RUBBER CULTIVATION DRIVEN SOCIO-ECONOMIC DEVELOPMENT OF TRIBAL COMMUNITIES IN ODISHA

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The present study was taken up in Mayurbhanj district in Odisha where the Rubber Board, in association with the Government of Odisha, has implemented Rubber Block Plantation Projects for the socio-economically marginalized scheduled tribes. The study found that the average annual household income of the respondent households with income from rubber was 188 per cent higher than that of households without income from rubber. The average expenditure of households for personal conveyance, education and healthcare with income from rubber was 879, 491 and 481 per cent, respectively higher than their counterparts without income from rubber. A transformation was noticed in the type of houses constructed from the traditional mud huts to *pucca* houses having modern amenities to enhance the standard of living, as income from rubber started to flow in. It is highly encouraging that the tribal households with income from rubber were investing the additional income earned from rubber in both physical and human capital. This can lay the foundation for a discernible change in the socio-economic status of the tribal communities and overall development of the region in the future.

Key words: Block rubber plantation, Household income, Natural rubber, Odisha, Socio-economic development, Standard of living, Tribal households

INTRODUCTION

Natural rubber (NR) cultivation was introduced in Odisha by the Rubber Board in the late 1980s on an experimental basis. The first large scale commercial cultivation of NR in Odisha was started in Jadunathpur in 1995 as Rubber Block Plantation Project implemented by the Rubber Board in association with the State government for development of the tribal communities (Rubber Board, 2017a). According to the census of India 2011, tribal communities form nearly 60 per cent of the total population of Mayurbhanj district. The tribal households of the region were primarily agrarian, engaged in subsistence rain-fed farming. At present, the state has 11 Rubber Block Plantations (Table 1) implemented by the Rubber Board, covering over 500 ha in Mayurbhanj district, for the tribal communities. Various other agencies like the Odisha Forest Development Corporation, Similipal Forest Development Corporation, Integrated Tribal Development Agency (ITDA) and the District Rural Development Agency (DRDA) are also engaged in promoting NR cultivation in the

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state. With 2736 ha, today Odisha is ranked 11th in the country in terms of area under NR (Rubber Board, 2017b). The Rubber Board has set up a Regional Research Station at Dhenkanal to develop region-specific technologies including high yielding clones suitable for the agro-climatic conditions prevailing in Odisha.

Though the role played by NR cultivation in bringing a huge shift in the livelihood pattern and standard of living of native communities in Tripura and Assam is well documented (Goswami, 2009; Joseph *et al*., 2010, 2012, 2013; Sharma and Dey, 2017), studies on the impact of introduction of NR cultivation among the tribal communities in Odisha was not available. Hence, the present study was taken up with the objective of assessing the impact of NR cultivation on the socio-economic development of the tribal households in Odisha.

MATERIALS AND METHODS

The study was taken up in Mayurbhanj district of Odisha where the Rubber Board in association with the Government of Odisha has implemented Rubber Block Plantation Projects for the socio-economically marginalized scheduled tribes including *Santal*, *Mundari, Bathudi,* and *Kolho* sects.

Out of the seven mature Block Plantations (Table 1), only three, in which planting was completed before 2002 (Jadunathpur, Kendugadi and Shyamakhunta) were considered for the study as they had income flow from rubber for some years. A total of 33 households (14% of beneficiaries) were randomly selected from among the beneficiaries of these Rubber Block Plantations and 30 tribal households without income from NR were randomly selected from the vicinity of these Block Plantations for comparison. Thus the total sample size was 63 households. Data was collected using a structured questionnaire through personal interview. Descriptive statistics was employed for analyzing the data to examine the socio-economic changes brought about by increased income from NR among the tribal households.

