for North-Eastern states in general is scanty and less reliable. In the land use pattern statistics, crops such as NR, tea, and vegetables are not reported. The area under NR is added to the cropped area in the state. The category 'Others' include vegetables and other missing crops in the statistics. There is no way out to estimate the land area for such missing crops. However, for area under NR, statistics is available from the Rubber Board.

Source: 1. Economic Review, 2009-10

2. Bhowmik and Debajit Chakraborti (2011)

Table 3.1 shows the cropping pattern in Tripura from 1950-51 to 2009-2010. Three important observations emerge from Table 3.1 are: (i) rice cultivation accounted for 70 percent of the Gross Cropped Area (GCA) till early 1980s.

Figure 3.1

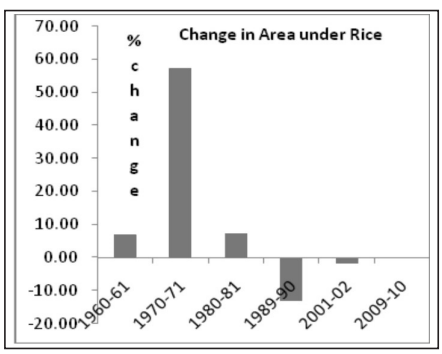
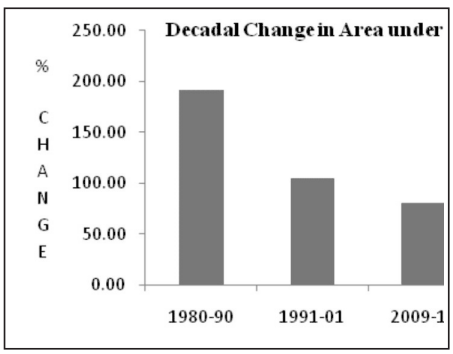


Figure 3.2



The area under rice cultivation declined to less than 50 percent of GCA by 2009-10; (ii) area under miscellaneous crop 'Others' has registered (vegetables and high value horticulture crops) substantial increase over the years and; (iii) area under NR has increased from 3.05 percent to 10.08 percent of the GCA between 1989-90 and 2009-10. The area under rice had registered a positive growth till 1980s and the spread of NR as the most favoured crop in the region by 1980s adversely impacted on area under rice cultivation. However, it is not logical to relate and draw one to one correspondence between area expansion of NR and the observed fall in rice area. Rice is grown in wet land (*lunga*) whereas NR is planted in upland (*tilla*). On the contrary, the experience of traditional NR growing regions indicated that the capital and labour had moved from less remunerative to more profitable ones and the change in area of different crops within a geographical region may be viewed from this paradigm of market driven allocation of resources. The rate of growth in area under rice has turned negative since 1980s while the growth in area under NR cultivation has been on the rise (Figures 3.1 and 3.2). In other words, NR, being a relatively more profitable crop, it did attract capital and labour from other crops, especially rice. The rice is the single largest and the dominant crop in the state of Tripura. Moreover, to a limited extent, rice was cultivated in upland (*tilla)* too when Jhums cultivation was the predominant mode of subsistence farming among Adivasi Community.

Table 3.2
Simpson Index of Diversification

Year	SID Index
1950-51	0.24
1960-61	0.28
1970-71	0.23
1980-81	0.35
1989-90	0.52
2000-01	0.60
2009-10	0.60

Source: Estimated using data from the Table 6.1.

The agricultural geography of Tripura is divided into NR crop dominated West Tripura (South and central region) and 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 grow NR. The NR has

been propagated into villages in Dhalai district adjacent to South district. 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 scenario of maximum skewed in land distribution is represented in SI of '0' while '1' indicates total crop diversification. The Simpson Index of Diversification is given as:

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

Where: Pi is the proportion of area under i^{th} crop in the GCA.

Table 3.2 shows the Simpson Index of Diversification in Tripura. The SI increased from 0.35 to 0.60 between 1980-81 and 2009-10. It is important to note that the emergence of NR as a commercial crop in the state was promoted vigorously by the government of Tripura in the 1960s through 1980s. NR has carved out substantial area by the late 1980s and the crop has established as the most remunerative one in the state by 1990s. Further, area under vegetables, particularly in northern part of West district, has significantly increased along with other districts and is registered under the category 'Others'. Crop diversification takes place either by bringing in uncultivable fallow land under cultivation (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 GCA is contributed more by land augmentation than by crop substitution in the 1970s and 1980s. The geographical potential to expand area under NR through land augmentation reached its upper limit by the late 1990s. The crop substitution was the only feasible option to expand area under NR in 2000.

