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INCOME INEQUALITY AMONG BENEFICIARIES UNDER NATURAL RUBBER BLOCK PLANTING SCHEME IN TRIPURA: A PRELIMINARY ASSESSMENT

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The distribution and inequalities in income among households under the block planting scheme in Tripura are analysed. The study is based on a sample survey of 402 beneficiary households during the year 2008. The study showed less inequality in income from rubber compared to that from employment and other sources. Moreover, income from rubber acted as a balancing force by minimising the inequality and variability in total income among households with mature rubber. Among the three sources of income, income from "other sources" showed the highest level of inequality. The study revealed that the mode of distribution of income has been the critical factor determining the level of income inequality. The three modes of income distribution were: equal income distribution, income distribution based on area slabs and distribution of income based on actual area under possession. The adoption of the mode of income distribution by different tribal groups is closely related to the extent of integration with the mainstream society. The emerging trends indicated the growing shift towards distribution of income from rubber based on actual area under possession.

Keywords: Block Planting Units, Gini coefficient, Income distribution, Income inequality, Lorenz curve, Rubber growers, Tripura

INTRODUCTION

The nature, objectives and scope of agro-based rehabilitation projects vary depending on region-specific factors. The sustenance of these projects has primarily depended on how judiciously the socio-economic aspects of the targeted groups are incorporated into the scheme. Apparently, though there are explicit similarities in the perceived objectives of a rehabilitation project across regions, the marked differences in its scope and the outcomes in the long-run have been determined by a host of factors. The experience of natural rubber (NR)-based rehabilitation projects exhibited notable regional differences in India (Viswanathan and George, 2006; Joseph *et al*., 2010). Though NR- based tribal rehabilitation projects were started in the traditional region of Kerala during the year 1986-87, the outcome is not comparable to that in Tripura. Among the targeted regions, tangible outcomes in Tripura have been more impressive in the backdrop of a steady growth in area under cultivation and substantial increase in the income of the

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beneficiary households. The area under the crop in Tripura grew at an annual average growth rate of 5.37% compared to the national average of 1.50% during the 15-year period from 1992-93 to 2006-07 (Joseph *et al*., 2010). Moreover, the beneficiary households under the Block Planting Scheme (BPS) of NR reported an average annual household income of Rs. 99167 during the year 2008[1]. In a comparative sense, the reported household income was 112% higher than the annual household income of their counterparts among the targeted groups without income from NR. In this process of change, there have been developments within the community with important implications on the cooperative spirit which had a strong bearing on the community-based approaches of tribal societies. The three different patterns of income distribution observed among the Block Planting Units (BPUs) in Tripura bear testimony to the structure and changing dimensions of the socio-economic profile of the targeted groups under the BPS. Hence, from the analytical and policy angles, it is imperative to understand the contributory factors to the varied patterns of distribution of household income and the implications of the same on the extent of income inequalities among the beneficiary households. This assessment is expected to provide valuable insights and policy inputs on the long-term feasibility of the BPS in Tripura with its prevailing organizational structure. The three objectives of the study were:

(i) to understand the pattern of distribution of household income under the seven selected mature BPUs;

(ii) to analyse the extent of inequalities in the income and;

(iii) to highlight major observations from a policy angle.

MATERIALS AND METHODS

The analysis was based on primary data gathered from 271 beneficiary households attached to seven BPUs in Tripura having mature rubber plantations. Among the seven mature BPUs, five, *viz*. PS Para, RS Para, Kamalasagar, Laxmandepha and Kariyamura II, are located in West Tripura and the remaining two (Dariabagma and Rani) in South Tripura. For a comparative analysis on the level of income inequalities among tribal rubber growers, data from 131 beneficiary households under BPUs with immature rubber plantation were also used. The income profile, *i.e*. the extent of inequality and variability in the household income under the immature BPUs, is expected to be the functional proxy for the households without income from rubber among the tribal communities. Though different categories of tribals are engaged in BPU activities in Tripura, the nature of land and land tenure systems are varied across regions and groups. The data on beneficiaries under immature BPUs were obtained from PS Para, Kamalasagar, Rambabu Para, Khamber Bari, and RS Para. The sample households were selected on the basis of selective random sampling. The field survey was conducted as part of a larger research project to assess the socio-economic impact of BPS in Tripura. The data on household income corresponded to the year 2008. The extent of inequalities in total household income within each BPU as well as different sources of household income was estimated using Gini coefficients[2] (Xu, 2004).