Table 1 . **Rubber Block Plantations in Mayurbhanj district**

Sl. No.	Name of Block plantation	Year of planting	Planted area (ha)	Number of beneficiaries	Status of Block plantation
1	Jadunathpur	1995-1998	40	75	Mature
2	Kendugadi	1999-2001	40	60	Mature
3	Shyamakhunta	2000-2002	40	98	Mature
4	Matigarh	2000-2007	40	106	Mature
5	Bisoi	2000-2007	40	94	Mature
6	Bholagadia	2006-2007	40	170	Mature
7	Astia	2006-2007	40	104	Mature
8	Tadiki	2008-2010	50	170	Immature
9	Saratchandrapur	2008-2010	50	83	Immature
10	Kumardagia	2008-2010	50	87	Immature
11	Rautraipur	2014-2016	80	79	Immature
	Total		510	1126	

Source: Rubber Board Regional Office, Baripada.

RESULTS AND DISCUSSION

Socio-economic profile of the households

The tribal communities of the study area were primarily rural peasants. They cultivated rain-fed rice on a subsistence level, collected minor forest produce and worked as manual labourers for a livelihood. The average land holding size of the respondent households with and without income from rubber were 3.13 and 2 acre, respectively. Some of the socio-economic parameters of the respondent households are furnished in Table 2.

The average age of the respondents with income from rubber was 49 years and that of the respondents without income from rubber was 48 years. The households visited were joint families with parents, children and grandchildren living together. The average family size of the respondent households was 4.4 and 4.8 members, respectively for respondents with and without income from rubber. Majority of the respondents were totally illiterate lacking the knowledge to write even their own names.

Table 2. **Socio-economic profile of the respondent households (%)**

Items	Respondent households	
	With income from rubber (n=33)	Without income from rubber (n=30)
Illiterates	45	50
Education up to 10^{th} grade	24	33
Above 10^{th} grade and below degree	27	7
Graduation	4	10
Average age (year)	49	48
Family size (members)	4.4	4.8
Land owned (acre)	3.13	2

Subsistence rain-fed farming of crops like rice, pulses, oil seeds and *sabai* grass (*Eulaliopsis binata)* was the common occupation in the area. Manual labour was the prime source of livelihood of the respondent households. Farming for subsistence and manual labour as a source of livelihood were practiced by 97 per cent of respondents without income from rubber (Table 3). Though at present rubber is the prime source of livelihood for the respondents with rubber, 58 per cent of them used to do subsistence farming and manual labour for a livelihood before income from rubber started to realize. The prime source of livelihood for 27 per cent of the sample households with income from rubber, prior to starting rubber cultivation, was manual labour.

Farming activities and household income

Rain-fed subsistence farming was prevalent in the locality. Sixty seven per cent

Table 3. **Occupational pattern of the respondents (%)**

Occupation	Respondents with income from rubber (n=33)		Respondents without income from rubber (n=30)
	Before starting rubber cultivation	After starting rubber cultivation	
Farming	9	100	0
Agril. labourer	27	0	3
Subsistence farming + Agril. labourer	58	0	97
Farming + salaried jobs	6	0	0

Table 4. **Crops grown by the respondents (%)**

Crop	Respondent households with income from rubber (n=33)		Respondent households without income from rubber (n=30)
	Before commencing rubber cultivation	After commencing rubber cultivation	
Rice	61	0	67
Rice + pulses	15	0	16
Rice + sabai grass	24	0	17
Rubber	0	43	0
Rubber + rice	0	58	0

of the respondent households without income from rubber had rice cultivation (Table 4). Eighty per cent of them were cultivating rice for own consumption. Sixty one per cent of the respondents currently having income from rubber were earlier upland rice growers. At present, 58 per cent of the respondent households with income from rubber had rice cultivation, mainly for their own consumption.

Animal husbandry has been one of the major economic activities in the area. The respondent households were found rearing goats, sheep, cow, poultry *etc.* for household consumption and sale (Table 5). Though similar trends in owning livestock were noticed among the households without income from rubber and households with rubber prior to having income from rubber, a decline in the share of owning livestock was observed among the households after realizing income from rubber. This was mainly because the family members got employed in the Block Plantations as wage laborers which was more remunerative than income from livestock. Seventy percent of the respondent households without income from rubber owned goat/sheep. On an average each household had six goat/sheep. While 51 per cent of the respondent households with income from rubber owned goat/sheep before realizing income from rubber, the share declined to three per cent afterwards. While 80 per cent of the households without income from rubber reared poultry, this was only nine per cent in the case of households with income from rubber which was 64 per cent prior to initiation of rubber cultivation. On an average each household reared 10 birds.