In the initial phase of NR cultivation, the forest department of the state government cleared swidden and forest land to make available land for NR cultivation. The forest department planted NR in the government land to rehabilitate *Jhum* cultivators. From the ST category, only a few could find resource for cultivating NR without the state's support. The land of non-NR cultivating STs were either bought by the neo-rich of the ST community. The neo rich from STs are there who have non-farm source of income (government service and business). Under the jurisdiction of Tribal Autonomous Council, land transaction is permitted between members of tribal community. Members from non-*Adivasi* community lease in land from tribal members for 99 year to circumvent the land regulations. The land lease amounts to outright sale for a price much below the ruling price

in the land market. The lease was intended to circumvent the regulations to prevent transfer of tribal land to non-tribal population. It helped bring in swidden land under cultivation during 1980s and to an extent in the early 1990s. It is found that crop diversification was primarily contributed by land augmentation as 97.77 percent of the area expansion was contributed by bringing uncultivated land under cultivation. Conversely, land for NR cultivation was drawn by substituting other crops as 97.02 percent of the increase in GCA was accounted for by increase in crop substitution. The finding is in conformity with the fact that the forest department in Tripura banned NR cultivation in forest land and the crop was declared as a non-forest specie by the Central Government in 2005.

3.3 Changes in Cropping Pattern during the Last Five Years

The shift in crop cultivation is analysed during the last five years. Table 3.3 shows shift to major crops during the last five year period in South and West districts in Tripura. The relative share of NR growers has increased from 18.48 percent to 41.40 percent during the last 5 year period. Although there has been significant decline in the number of farmers who have changed crop from rice to others, there has been a marginal increase in the relative share of farmers cultivating banana and vegetables. It points out to the income effect on consumption. In an analysis of reasons for the crop shift, 75 percent of farmers who had shifted to NR reported that higher income, vigorous extension programme, various subsidies, and other non-monetary benefits from central and state governments were important incentives for the shift.

Table 3.3
Shift in Cropping Pattern during Last 5 Years (as peresantage of gross cropped area)

Crop	2011	2007
Rubber	41.40	18.48
Rice	50.00	72.28
Vegetables	8.33	8.15
Jute	0.00	1.09
Banana	0.27	0.00
Total	100.00	100.00

Source: Primary Survey

Table 3.4 shows that farmers with relatively large holding have shifted to NR cultivation than marginal and small farmers. There are two factors restraining marginal and small farmers from growing NR: (i) land under possession is barely sufficient to cultivate food crops for home consumption; (ii) medium and large farmers had shifted early to NR as compared to marginal and small farmers. There existed social resistance to NR cultivation in certain locations where marginal and small farmers are thickly populated. Social resistance to NR cultivation stems from their belief that the stink from latex is harmful to the health of the children and causes cancer, heart ailment and tuberculosis. Moreover, NR cultivation adds to water contamination and environmental pollution. (3) initial investment to cultivate NR is much higher than annuals and further, NR has long gestation period of seven years.

Table 3.4
Shift to NR cultivation during the last Five Years by Type of Farms

Type of farm	Number of farms	Percentage of farms shifted to NR
Homestead only	50	19.40
Marginal	306	49.60
Small	75	60.00
Semi-Medium	51	77.00
Medium	16	71.00
Large	2	100.00
Total	500	53.34

Source: Primary survey

Often it is asked why a small state like Tripura should promote NR at the cost of the food security of its people, who are largely tribal and socially vulnerable. It is a broad political question and can be answered by looking at the very policies of the central and State governments. NR is widely used for the manufacture of tyre products. Although the use of NR in non-tyre sector is equally large, their stake in controlling the state policies is relatively less as compared to tyre manufactures.

The area expansion of NR in Tripura can be categorised under three distinctive phases. The 1960s and the 1970s represent the first phase of NR plantation in Tripura. In this phase, Forest Department of the Government of Tripura planted NR in the forest land as part of the afforestation programme during

the 1960s. Latter, NR cultivation was launched under the state's patronage to rehabilitate the *Jhumias* to stop slash and burn cultivation. The experience of planting NR as a rehabilitation programme was initially introduced on a trial basis. The NR was found a feasible crop in the agro-climatic condition of the state. Subsequently, government of Tripura entrusted NR programme to Tripura Forest Development and Plantation Corporation (TFDPC) in 1976 (Bhowmik 2006). The plantation at Warrangbari was the first model NR plantation established to explore the possibilities of resettlement of tribals, who had been practicing *Jhum* cultivation. In order to rehabilitate *Jhumia* tribal, Tripura Rehabilitation Plantation Corporation (TRPC) was established in 1983. It marked the phase II of the NR plantation). Although the Rubber Board launched its extension activities in Tripura as early as 1967, vigorous expansion schemes was initiated only by the late 1970s. Subsequently, the Rubber Board established NRETC at Agarthala for the propagation and extension of NR in Tripura in 1984[5]. The Rubber Board and other state agencies choose relatively peaceful, fertile and plain land (*Tilla)* in West and South Tripura districts for NR expansion in the state. South and West Tripura districts accounted for more than 90 percent of the total area under NR cultivation in 2012. The phase III of NR expansion programme was introduced with the launching of an ambitious and vigorous state-sponsored NR propagation in government land allotted to STs and landless SC workers in 1992. The programme is known as Block Planning Scheme (BPS). The scheme was implemented jointly by the Rubber Board and the government of Tripura (Department of Tribal Welfare). The project envisaged to raise NR plantations in 2500 hectare in two phases in a span of 10 years for the rehabilitation of 2500 tribal families. The scheme insisted on growing NR in tribal land in a compact block of not less than 50 hectare of land or a group of 50 farmers. The Government of Tripura allotted one hectare of land to landless tribal's as part of its rehabilitation of *jhumia* cultivators. The individual title holder of the land enter into a legal agreement with Rubber Board and Tribal Department entered to make the land available for cultivation of NR for a minimum of 11 years. The stipulation of 50 hectare of compact patch of land to constitute a *Block Planting* of NR ensured that the government allotted land to STs and landless agricultural labour was not put into the cultivation of any crop other than NR.