RESULTS AND DISCUSSION

Though total annual average household income of mature BPUs was 112% higher than that of the immature BPUs, the extent of inequality was comparable with higher variability. Table 1 shows the differences in annual household income, its variability and inequality under mature and immature BPUs.

The income from rubber accounted for 66% of annual household income of mature BPUs whereas employment was the major (77%) source of income in the immature BPUs. In both categories, the highest inequality was observed in the case of income from other sources. However, the extent of inequality and variability in income from other sources under the two categories was comparable. The highest difference in income inequalities was observed in the case of income from employment and the mature BPUs recorded higher income inequality. Among the three sources, income from rubber showed the lowest income inequality in households under mature BPUs. Despite a higher inequality and variability of income from employment and other sources under the mature BPUs than the immature BPUs, the extent of inequality and variability of total household income was comparable. Apparently, the income from rubber might have played a balancing role of minimizing the observed differences in the extent of income inequality between the two categories[3]. In sum, the extent of inequality and variability of total household income of the targeted groups under the mature and immature BPUs was comparable.

The observed differences in the annual household income of the mature and immature BPUs at the aggregate level neither revealed the differences in the household income at the disaggregate level nor provided details on the impact of income from rubber. Hence, it is imperative to analyse the composition and inequalities in household income under each BPU, from a long-term policy angle. This proposition assumes importance since such an assessment is expected to provide valuable inputs to devise appropriate strategies for the sustainability of this rehabilitation package. In order to capture varied dimensions of the impact of income from rubber, the analysis is focused on the composition of income from rubber, extent of inequalities in the area and income from rubber and factors influencing the distribution of income from rubber among the households under the mature BPUs. Table 2 shows the differences in annual household income and its composition among the households with mature rubber plantations under the selected BPUs.

Except in the case of Kariyamura II, rubber is the major source of household income for all the BPUs[4]. However, the total

Table 1. **Annual household income under mature and immature BPUs**

Source	Mature BPU			Immature BPU		
	Income (Rs.)	CV	Gini	Income (Rs.)	CV	Gini
Rubber	65137	0.91	0.43	—-	—-	—-
Employment	25828	1.36	0.61	35844	0.80	0.41
Other	8202	1.65	0.68	10980	1.60	0.67
Total	99167	0.71	0.33	46824	0.65	0.34

Table 2. **Average annual household income (Rs.)**

Name of BPU	Sources of income			
	Rubber	Employment	Other	Total
PS Para	82978 (57.9)	39191 (27.3)	21168 (14.8)	143336 (100.0)
RS Para	72263 (67.2)	29281 (27.3)	5927 (5.5)	107471 (100.0)
Dariabagma	53536 (58.5)	31639 (34.6)	6330 (6.9)	91505 (100.0)
Kamalasagar	30183 (53.0)	22578 (39.7)	4167 (7.3)	56928 (100.0)
Laxmandepha	108113 (85.0)	10662 (8.4)	8321 (6.5)	127096 (100.0)
Kariyamura II	10647 (19.2)	36414 (65.6)	8471 (15.2)	55532 (100.0)
Rani	105445 (83.5)	14650 (11.6)	6215 (4.9)	126310 (100.0)
All	65137 (65.7)	25828 (26.0)	8202 (8.3)	99167 (100.0)
CV (%)	91.4	136.3	165.1	70.9