The tribal community in the area faced uncertainty in employment and household

Table 5. **Livestock owned by the respondents (%)**

Livestock	Respondent households with income from rubber (n=33)		Respondent households without income from rubber (n=30)
	Before commencing rubber cultivation	After commencing rubber cultivation	
Goat/sheep	51	3	70
Cow	21	0	10
Poultry	64	9	80
Draught animals	18	0	23

Table 6. **Sources of household income (%)**

Source	Respondent households	
	With income from rubber (n=33)	Without income from rubber (n=30)
Sale of agrl. commodities	3	13
Sale of livestock/poultry	1	2
Manual labour	34	85
Rubber cultivation	62	0
Average income (Rs./year)	100195	34756
CV (%)	36	39

income due to erratic rains and crop failures as their farming was entirely rain-fed with little facilities for irrigation. The region receives around 1600 mm of annual rainfall and most of it was received during the period from June to September. Crop failure in a subsistence mode of farming has direct bearing on household food security and this was not uncommon in the region. Since the major economic activity of the locality being rain-fed rice cultivation, job availability for manual labourers was seasonal and dependent on the monsoon rains. Thus, in years with deficit rainfall, both food security and household income would be at stake. The other job option available to the tribal community was the employment provided through the MGNREGA. The share of household income earned from various sources by the respondent households is presented in Table 6.

The study revealed that the average annual income of the households with income from rubber was 188 per cent higher than those without income from rubber. While manual labour was the major source of income for the respondents without income from rubber, rubber was the prime source of income for the rubber farmers. Analysis has revealed that before venturing into NR cultivation, the prime source of income for 85 per cent of the households currently having income from rubber was manual labour (Table 3). Thus, NR cultivation has not only increased the household income of the respondents, but has also changed their social status from manual labourers to rubber plantation owners. Since erratic monsoon has relatively low impact on the annual yield of rubber than a crop like rice in the region, rubber cultivation served as a sustainable livelihood for the households with reduced risk and more assured income.

Household expenditure

The increased income realized by households with income from rubber improved the standard of living of the otherwise marginalized tribal communities in the area. The increased income from rubber was spent by the tribal community to increase consumption expenditure on their basic necessities like food and clothing (Table 7). Asset creation like constructing/ renovating the houses was also noticed. They were investing more on the healthcare and education fronts which would help in improving the human capital in the area.

As commonly observed in any low income groups, the propensity to consume was high among the tribal communities in the study area, particularly for food articles.

Table 7. **Expenditure pattern of the households**

Items	Respondentswith income from rubber (n=33)		Respondentswithout income from rubber (n=30)		Difference in avg. expenditure (%)
	Avg. amt. (Rs)	Share (%)	Avg. amt. (Rs)	Share (%)	
Food	37600	60.6	27600	73.7	36.2
Cloth	6939	11.2	5017	13.4	38.3
Packed consumer goods	7255	11.7	3040	8.1	138.7
Healthcare	4360	7.0	750	2.0	481.3
Education	4962	8.0	840	2.3	490.7
Electricity	135	<1	76	<1	77.6
Fuel (petrol/diesel)	509	<1	52	<1	878.8
Intoxication	300	<1	58	<1	417.2
Avg. expenditure (Rs./year)	62060		37433		65.8
CV (%)	36		29		

The study has revealed that 61 and 74 per cent, of the household income was spent on food articles by the households with and without income from rubber, respectively. The households with income from rubber spent 36 per cent more on food articles than their counterparts without income from rubber. The average expenditure of the households with income from rubber, on the selected items such as food, healthcare, children's education, electricity, fuel for personal conveyance *etc.* was 66 per cent higher than those without income from rubber.

Spending of the tribal households with income from rubber on items like fuel, education, healthcare and intoxication was substantially higher than that of the households without income from rubber. The higher spending on healthcare and education will benefit the tribal community in the long-run as it augments the human capital formation. Seventy six and 97 per cent of the respondent households with and without income from rubber depended on the public healthcare system to meet their clinical needs, respectively (Fig. 1). In the case of respondent households with income from rubber, a substantial increase in the share of those availing services of private clinics and hospitals (21%) for better healthcare was observed compared to households without income from rubber.

