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LABOUR EMPLOYMENT AND RESOURCE-USE EFFICIENCY IN RUBBER PLANTATIONS OF NON-TRADITIONAL AREAS : A CASE OF DAKSHINA KANNADA DISTRICT, KARNATAKA STATE

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ABSTRACT

The present paper attempts to estimate the labour employment and resource use efficiency in rubber plantations of Dakshina Kannada district of Karnataka State. Labour employment was estimated by converting all the labour employed into mandays of 8 hours giving due weightage for the wage differences and then converting it back into manhours. Resource use efficiencies of labour, fertilizers, plant protection chemicals and capital employed in both small and large farm groups were estimated. The results of the study strengthen the case of rubber cultivation in Dakshina Kannada district with respect to the creation of employment opportunities. This being a new area, the suboptimal use of resources found in the study area may be due to the lack of proper knowhow of rubber cultivation among the farmers. Improved cultivation practices along with proper extension services would make rubber a more profitable enterprise in the locality.

Introduction

Unemployment is one of the major problems of our country to be tackled with urgency and acumen. Since a vast majority of our people are dependent on farm activities for their livelihood it is mandatory to start the investigation from this level. The primary sector contribution towards GDP has gone down to nearly 35 per cent in 1990 from 55 to 60 per cent at the onset of planned economy. Ironically the per cent of population dependent on primary activities has stabilised at 70 per cent since half a century. In absolute terms, this has gone up from 290 million in 1950 to 520 million in 1981 (Ballabh and Sharma, 1992) while the cultivated area has changed only marginally with a sharp decline in the per capita land availability.

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On the other hand, in the private sector growth in output is associated with a declining trend in the growth rate of employment in the 1980s (Ahluwalia, 1991). The new economic policy (NEP) of the government focusses on privatisation of the public enterprises and increasing role of private sector in the industry. Given the trend in the 1980s it is highly unlikely that private organised sector will solve the unemployment problem. For any achieved or prospective rate of output growth, there has been a decline in the labour absorptive capacity of the Indian economy. In agriculture, the percentage increase in employment associated with a one per cent increase in output has come down from something in the neighborhood of 0.75 per cent in the early seventies to something like 0.59 per cent or even lower today. In manufacturing, the fall has been even more precipitous, from roughly 0.55 per cent upto the mid seventies down to 0.35 per cent in the most recent decade (Bhalla, 1990). A comparison of the magnitude of decline in employment associated with one unit of increase in output reveals agriculture sector to be in a relatively advantageous position as against industrial sector especially the organised manufacturing sector. Thus we have to look at agriculture and allied sector for possible employment generation. Furthermore, the NEP gives emphasis on improving efficiency of our scarce resources.

Plantation crops are generally labour intensive enterprises. In this paper we would like to examine the prospects of employment opportunities in the plantations sector with special emphasis on rubber cultivation in the non-traditional areas such as Dakshina Kannada district of Karnataka State. The specific objectives of the paper are (a) to estimate the employment potential and (b) to estimate the resource use efficiency in rubber plantations of new areas.

Methodology

The study area, Dakshina Kannada (DK) district is essentially an agriculture district with more than 60 per cent of the population dependent on agriculture for their livelihood. In Karnataka, DK occupies first place with an area of 7,819.47 hectares under rubber cultivation thus claiming around 85 per cent of the area under cultivation in Karnataka and around 3 per cent of the total area of the country.

A multistage purposive sampling technique was adopted to select the sample farmers considering highest area under rubber as the main criterion. Karnataka, with 37 per cent of the area among all the new areas under rubber, forms the first stage. Dakshina Kannada district, with 80 per cent of the area under rubber in the State, constituted the second

stage. Three taluks, namely Belthangadi, Puttur and Sullia were selected at the third stage and from these taluks one hobli each was selected at the fourth stage. Finally a total of 67 rubber growers were randomly selected and based on the area under cultivation the farmers were separated into small farms (SF) having an area of 5 ha and less, and large farms (LF) with an area of above 5 ha, out of which 35 were SFs and 32 were LFs. From the respondents thus selected data were collected by personal interview method using a pre-tested questionnaire. The data pertains to the crop year 1988-89.

Labour use was estimated by converting all the labour employed into mandays of 8 hours each giving due weightage for wage differences between male and female workers.