The first seven years cover the immature phase of NR and the following 3-4 years are meant for yield stabilisation. In the immature phase, the

plantation is nursed and maintained by the Rubber Board while the title holder of the land contribute the self and family labour to the NR plantation, for which the labour household is paid statutory minimum wage. The cost of raising the NR plantation is shared between the Rubber Board (40%), Tribal Welfare Department of Tripura government (50%) and the Farmer (10%). The contribution of owner farmer is notional and the amount is adjusted against the family labour services supplied to the plantation. The farmer enters is into an agreement with the Rubber Board. Another agreement is make the land available for NR cultivations to form Rubber Producers' Society for group processing and marketing of NR produced from Block Plantations. The mature plantations are parcelled out and handed over to the title holder of the land. The Rubber Board subsidises 50 percent of the cost of fertiliser. There is severe shortage of chemical fertilisers in the state while fertiliser for NR is made sufficiently available by the Rubber Board through its sponsored outlets. In other words, the NR is fully subsidized including the land to ensure that no other crops is grown in the government allotted land. The World Bank has been funding the NR expansion scheme in India since 1990s.

The Tripura Rehabilitation and Plantation Corporation (TRPC) has planted 4696.75 hectare of NR in the state till 2005. The Tripura Forest Department and Plantation Corporation was the lead agency in the state for the propagation of NR till 1998. The corporation raised rubber plantation on a commercial basis over an area of 7542.90 hectare till March 2006 and inherited 418.66 hectare of NR plantation raised by the State Forest Department between 1963 and 1975 (Appendix Table 2). The private capital has been attracted to NR cultivation in a big way by early 1990s (Phase III) in the development history of NR in Tripura. The period coincided with the re-entry of Multinational Companies into the automotive tyre manufacturing sector. It was the period of expansion of Indian rubber goods manufacturing industry with the lead in tyre industry (Mohanakumar S. and George 2002). The delicensing of tyre and vehicle industry in India on the one side and vigorous propagation of NR in non-traditional area may be viewed against the backdrop.

The crop subsidy for NR cultivations clearly showed that the Central Government through the Rubber Board vigorously promote NR in Tripura. The amount of subsidy per hectare of NR cultivation in Tripura is 48 percent higher, than the subsidy for NR in Kerala and

Kanyakumari district of Tamilnadu (traditional NR growing regions). Area expansion of NR and area contraction under food crops is not an outcome of discriminatory crop subsidy and extension programme, rather than the market force driven price effect. Moreover, the area under NR cultivation recorded 89 percent growth in Tripura, where is the highest in any state including traditional and non-traditional between 2000-01 and 2008-09 and it is the highest rate of growth in any state including traditional and non-traditinal area of NR. The crop subsidy discrimination exists not only in the amount of subsidy per unit of land, but land sealing too. NR growers in Tripura avail subsidy for NR area upto 5 hectare of land whereas the upper limit of land for availing subsidy in traditional NR growing region is 2 hectare of land. Tripura accounted for 7.5 percent of the total area under NR in 2008-09 in India. There are a few other characteristic features of NR cultivation in Tripura as compared to traditional NR growing region. (i) NR productivity in Tripura (1146 kg/ha) lags behind the national average of 1867 kg/ha and of Kerala 1949 kg/ha (2008-09); (ii) Relative share of the estate sector in NR plantation is higher (23 percent) as compared to the national average of 10 percent.

The rate of growth in NR price was higher than that of rice, pulses and sugarcane. 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.