The higher income of the households with income from rubber had also influenced the occupational pattern of the younger generation of these households. While 65 per cent of the younger generation, between the age group of 7 to 25 years, in the households with income from rubber were school/ college going, this was only 46 per cent for households without revenue from rubber (Table 8). While 32 per cent of the family members in households without revenue from rubber was engaged as manual labourers, it was 25 per cent for households with income from rubber. Migration to South India in search of better fortune was prevalent among the youth in the study area due to lack of remunerative local employment opportunities. While no migration to cities for employment was

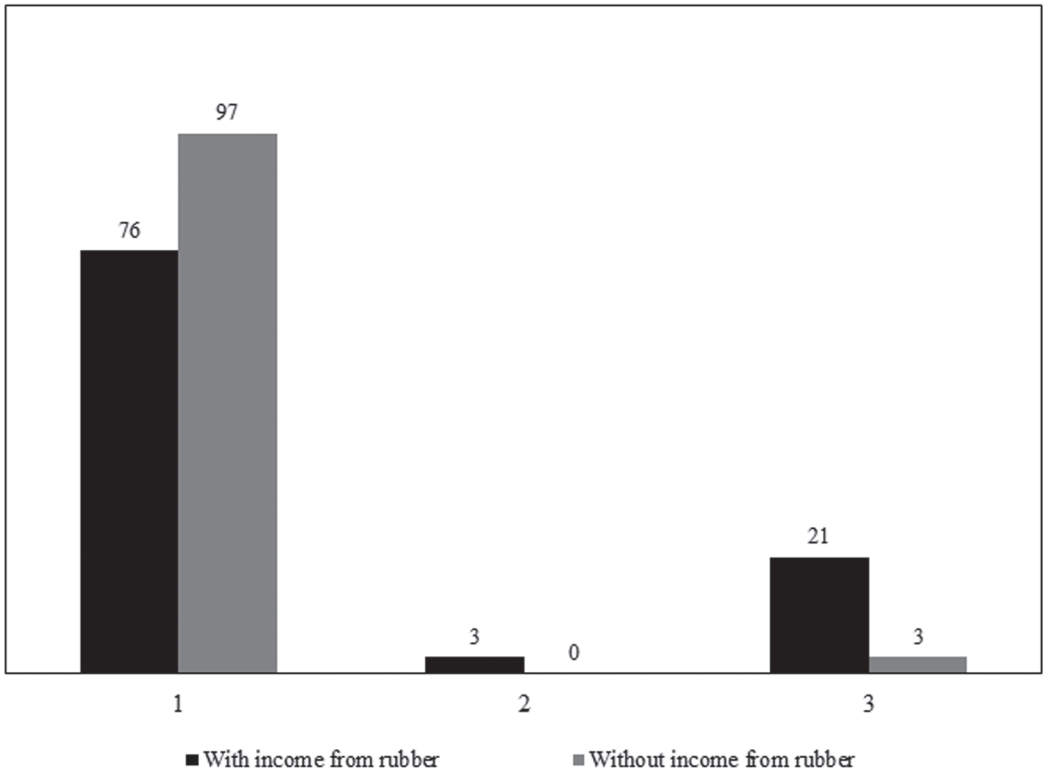

Fig. 1. Sources of healthcare (%)

Table 8. **Occupational pattern of family members (age group 7 to 25 yrs) (%)**

Occupation	Respondent households	
	With income from rubber (n=33)	without income from rubber (n=30)
Student	65	46
Manual labour	25	32
Migrated to South India	0	9
Unemployed	10	13

noticed among the youths of tribal households with income from rubber, nine per cent of the youths from households without income from rubber migrated to cities mainly in South India for employment.

Items owned by the households

Items owned by the households, particularly consumer durables and white goods reflect the standard of living. The items owned by the respondent households are presented in Table 9.