Figures in parentheses show the percentage share

household income and income from rubber exhibited wide variations among the remaining six BPUs. The highest variation in income was observed in the case of other income (165%) followed by employment (136%) and income from rubber (91%). Among the seven BPUs, the highest annual household income was reported in PS Para (Rs. 143336) followed by Laxmandepha (Rs. 127096) and Rani (Rs. 126310). However, the highest annual income from rubber was reported in Laxmandepha and Rani. The observed differences in income from rubber among the selected BPUs were due to the differences in the average size of holdings and age-composition of the tapped area[5]. The higher variations in the other two sources of income could have been contributed by the differences in the extent of diversification of the sources of income. From a long-term policy perspective, the extent of income inequality within each BPU assumes more importance than the differences in the annual household income among the BPUs. Fig. 1 and Table 3 provide the details on the extent of income inequalities in total household income of all the BPUs and its sourcewise status in the individual BPUs.

Fig. 1 shows that the bottom 20% of the households had a share of only less than 8% in the combined total annual income of all households under the seven BPUs. Conversely, the share of top 20% of the households was around 38%. However, the extent of sourcewise income inequalities is higher than the total household income (Fig. 2). The highest level of inequality was observed in the case of other income where the top 20% of the households had a share of about 66%.

At the disaggregate level, the BPUwise and sourcewise income inequalities indicated notable differences among the seven BPUs.

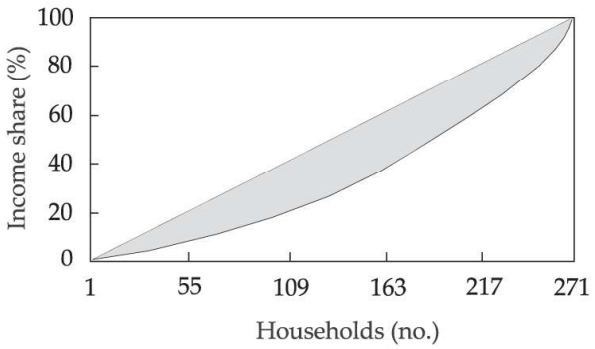

Fig. 1. Income inequality in annual household income in the mature BPUs

Table 3. **Sourcewise income inequalities among the beneficiaries**

Name	Rubber		Employment		Other		Total	
	Gini	CV	Gini	CV	Gini	CV	Gini	CV
PS Para	0.40	0.83	0.68	1.61	0.47	0.97	0.37	0.87
RS Para	0.34	0.63	0.61	1.26	0.77	2.16	0.29	0.51
Dariabagma	0.04	0.09	0.55	1.10	0.79	2.67	0.22	0.50
Kamalasagar	0.24	0.63	0.45	0.88	0.77	2.21	0.28	0.57
Laxmandepha	0.02	0.13	0.67	1.85	0.56	1.10	0.08	0.20
Kariyamura II	0.10	0.41	0.36	0.97	0.56	1.14	0.29	0.68
Rani	0.42	0.98	0.72	1.71	0.71	1.90	0.37	0.83
Total	0.43	0.91	0.61	1.36	0.68	1.65	0.33	0.71

Among the three major sources of income, the lowest inequality was observed in income from rubber in the case of all the BPUs. The combined income from rubber in the seven BPUs also showed the lowest inequality (0.43) compared to income from employment (0.61) and other sources (0.68). The BPUwise household income inequality showed the lowest level of inequality in Laxmandepha (0.08) followed by Dariabagma (0.22) and Kamalasagar (0.28). The highest level of household income inequality (0.37) was observed in PS Para and Rani. Rubber being the major source of household income in the case of all the BPUs other than Kariyamura II[6], it is important to understand the underlying factors behind the wide variations in this income component. Technically, the two important factors that could have contributed to the observed inequalities in income from rubber within each BPU are the inequalities in the distribution of area under NR and the mode of distribution of income from the crop. Table 4 shows the comparative influence of the distribution of area under the crop on the inequalities in income from rubber among the six BPUs.