Table 3.5
Comparison of Support to System to NR cultivation in Traditional area and Tripura

Item	Tripura (Non-Traditional Region)		Kerala (Traditional Region)	
	Subsidy amount per hectare (Rs)	Land sealing (in hectare)	Subsidy amount per hectare (Rs)	Land sealing (in hectare)
Planting grant	22000	Upto 20	19500	Upto 2
Planting material grant and cost of transportation	8000	Upto 20	Not available	For the 11th Plan period, subsidies other than planting grant are not given to farmers' group.
Irrigation	3000	Upto 20	Not available	
Fencing	12500	2	Not available	
Supply of rubber seeds, bud woods, budded stumps, budding tape and polythene bags for raising nurseries free of cost	No upper limit	RPSs, RGSs, SHGs, NGOs	Not available	
Rubber sheeting rollers	10000	20	Not available	
Smoke house	20000	20	Not available	
Effluent treatment plant	8000	20	Not available	
Primary Processing and Marketing	A joint venture company under 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)	
Tappers' Training School	One month residential training to workers	All workers	Available	
Exposure visits	Free of cost to Traditional areas	All farmers	Not available	
Labour Welfare Schemes	Different schemes to attract labours	Workers in Rubber Plantations	Available	

Source: Compiled from Rubber Growers' Companion 2012

The area expansion under NR needs to be viewed in the backdrop of the programmes and schemes of the general agricultural sector in the state. There is substantial decline in the schemes and fund for general agricultural sector during the last one decade. However, as part of export promotion scheme of the national government, schemes of the horticulture department have been implemented. It was reported that the budgetary allocation and other traditional food crops for the general agricultural sector is unspent for the schemes and finance earmarked for general agricultural sector remained unspent for the reason that the schemes are not implemented. Further, the extension work for rice cultivation has been virtually stopped. Quality seed for rice cultivation is made available to farmers either after the sowing season or it is not supplied. Conversely, for NR cultivation, new varities of planting material are available through RPS, Rubber Board and there are private nurseries and every corner of both South and West Tripura districts. Table 3.6 shows the trend rate of price of NR and other two next best competitive crops in the state. The rate of growth in NR price is the highest as compared to rice and vegetable.

Table 3.6
Trend Rate of growth in Price (2005-06 to 2011-12)

Crop	Rate of Growth	T-value
NR	18.20	7.10
Rice	9.20	12.67
Vegetables	8.80	9.68

Source. Indian Rubber Statistics and Government of India

3.4. Crop Substitution and Employment Effect

This section analyses the impact of the shift in cropping pattern from labour intensive food crops to NR based cash crop in Tripura. The employment effect of the crop shift from a labour intensive food crop to a perennial crop has been studied in greater detail in the context of Kerala (Mohanakumar and Chandy, 2004). In rice cultivation, 50 percent to 70 percent of the workers are females from ST and SC labour households. Moreover, female workers of cultivator households work with hired labours in their rice fields during peak agricultural operations. On the contrary, for NR cultivation, mostly male workers are employed. Table 3.7 shows the labour hiring by type of cultivator households in Tripura.

Table 3.7
Labour Hiring by Land Holdings (Percent Share)

Type of farmers	Percentage of households Hiring Labour
Landless	24.04
Marginal	63.69
Small	76.12
Semi-Medium	80.00
Medium	71.43
Large	100.00

Note: Landless is defined as households with less than or equal to 1 kani or 40 cent of land including the homestead.
Source: Primary survey

3.5. Employment Effect of the Crop Shifts

During the first six years of NR cultivation, 1041 man days are generated from a hectare of land, of which 578 days are required in the first year of planting[6]. From the second year to sixth year of planting of NR, employment days fall significantly from 168 to 44 days per hectare of land. In the 7th year of NR cultivation, employment days would increase to 162 days including 140 days of tapping (harvest) and 15 days weeding and 7 days for manuring in a hectare of land. Following observations can be made from Table 3.8 (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 cultivation in a season or six months is 250 days or 3500 days for seven years (under the assumption that the crop is grown twice a year) while NR provides only 1203 employment days for 7 years (ii) rice cultivation, 78 percent of workers are female whereas NR cultivation does not employ female workers; (iii) employment days in a plantation progressively declines over the years while employment in paddy field remain constant; (iv) in mature plantation, male labours of the age group 18-50 are employed, while no such gender-age constraint operate in rice cultivation.

Table 3.8
Employment days in NR and Paddy cultivation for a hectare of land

Operation	Paddy			Natural Rubber		
	Male	Female	Total	Male	Female	Total
Operation 1/Yr1	8	0	4	578	0	578
Operation 2/Yr2	6	120	126	168	0	168
Operation 3/Yr3	0	6	6	124	0	124
Operation 4/Yr4	12	18	30	74	0	74
Operation 5/Yr5	30	24	54	53	0	53
Operation 6/Yr6	2	28	30	44	0	44
Operation 7/Yr7				162	0	162
Total for 6 months	58	196	250	1203	0	1203
Total for 7 yrs (2 times operations a year)	812	2744	3500			