While the share of households with electricity, mobile phones and bicycles was comparable for both the groups, significant difference was observed among them in the ownership of other consumer durables and movable assets. While 79 per cent of the households with income from rubber owned at least one motorbike, only 16 per cent of the households without income from rubber owned one. While 61 per cent of the

Table 9. **Items/facilities owned by the households (%)**

Items	Respondent households	
	With revenue from rubber (n=33)	Without revenue from rubber (n=30)
Electricity	97	87
Mobile phone	97	83
Bicycle	100	93
Motorbike	79	16
Motor vehicles/tractor	6	0
Radio	21	3
TV with DTH	61	3
Refrigerator	12	0
Water pump	6	0
LPG	9	0

households with income from rubber owned a TV with DTH, only 3 per cent of the households without revenue from rubber owned it. Similarly, while 21 per cent of the households with income from rubber owned a radio, it was only three per cent for households without income from rubber. While a few households with income from rubber owned items like refrigerator, water pump, LPG connection and a motor vehicle, none of the households without income from rubber owned these items, which are associated with a higher standard of living and depicts availability of higher disposable income of the households.

As observed in the case of expenditure, the investment pattern of the households with income from rubber was substantially different from that of households without income from rubber (Table 10). As expected, in all the heads considered, the share of respondent households with income from rubber was higher than that of households without income from rubber. While only 16 per cent of the households without income from rubber had bank deposits, 67 per cent of households with income from rubber had savings in banks. The share of households with income from rubber invested more on housing, education of children and on consumer durables as compared to their counterparts without income from rubber. The share of respondents with income from rubber investing in real estate and ornaments was also higher than that of respondents without income from rubber. The share of households with income from rubber resorting to investments to meet future consumption/eventualities was observed in the form of increased investments in insurance and savings. The trend in investment of the households with income from rubber on both physical and human capital is a welcome sign as it will have long reaching beneficial impact on the socio-economic development of this marginalized section in the long-run.

The traditional dwellings of the tribal communities in the area were mud houses with thatched roof made either of straw, grass or palm leaves. Each such hut with two to three small rooms housed four to five

Table 10. **Pattern of investment of the households (%)**

Investment/ saving	Respondent households	
	With revenue from rubber (n=33)	Without revenue from rubber (n=30)
Bank deposits	67	16
Insurance policies	36	10
Land	27	3
Housing	73	10
Ornaments	6	0
Consumer durables	79	3
Education of children	87	33
Saving for other eventualities	48	13

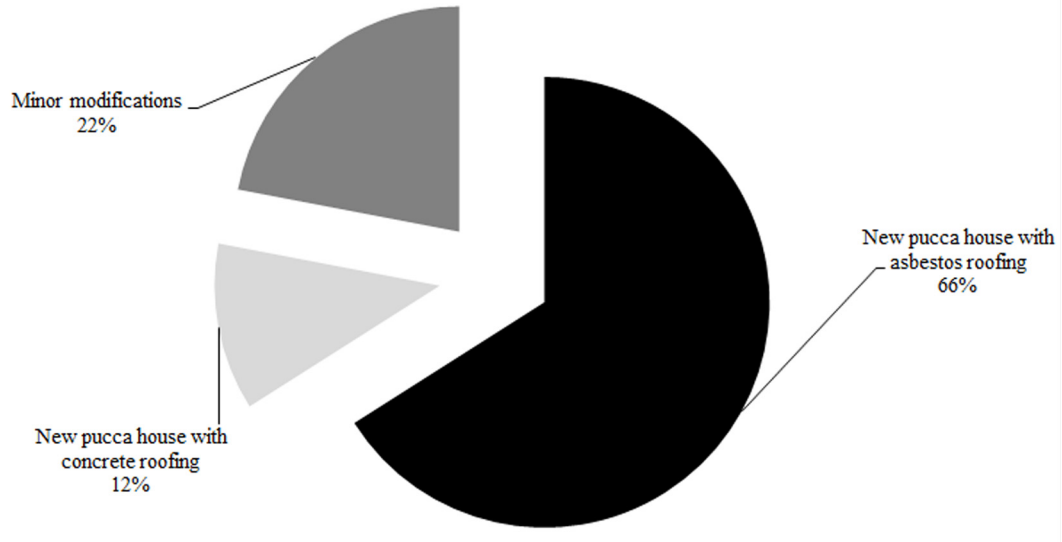

Fig. 2. Modifications made in the houses by respondents with income from rubber

individuals of various age groups. It was observed that the respondents gave prime importance to improve their houses as the household income increased. While 73 per cent of the respondent households with income from rubber have either made minor/ major modification in the existing houses or constructed a new one, only 10 per cent of the respondents without income from rubber had modified/constructed houses (modifications made to the dwellings by the respondents using various government shemes was excluded). The modifications made in the dwelling by the respondent households with income from rubber are furnished in Figure 2.