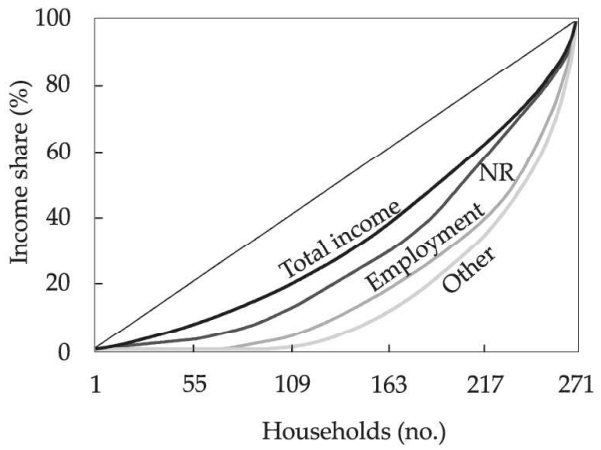

Fig. 2. Sourcewise income inequality in household income

Table 4 reveals that the extent of inequalities in the distribution of area *prima facie* has a strong bearing on the inequalities in income from rubber as is evident from the lowest Gini coefficients observed in the cases of Laxmandepha, Dariabagma and Kamalasagar. However, the extent of this apparent influence of the distribution of area on income inequalities has not been statistically testified by the correlation analysis for two reasons: (i) though Laxmandepha showed the lowest inequality in the distribution of income as well as area the correlation between the two variables was the lowest, and (ii) while Dariabagma

and Kamalasagar showed the highest correlation between the distribution of area and income, there were considerable differences in the inequalities in the distribution of area and income. Conversely, the observed income inequalities had been influenced more by the mode of income sharing. Three different modes of income distribution were observed among the selected BPUs. The three modes of income distribution were closely associated with the category of tribal community attached to the individual BPUs. The distribution of income under Mode I is fully egalitarian as income from rubber was distributed equally irrespective of the size of the individual holdings. In Mode II, income from rubber is distributed on the basis of area slabs, whereas under Mode III, distribution of the income is based on actual area under the possession of individual holdings. Table 5 provides the mode of income sharing among the selected BPUs.

Functionally, the choice of the mode of income sharing has been closely related to the socio-economic ethos of the individual tribe and the extent of integration to the mainstream society. A higher extent of integration with the mainstream society will reflect in higher individualistic approaches of tribal communities and *vice versa*. This proposition is evident from the choice of the mode of income sharing by the tribal communities under the selected BPUs. The category of tribes which opted Mode I *i.e.*, Mulsum, is one among the most primitive compared to the categories which opted Mode II *i.e.*, Jamtia and Jalia Kiriboti (SC) which are more integrated to the mainstream society. The categories which opted Mode III are socially more advanced and highly integrated to the mainstream society. However, the emerging trends indicated a shift towards Mode III as out of the 28 mature BPUs in West Tripura 13 have been sharing income based on the actual size of holding. In effect, the impact of the differences in distribution of area on income has been dependent on the mode of distribution of income. However, the recent trend towards adoption of Mode III in income sharing indicates the growing influence of the integration with the mainstream society and the resultant shift from the traditional cooperative behaviour of the tribal tradition.

Table 4. **Inequalities in area and income under the BPUs**

Name	Rubber area		Rubber income		Correlation*
	Gini	CV	Gini	CV	(r)
PS Para	0.41	0.80	0.40	0.83	0.59
RS Para	0.36	0.69	0.34	0.63	0.86
Dariabagma	0.12	0.29	0.04	0.09	0.96
Kamalasagar	0.23	0.60	0.24	0.63	0.99
Laxmandepha	0.11	0.23	0.02	0.13	0.31
Rani	0.29	0.76	0.42	0.98	0.87
Total	0.29	0.62	0.32	0.73	

*Correlation between area and income of all BPUs is significant at 1% level except Laxmandepha where the significance is at 5% level.