Source: Primary survey

2.Rice is cultivated twice a year in Tripura. Major operation of rice fields are: (i) field preparation for sowing; (ii) plucking, (iii) replanting, (iv) weeding; (v) fertiliser and pest application; (vi) weading (vii) harvesting; (viii) thrushing and hey drying; (ix) paddy boiling. In rice fields, between two seasons, seasonal vegetables and pulses are grown. The change in employment days particularly for female workers in the SC and ST category may be viewed in the backdrop of the recently observed trends in the labour market in Tripura. The Work participation rate (WPR) for Tripura is 36.20 percent with 50.60 percent for male and 21.1 percent for female against the national average of 51.7 percent for male and 25.6 percent for female. The WPR for ST in Tripura is 42.7 percent against the national average of 49.1 percent and for ST male (47.6 percent) and for female (37.5 percent). The WPR in Tripura was the second lowest after Assam (35.8 percent) in 2001. The farm dependent population comprising both agricultural labour and cultivators together constituted 47 percent of the workforce in the state, It is a positive indicator of development as the national average of the same is 58 percent in 2001. However, the farm dependent population is as high as 55 percent in rural Tripura. A higher proportion of female agricultural worker is attributable to the rice dominated cropping pattern in the state. Among STs, 77 percent of the workforce depends on agriculture for livelihood. It is a matter of concern for policy makers that the proportion of the farm dependent population in Tripura declined from 70 percent in 1991 to 47 percent in 2001; a commendable achievement in any standard

indicator of development while the extent of decline of ST workforce is minimal from 78 percent to 70 percent during the reference period (Table 3.8). The weekly and usual status of employment for male and female workers in agriculture and NR cultivation showed that a male worker was employed for 17 days and a female worker for 15 days in a month in the agricultural sector. In the case of 'other agricultural work' (casual labour in rural area) male workers are employed for 16 days and female workers are employed for 15 days. In NR plantations particularly in its mature phase, female workers are not employed and only male labours get wage employment as tapping labour. Employment in NR plantations other than tapping is confined to weeding and fertiliser application.

3.6. Income Effect of NR Cultivation

Table 3.9
Gross Income from NR and Paddy 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 seasons. In the first season, paddy fetch a price of Rs 7.5/kg and in the second season, Rs 11.5/kg (boiled paddy). 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. 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 4.5 lakh at the terminal stage of NR plantation, i.e., on completion of 25-30 years of NR planting.

Source: Primary survey

Cost of cultivation of NR under A+B+C cost system is cumbersome as the major share of NR plantations in the mature stage in sample area are grown under total cost-coverage subsidy scheme (Block Planting Project). However, productivity is available for NR as well as rice operations. An analysis of income from a hectare of land of NR and rice is compared in

Table 3.9. It is quite clear that NR has a price and income advantage over the cultivation of rice. Moreover, NR subsidy is Rs 30000 per hectare of land while no such support system exists for rice farmers. It is in addition to the subsidy to RPS. In the estimation of net return from NR, for comparison with other crops grown in the state, such cost and benefit factors should also be factored in. It was found that annual net income of NR farmers from a hectare of land in West and South district in Tripura is 920 percent higher than its income from rice cultivation.

3.7. Impact of NR cultivation on Land Market

The emergence of NR cultivation developed the land market in the state. The exchange system works out in favour of the lucky crop. In the total sample households, 21.82 percent reported that they possessed land by purchase and 64.20 percent inherited land. Land obtained from government allotment accounted for 10 percent and 3 percent of land area has been obtained through exchange system. A district-wise comparison revealed that land market is more developed in South Tripura as 26.11 percent of the land possessed were from purchase against 19.38 percent in West Tripura. The distribution of sample households by social groups and sources of land under possession (Table 12) revealed the following: (i) land purchased by ST are the lowest among social groups; (ii) STs have mostly government allotted land. In the inherited land too, STs have relatively small proportion as compared to other social groups. It could be on account of the fact that restrictions on land transaction could be the major factor hampering the development of land market in the notified area. It in turn implies that the NR driven commercial cultivation in Tripura is likely to have fewer advantages to the ST population in the society. In the total sample households, 6.2 percent reported to have sold their land while 16.40 percent purchased land. In the sale of land, West Tripura district accounted for 41.94 percent and South Tripura recorded 58.06 percent. On the contrary, West Tripura registered 63.41 percent of land purchase in the total land transactions during the last five years while South Tripura recorded 36.59 percent purchase. 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 is bought for NR cultivation and the higher land purchase is also on account of fast development of NR cultivation. The development of labour market too has its manifestation with marked changes in the wage rate. In the NR growing area, wage labour is not available for agricultural work and the daily wage rate was

also reported to be higher. Daily wage rate for female labour was Rs 120 and for male labour Rs 200 in 2011. It was Rs 70 and Rs 120 respectively for female and male labour respectively in 2008. The hike in wage rate does not compensate for the loss in employment.