Out of the total respondents with income from rubber who made modifications to their

Table 11. **Details of dwellings of the respondents (%)**

Particulars	Respondent households	
	With income from rubber (n=33)	Without income from rubber (n=30)
Mud houses with palm leaves/ straw thatched roofs	27	77
Mud house with tile roofing	15	13
Pucca houses with hollow bricks/ burned bricks with asbestos/tile roofing	49	10
Pucca houses with concrete roofing	9	0
Toilet (within the yard)	61	33
Toilet (within dwelling)	3	0

Table 12. **Flooring materials used (%)**

Particulars	Respondent households	
	With income from rubber (n=33)	Without income from rubber (n=30)
Mud floor	45	87
Cement floor	45	13
Vinyl floor	6	0
Tile/marble	4	0

houses, 66 per cent have made new *pucca* houses constructed using cement/burned bricks with asbestos roofing. Twelve per cent of them constructed *pucca* houses with concrete roofing which are rare to the locality. Table 11 shows the details of dwellings of the respondent households.

Table 13. **Sources of drinking water (%)**

Source	Respondent households	
	With income from rubber (n=33)	Without income from rubber (n=30)
Own open well	42	54
Open well (Neighbours')	04	20
Open well (public)	0	06
Piped into yard (public water supply)	48	20
Piped into house	06	0

Majority of the respondents (77%) without income from rubber still dwelled in the traditional mud houses with thatched roofing made of straw, palm leaves or grass. The income from rubber has helped the tribal

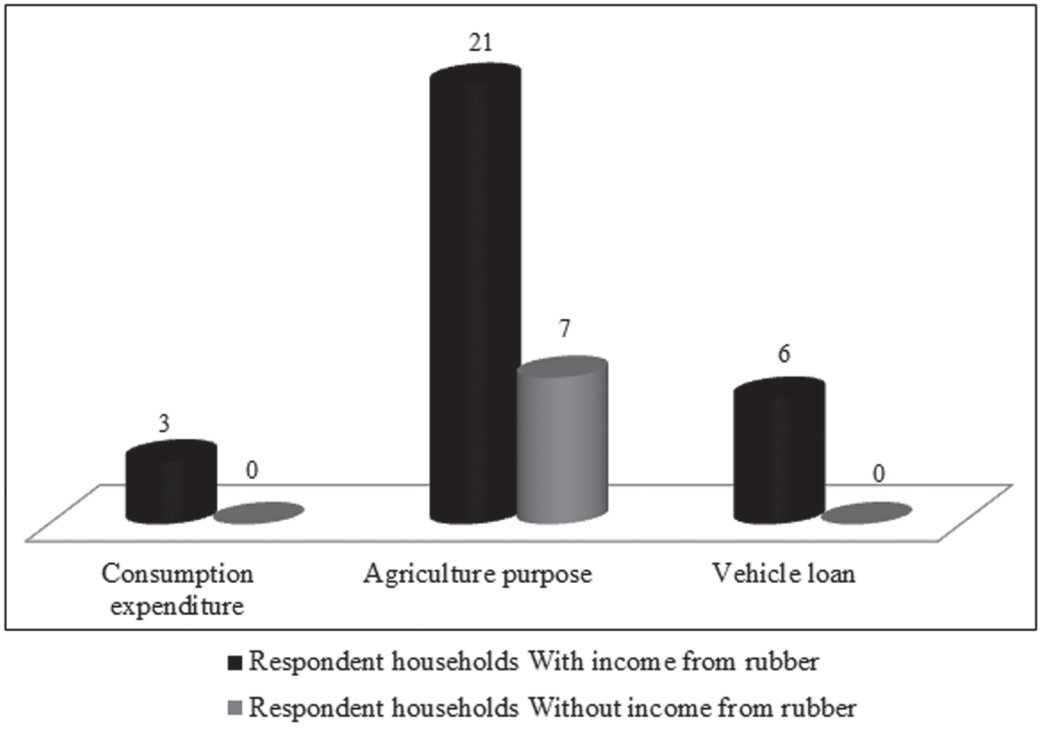

Fig. 3. Credit availed by the respondents (%)