Table 5. **Mode of income sharing in BPUs**

Name	Year of planting	Mode of income sharing	Name of tribe
Laxmandepha	1992	Mode I	Mulsum
RS Para	1994	Mode III	Debberma
Dariabagma	1994	Mode II	Jamatia
PS Para	1995	Mode III	Debberma
Rani	1995	Mode III	Murasing
Kamalasagar	1996	Mode II	Jalia Kiriboti

CONCLUSION

The analysis revealed that despite higher differences in the annual household income of mature and immature BPUs the estimated inequalities were comparable. The income from rubber constituted the largest source of the household income of the mature BPUs and the observed inequalities were lower than the other two sources of income. The disaggregate level analysis indicated significant differences in the inequalities of income from rubber and it was primarily determined by the mode of distribution of income rather than distributional inequalities in the distribution of area under individual holdings. The emerging trends in Tripura indicate a growing shift towards distribution of income from rubber based on actual area under possession (Mode III) as the tribal communities are increasingly integrated to the mainstream society. In this respect, clear demarcation of the individual holdings under Mode I and II may be initiated as the beneficiaries are not aware of the specific location of their holdings. Though the combined measure of income inequality among the selected BPUs (0.32) is lower than the reported (UNDP, 2009) national average (0.37), the shift towards individualistic approaches to income distribution poses important policy challenges to the organizational framework of BPS based on community-oriented priorities and strategies.

ENDNOTES

1. The results of the study revealed substantial increase in household income of the beneficiaries from the settled mode of NR cultivation compared to the income from the traditional shifting cultivation (Joseph *et al*., 2010)
2. The Gini coefficient based on Lorenz curve measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual. The Gini coefficient measures the area between the Lorenz curve and a hypothetical line of absolute equality. Thus, while a Gini coefficient of 0 represents perfect equality, a coefficient 1 implies perfect inequality (World Bank, 2006). Gini coefficients were estimated by using the package R 2.11.1
3. In fact, in the mature BPUs, the inequality of income was 0.51 (Gini) with a variability of 117 per cent (CV) without income from rubber. Therefore, apparently, income from rubber had the effect of minimizing the inequality and variability of income.

4. During the study period, the area under Kariyamura II was only in the first year of tapping. Therefore, income from rubber as well as total income of households under this BPU was the lowest among all the selected BPUs.

5. Among the seven BPUs, the smallest average size of holding was reported in Kamalasagar (0.41ha) and the largest average size of holding was observed in Rani (1.95 ha). Except Kariyamura II, area under all others were in the age group of 3-7 years of tapping.

6. As the tapped area in Kariyamura II was in the first year of tapping the income from rubber in the BPU was not considered for disaggregate level analysis.

REFERENCES

Joseph, J., George, K.T. and Dey S.K. (2010). *Report on the Socio-Economic Impact of Natural Rubber Cultivation under the Block Planting Scheme in Tripura*. Working Paper, Rubber Board, Kerala, India, 39p.

Viswanathan, P.K. and George, K.T. (2006). *Development of Rubber and Rubber Integrated Farming Systems in North East India: Status, Socio-Economic Feasibility and Future Perspectives*. Mimeo. Asian Institute of Technology, Bangkok, Thailand, 98p.

UNDP (2009). *Economy and Inequality-Gini index. Human Development Report 2009*. United Nations Development Programme. http:// hdrstats.undp.org/en /indicators/161.html.

World Bank (2006). *Distribution of Income or Consumption. World Development Indicators.* The World Bank, Washington, p.79.

Xu, K. (2004). How has the literature on Gini's index evolved in the past 80 years? Department of Economics, Dalhousie University,, Canada, 41p. www.economics.dal.ca/RePEc/dal/wparch/ howgini.pdf.