The form of production function employed was

$$Y = a X_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4} X_5^{b5} e \qquad \ldots(1)$$

where,

Y = Output per acre of rubber sheets in kilograms

Y_1 = Age of the plantation in years

X_2 = Labour use per acre in manhours

X_3 = Manures and fertilizers per acre in rupees

X_4 = Cost of plant protection chemicals per acre in rupees

X_5 = Other capital costs per acre in rupees

b_1, b_2, b_3, b_4, and b_5 are the output elasticities of the respective resources.

The above function, estimated in linear form by making logarithmic transformations, was fitted separately for the two group of farms under study viz., small and large farms and also the pooled farms. To know the relationship between the parameters in the three functions, Chow test was applied (Chow, 1960).

The marginal value product (MVP) was worked out by using the following formula :

$$\text{MVP of i th resource} = bi \frac{Y}{Xi}$$

where Y = estimated geometric mean levels of the total return

Xi = geometric mean levels of use of 'i' th input, and

bi = regression coefficient of the 'i' th input,

The computed MVP was compared with marginal factor cost (MFC) or the opportunity cost of input to draw inferences. Resources are said to be optimally allocated when MVP equals MFC or the opportunity cost of the resources[1]. The ratios of MVP and MFC of individual resources were used to judge the allocative efficiencies.

Results of the Study

The employmeut generation for SFs and LFs were estimated based on the number of labourers currently employed for different operations. In both small and large farms, it was observed that the amount of labour employed varied between the farm groups (Table 1) The total labour employed per acre by SFs was found to be 6 per cent higher than that of LFs. Tapping and collection of latex is done throughout the year accounting for 79 to 82 per cent of the total labour employed in rubber cultivation. This was followed by weeding and mulching which accounted for 6 per cent and 5.15 per cent of the total labour employed on the

Table 1. Employment in rubber plantations

(Mandays per acre)

Sl. No.	Particulars	Small Farms	Percentage	Large Farms	Percentage
1.	Weeding and mulching	4.05	6.26	3.15	5.15
2.	Manure and fertilizer application	1.96	3.02	1.40	2.30
3.	Plant protection	2.40	3.72	3.01	4.93
4.	Lime application	0.56	0.87	0.26	0.42
5.	Annual marking and fixing of cups	1.74	2.69	0.66	1.09
6.	Tapping and collection	52.74	81.56	48.24	78.92
7.	Packaging	0.19	0.29	0.21	0.34
8.	Fixing of rain guard	—	—	3.08	5.03
9.	Miscellaneous	1.03	1.59	1.11	1.82
	Total	64.66	100.00	61.13	100.00
10.	Yield (in kgs) (Rubber sheets)	546.68	—	562.67	—

1. The MVP of the output was worked out by considering the average price received per kilogram of rubber sheets (Rs. 18/-) and the labour hours were converted into rupees by considering the average wages paid for one manday (Rs. 20/-).

small and large farms, respectively. And the other seasonal operations accounted for only 0.2 to 5.03 per cent of the total labour employment on small and large farms. When the total labour employment was compared, it was found that even for larger output, large farms used less labourers while for slightly less output small farms used 6 per cent more labourers. This may perhaps be attributed to the surplus family labour availability on small farms. On an average, an acre of rubber plantation generates about 65 mandays of employment per year.

The Chow's test (Chow, 1960) indicated that the production relationship for small and large farms were distinct and hence pooling of small and large farms for the purpose of generalisation was not realistic. Therefore, the production relations have been interpreted separately. The calculated coefficient of determination ($\bar{R}^2$) varying between 0.5668 in case of LFs and 0.6419 in case SFs (Table 2) indicated that the six variables included in the production function could explain most of the variations in the total yield. In case of both the SFs and LFs, age of the plantation, labour and other capital items were found to be significantly different from zero, while manure and fertilizer and plant protection chemicals were found non-significant in the estimated production functions. In case of both SF and LF, labour was found to be significant and positive indicating more scope to employ additional labour over and above the existing mean level of labour use in rubber cultivation. In respect of other capital items on both small and large farms, the estimated coefficients were found to be negative and significant indicating over use of capital. Age of the plantation was found to be significant in both the farm groups. This indicates a possibility of attaining more yield in the forthcoming years since most of the plantations included in the sample were between the age of 12 and 14 years due to the recent introduction of rubber cultivation in the study area. The probable reason for other variables, such as manures and fertilizers and plant protection chemicals, to be non-significant in both the size groups may be perhaps due to the producers standardization of cultural practices which leaves very little scope to either increase or decrease these resources under the existing technology.