community to upgrade their dwellings. Fifty eight per cent of the respondent households with income from rubber are now dwelling in *pucca* houses and majority of them (64%) have toileting facility compared to 33 per cent in the case of respondents without income from rubber. While majority of the houses in the study area had traditional mud floors, the respondents with income from rubber showed a shift towards modern flooring materials (Table 12).

Cement flooring of the dwellings was becoming popular among the respondent households with income from rubber. Modern flooring materials like vinyl and tiles/marble which were very rare in the locality were also found being used by the respondents with income from rubber.

Majority of the households in the locality had own open wells as sources of drinking water (Table 13). Running water connection to households installed by government agencies and NGOs working among the tribal communities served 48 per cent of the respondent households with income from rubber and 20 per cent of respondents without income from rubber. Six per cent of the households with income from rubber had installed pump sets in their wells to pipe water into their houses.

Banking and credit

While 94 per cent of the respondents without income from rubber had bank accounts with scheduled commercial banks, 100 per cent of the respondents with income from rubber had bank accounts. The assured income from rubber have prompted the households to avail bank loans for various purposes as their repayment capacity is higher than their counterparts. While 30 per cent of the respondents with income from rubber had availed bank loans, only seven per cent of the households without income from rubber had availed loans (Fig. 3). Contrary to prevalence of local money lenders in rural villages of India, all the loans availed by the respondents were from scheduled commercial banks. This shows the accessibility of the people to modern banking system in the study area.

CONCLUSION

Though commercial cultivation of NR in Odisha is in its infancy, the study gives clear indications of it being an effective tool for socio-economic inclusion of the marginalized native communities. Natural rubber cultivation has transformed the tribal community from a subsistence livelihood-based system to a highly remunerative and sustainable livelihood system. The average income earned by the sample households with income from rubber was almost three times higher than that of their counterparts without income from rubber. This has substantially influenced their spending behavior and standard of living. The tribal households with income from rubber was investing more on improving their basic necessities including housing, healthcare and education of children. A transformation was noticed in the type of houses constructed from the traditional mud huts to *pucca* houses having modern amenities to enhance the standard of living, as income from rubber started to flow. It is highly encouraging that the tribal households with income from rubber were investing the additional income earned from rubber in both physical and human capital. This can lay the foundation for a discernible change in the socio-economic status of the tribal communities and overall development of the region in the future.

But due care needs to be ensured on the part of policy makers to keep the diversity

of livelihood options for the tribal communities. It was noticed that prior to NR cultivation, the tribal communities had diverse sources of livelihood like cultivation of rice, pulses, *sabai* grass and rearing livestock though mainly on subsistence level. A trend towards mono-cropping of NR was observed among the households as the income from rubber was highly remunerative. The inherent risk in narrowing the livelihood options is potentialy high. Hence, while promoting NR cultivation among the tribals for their socio-economic development, care shall be taken to device strategies to diversify the household sources of income like rearing livestock to minimize risk of income loss.

Hence, strategies shall be formulated to ensure a balanced inclusive development without creating wide income disparity among the tribal households, as it may create rifts among the otherwise largely homogenous groups. The benefits of government interventions like the Rubber Block Plantations Schemes shall be devised to ensure percolation of benefits to the non-direct beneficiaries (people without rubber) of the project living in the fringes of the project, through employment opportunities and other possible economic assistances to ensure a larger inclusion.

The potential of NR as a tool for socio-economic development of the tribal and rural farmers can be harnessed with large scale expansion of area under NR in the State. But, due care shall be exercised in identifying suitable areas keeping in mind the land and agro-climatic requirements of the crop, to ensure success of the plantations.

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