Table 3.10
Distribution of Households by Source of Land Possessed (Percentage)

Social Group	Purchased	Inherited	Government Allotted	Exchange System	purchased and Inherited
General	29.55	23.68	0.00	66.67	15.38
OBC	34.09	33.64	3.37	33.33	23.08
SC	28.03	21.18	10	0.00	53.85
ST	8.33	20.87	86.67	0.00	7.69
Total	100.00	100.00	100.00	100.00	100.00

Source: Primary Survey

The Sale and purchase are two different aspect of the land transaction. A higher proportion of sale than purchase by a particular section of the society is indicative of the directions to which the newly emerging productions relations workout. It was reported that 63 percent of people had purchased land while 37 percent did sell out their land. It was found that 8.33 percent of ST people purchased land as compared to 34.09% from Other Backward Caste (OBC).

3.8. Food Security

Food security issue in Tripura assumes significance primarily on account of its demographic profile. A recent study in Tripura on nutrition level and food security has revealed that there was difference in nutritional intake between the tribal and non-tribal population. (Government of Tripura, 2007). Intake of cereals, millets, leafy and other vegetables were above the recommended daily allowance level for tribal households. The dietary intake of foods other than cereals and leafy vegetables by members of tribal society is on a lower side as compared to non-tribal families (*ibid,92*). The shift in cropping pattern in Tripura assumes significance in this context. The total area available for cultivation in the state is 4.45 lakh hectare, of which 65000 has already been under NR cultivation[7]. The envisaged plan of the Rubber Board confirms that more than a lakh hectare of the land

would be brought under NR cultivation in Tripura by 2020. A few 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 looser?

The main agricultural crops grown in the state are rice, wheat, sugarcane, potato, coconut, jute and oil seeds. Tripura is known to be a food deficient state. 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. Table 3.10 compares the mean food intake per adult consumption unit between tribal and non-tribal unit.

Table 3.11
Mean food intake per Adult Consumption Unit as percentage of Recommended Daily Allowance in Tripura-2005

Food Group	Percent of recommended daily	
	Non-Tribal	Tribal
Cereal and millets	109.0	102.30
Pulses and legumes	109.70	27.0
Leafy vegetables	75.30	108.70
Roots and tubers	32.10	92.40
Other vagetables	180.90	135.10
Milk and milk products	22.70	4.0
Fats and oils	92.50	20.0
Sugar and jiggery	128.40	1.20

Source: Government of Tripura, 2007

In the rural area, especially the cultivator households make only the essential purchase from the market and most of the demand for food items is met from home production. In West Tripura, for almost every house, there is a fish pond in the homestead and fish is the staple of the people. There are areas where NR cannot be planted and people from such area experience a depletion in their relative living standard as rice and vegetable price do not increase as much as the increase in NR price. As mentioned elsewhere, rice is the staple food of Tripura and the cultivation of rice is the predominant crop in the state. Table 3.11 shows the area under rice and its production. There has been a steady decline in area under rice in Tripura from 287630 hectare in 1980-81 to 262000 hectare in 2010-11. The production of rice has also registered a fall. There has been a shortage of food grain production in

relation to its demand since 2004-05 to 2010-11. Barring 2010-11, the food deficit in the state has been widening over the years. 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. What would happen to those who do not have NR to buy rice. In an Adivasi dominant state like Tripura, such questions assume crucial importance. The area under NR cultivation is expected to be increased by one lakh hectare during the 12th and 13th Plan period in the state. It is in addition to the existing 0.65 lakh hectare of NR.

Table 3.12
Area and Production of Rice in Tripura

Year	Area in (000 Hectare)	Production in (000 MT)
1970-71	268.06	256.10
1980-81	287.63	558.00
1989-90	250.11	752.00
2001-02	246.09	608.84
2006-07	250.98	641.63 (200-08)
2010-11*	262.00	701.00

Source: 1.*Economic Review, 2010-11

2. Chakraborthy, D. (2011).

3.9. NR Cultivation and Village life

When a lucky crop like NR cultivation spreads fast replacing traditional food crops, farmers of different types are attracted to the crop by different means of social communication at the village level. *Village talk* is the most common facilitator of propagating NR in the village. Different aspects of NR cultivation have been dominating the village talk since the NR has become the boom crop in the 1990s. Although the *Adivasi* and non-*Adivasi* communities talk about NR cultivation, concerns over the disappearance of vegetables, fish pond from the homestead, rice and other traditional food crops and its price rice of ten crop up in the village talk of *Adivasi* members. Formation of Rubber Produces Society (RPS), NR price volatility, shortage of tapping labour and exorbitant price raise of planting materials by private NR nurseries, shortage of chemical fertilisers and other inputs stand out in the meeting of Non-Adivasi community in Tripura.