The ratios of MVP and MFC worked out for four variables viz., labour, manures and fertilizers, plant protection chemicals and other capital, indicated that all the variables except other capital items in both SF and LF groups were found to be underused (Table 3). Other capital items in both SFs and LFs were found to be negative, indicating overuse of these resources. The ratio of MVP and MFC were found to be positive

Table 2. Production functions for different farm groups

Sl. No.	Farm group	Intercept	Production elasticities					$\bar{R}^2$	F-value	Durbin-Watson Statistic
			b_1	b_2	b_3	b_4	b_5			
1.	Small farms	5.17 (3.75)***	0.35 (1.85)*	0.17 (1.96)**	0.08 (0.65)	0.60 (0.47)	—0.24 (—2.71)***	0.6419	4.85	2.0094
2.	Large farms	0.80 (2.15)***	0.15 (2.47)***	0.90 (2.26)***	0.32 (0.91)	0.24 (0.53)	—0.47 (—1.95)*	0.5668	4.63	2.1653

Note: (1) b_1, b_2, b_3, b_4 and b_5 are the elasticities of age of the plantation, labour, manures and fertilizers, plant protection chemicals and other capital, respectively.

(2) Figures in the parentheses are the 't' values.

(3) ***, ** and * indicate significance at 1 per cent, 5 per cent and 10 per cent, respectively.

Table 3. Estimated ratio of marginal value product (MVP) and marginal factor costs (MFC)*

(in rupees)

Sl. No.	Variables		Small farmers MVP/MFC	Large farmers MVP/MFC
1.	Labour	X_2	1.2491	8.5192
2.	Manures and fertilizers	X_3	2.6611	14.0625
3.	Plant protection chemicals	X_4	24.3838	6.5342
4.	Capital	X_5	—5.3465	—20.2057

* The MFC or the opportunity cost of all inputs was assumed to be rupee one.

and greater than one for other variables such as labour, manures and fertilizers and plant protection chemicals in case of both SF and LF groups indicating further scope for use of these resources. The underuse of labour in case of LFs was higher and could probably be due to the nonavailability of skilled labour which is required for operations like tapping and collection of latex coupled with high wage rates. In case of SFs, labour use was more when compared to LFs and this could be because of the involvement of family labour especially in tapping and collection, fertilizer application, etc. Lack of proper technical knowledge and awareness of cultivation practices could be the reason for the suboptimal use of fertilizer and plant protection chemicals. However, in general as both SF and LF group farms were not employing the required inputs optimally, efficient use of these resources could increase the returns and would make rubber cultivation a more profitable enterprise[2].

Conclusion and Policy Implications

From the results obtained it could be very well concluded that rubber cultivation provides ample opportunities for employment in case of large ferms. It could also be concluded that rubber growers in DK were not employing the required inputs efficiently. Efficient allocation of resources could increase the yield and also returns to the farmers. The forward and backward linkages of rubber plantations[3] could be strengthened by setting up of small scale industries for

2. The details regarding the costs and returns of one rubber plantation in Dakshina Kannada district is given in Appendix-I.
3. For details about forward linkages of rubber plantations see George and Joseph, 1992.

processing and reclamation of raw rubber, tyre and tube manufacturing, footwear, and other industries which could utilise the by-products of rubber plantations such as rubber seed, honey, and rubber wood. This could bring in more income and also employment opportunities for the unemployed educated youth of the locality. The current emphasis for exports being value added commodities, natural rubber and its products could be one of the potential components in our export basket.

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Appendix—I

Yield and returns from an acre of rubber plantation

Sl. No.	Description	Units	Farm Size	
			Small	Large
1.	Yield in the form of rubber sheets	Kilograms	546.56	562.75
2.	Average price per kg	Rupees	18.00	18.00
3.	Value by sale	Rupees	9838.06	10129.55
4.	Yield in the form of scrap rubber	Kilograms	57.49	38.46
5.	Average price per kg	Rupees	8.00	8.00
6.	Value by sale	Rupees	459.92	307.69
7.	Total (3+6)	Rupees	10297.98	10437.25
8.	Annual average maintenance cost	Rupees	3247.77	3121.05
9.	Cost per kg. of rubber sheet	Rupees	5.94	5.55
10.	Net returns	Rupees	7050.20	7316.19