Chapter 4

Conclusions and Recommendations

4.1. Conclusion

The agrarian economy of Tripura has been undergoing a process of transformation from a food producing subsistence economy to NR based commercial crop production. NR has been a boom crop in the domestic and international markets since the 1990s. The central and state governments have been promoting NR in Tripura through regional discrimination of crop- subsidy system for NR. In non-traditional NR growing region, the amount of subsidy per hectare of land, scope and coverage of subsidy schemes are much higher than the traditional NR growing region. The state has adopted a step-motherly policy to non-NR crops in Tripura. It included partial or full withdrawal of financial assistance, near total stoppage of extension services, non-implementation of declared schemes and non-release of funds for traditional food crops, particularly rice. The presence of domestic and international capital in the automotive tyre industry, export boom of tyre products, expansion of domestic tyre market propelled by the entry of automobile manufactures from the global market during the last two decades and exorbitant price raise of crude oil have influenced the NR promotion policies of the central government. NR is a small holders' crop and the income from NR cultivation from a hector of land in Tripura is significantly higher than any other crops cultivable in the land. The supply price of NR is kept low with the state's patronage. The state managed low supply price and the resultant higher relative profitability of NR lured small holders to the crop. Vigorous propagation of NR has converted large track of traditional food growing area along with forest, garden and swidden land to NR cultivation. The land policy of the state government jointly implemented with the Rubber Board helped pace up the extension of NR. The employment elasticity of NR as compared to food crops, reduced employment avenues of ST and SC community in the farm sector. The clearing of forest and swidden land, for NR cultivation further reduced the accessibility of ST population to forest resource. In a food deficient and land locked economy, and concentration of land in the neo-rich in rural area would tilt the distribution of income and consumption against the vulnerable social groups and farm workers in the state. Adverse consequences of NR expansion are likely to aggravate inequality, land alienation of the poor- particularly of SCs and STs because the value addition of NR takes place outside the state of Tripura. In a landlocked, ST dominant and an economically backward state in terms of availability of non-farm employment further compound the social and economic problems of the poor in the state of Tripura. However,

such deleterious consequences can be partly and temporarily resolved by designing an agriculture policy including land use which would maintain the balance among income, employment and food security of different categories and class of people in the state.

4.2. Policy Implications

The study found that the area under NR has been increasing faster than any other crops in Tripura. As long as the decision of individual farmers prevails over the social inevitability of food production, a favourable relative price for NR supplemented with vigorous extension schemes and subsidy system, is likely to transform the state into a mono-crop agrarian system. However, given the social and economic structure of the agrarian economy of the state, fall in area under rice cultivation is a matter of serious concern with respect to the economically and socially vulnerable sections. Against the backdrop, the study suggests the following:

1. A subsidy system for paddy and vegetable production should be put in place which would compensate for the relative income loss from growing food crops.
2. There should be an extension service system as effective as or more effective than NR for food crops as well, particularly for rice;
3. A land use policy needs to be framed which would clearly mark the places where only food crops should be cultivated
4. The activities of Rubber Board may be integrated with the activities of Rice Board and the vigorous extension for NR may also be clubbed with rice cultivation
5. The society at large may be made aware of importance of expanding food production in a land locked state like Tripura.
6. The Rubber Board should revise its extension activities to promote establishment of manufacturing units of NR and a clearly defined and feasible target may be placed and achieved to ensure that a minimum of 50 percent of NR produced in the state is processed and converted into NR based industrial products from Tripura. The decline in employment opportunities for paddy field workers would be compensated by providing them employment in latex based industries.
7. Training needs to be imparted to rehabilitate displaced workers from paddy field in the latex based and other rubber goods manufacturing industries.
8. Adequate training needs be imparted to women workers to enable them to get employment in NR plantation including tapping jobs.

9. Rubber Board should ensure that there is a well-designed and sufficiently funded labour welfare schemes for workers in NR plantations, which would attract more labour to the sector.
10. The loss in employment for those who had been engaged in the making of articles such as *Gola* for paddy storage needs to be supported by adequate marketing facility and subsidy system.

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Appendix Table

Appendix Table 1. Area under NR Planted by different Agencies in Tripura (Area in hectare)

Year	TFDPC	TRPC	SDM/SDC	Rubber Board	ADC	PRIVATE	Total
1979	1942.16	Na	Na	Na	Na	23.09	1965.25
1980	2650.28	Na	Na	Na	Na	74.23	2724.51
1981	3368.88	Na	Na	Na	Na	209.75	3578.63
1982	4093.83	Na	Na	Na	Na	559.69	4653.52
1983	4610.06	Na	Na	Na	Na	851.14	5461.2
1984	5281.91	75	Na	Na	Na	1074.91	6431.82
1985	5817.89	152.1	Na	Na	Na	1267.93	7237.92
1986	6721.88	377	Na	Na	Na	1622.25	8721.13
1987	7672.68	721.7	Na	Na	Na	1786.1	10180.48
1988	8150.05	990	Na	Na	Na	2031.97	11172.02
1989	9035.61	1356.3	Na	Na	Na	2345.24	12737.15
1990	9124.01	1439.4	Na	Na	Na	2604.29	13167.7
1991	9255.51	1470.35	Na	Na	Na	2844.29	13570.15
1992	9386.16	1653.05	Na	122.22	Na	3149.32	14310.75
1993	9510.01	1776.85	Na	389.77	Na	3470.63	15147.26
1994	9647.11	1990.05	Na	379.03	Na	3951.18	15967.37
1995	9915.09	2171.07	Na	978.47	na	4753.36	17817.99
1996	10004.89	2262.09	35.46	1131.07	na	5718.28	19151.79
1997	10063.95	2473.42	35.46	1387.68	165	6755.5	20881.01
1998	10091.95	2536.34	93.84	1837.56	906	7467.13	22932.82
1999	10145.45	2717.99	135.09	2008.73	1246	7899.2	24152.46
2000	10285.45	2992.39	341.43	2154.42	1246	8482.47	25502.16
2001	10315.45	3367.72	281.45	2556.9	1321	8997.37	26839.89
2002	10456.1	3674.74	338.93	2667	1321	9258.86	27716.63
2003	10620.9	4079.32	439.68	2781.85	1521	9582.43	29025.18
2004	10720.15	4329.13	496.52	2958.04	1521	10198.26	30223.1
2005	10744.3	4696.75	541.25	3090.07	1521	11079.82	31673.19
2006	Na	Na	Na	Na	na	na	34189
2007	Na	Na	Na	Na	na	na	37846
2008	Na	Na	Na	Na	na	na	41165
2009	Na	Na	Na	Na	na	na	50070

Note: Blanks show either planting was not started or stopped.na

Source: Bhowmick, 2006

Notes

[i] Important tribes in Tripura are: (i) Tripuri, (2) Reang, (3) Jamatia, (4) Chakma, (5) Lusal, (6) Mog, (7) Garo, (8) Kuki, (9) Chaimal, (10) Uchal, (11) Halam, (12) Khasia, (13) Bhutia, (14) Munda, (15) Orang, (16) Lepcha, (17) Santal, (18) Bhil and (19) Noatia. The population size as well as exposure to the mainstream population vary significantly across sub-tribes.

[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. With the reorganisation of districts in the state, number of districts has been increased from four to eight and six subdivisions, and five development blocks have also been created. The four new Distrcts are Khowai Unakoti, Sipahijala and Gomati; the six new sub-divisions are Jirania, Mohanpur, Kumarghat, Panisagar, Jampuijala and Karbook; the five new development blocks are Yuvarajnagar, Durga Chawmuhani, Jolaibari, Silachari and Lefunga. The North Tripura and Ambasa districts remain with an addition of only one more district while the new three districts have been created in the South and West Tripura. Unokotti is the new district formed by slicing and joining together the northern parts of north Tripura and Ambasa 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 remain more or less unchanged in those districts. Further, the settled cultivation in those districts are yet to taken in a significant way. The population of the old and new districts is given in the Table below.

Table 1
Population and Area in Old four Districts in Tripura-2011 Census

District	Headquarter	Population	Area (KM2)	Density of population per KM2
Dhalai	Ambassa	377988	2523	157
North Tripura	Kailasahar	693281	2821	341
South Tripura	Udaipur	875144	2152	286
West Tripura	Agartala	1724619	2997	576
Tripura	Agartala	3671032	10493	350

Source: http://en.wikipedia.org/wiki/List_of_districts_of_Tripura

Table 2
Population and Area in New Districts in Tripura-2011 Census

District	Headquarter	Population
Dhalai	Ambassa	484,233
Sipahijala	Bishramganj	327,391
Khowai	Khowai	436,868
Gomati	Udaipur	277,335
Unakoti	Kailashahar	415,946
North Tripura	Dharmanagar	433,737
South Tripura	Belonia	917,534
West Tripura	Agarthala	484,233
Tripura	Agartala	3671032

Source: http://en.wikipedia.org/wiki/List_of_districts_of_Tripura

[iii] Only 6% of the population in Dhalai district is classified as urban while 26.7% of the population in West district live in urban area (2001 census).

[iv] During the time of separation and formation of Bangladesh, Hindus from Bangladesh migrated to Tripura and Muslims from Tripura migrated to Bangladesh. In the transit process, primarily for farm folk, they had only one immovable asset, i.e., farm land. Migrants to both places therefore mutually exchanged their land. It is often called exchange system in Tripura. 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 India and the land can not be sold to people from Bangladesh and there is little buyers for reason rather known from India.

[v] 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.

[Vi] Comparison of employment of NR and paddy has certain limitations on account of the following. (i) NR is a perennial crop and its employment is spread over first six years (immature phase); (ii) employment in NR cultivation in mature phase is limited to two times fertiliser application and tapping; (iii) paddy has a life cycle of five months and its employment is spread over all five months. In Tripura, two crops are grown in paddy land.

[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.

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