

ENTREPRENEURSHIP IN PLANTATION CROPS - OPTIMUM SIZE FOR SMALL HOLDINGS*

E. V. NELLIAT

Central Plantation Crops Research Institute,
Kasaragod 670 124, Kerala, India.

India is one of the leading producers of plantation crops like coconut, arecanut, tea, coffee and rubber. All these crops, except arecanut are commodities of international trade and the employment generated by them on the farm and industrial sectors are substantial. The present area and production of these plantation crops in India are given in Table I.

Table I. *Area and production of major plantation crops in India during 1979-'80*

Crop	Area (million ha)	Production
Coconut	1.01	5,830 million nuts
Arecanut	0.18	0.18 million tonnes
Tea†	0.37	0.55 "
Coffee	0.20	0.15 "
Rubber	0.24	0.19 "

† during 1979

Coconut and arecanut were being cultivated in India from time immemorial. Tea was introduced to this country about 150 years ago from China; but systematic cultivation on plantation scale started only at the turn of this century. Bababudon, a muslim pilgrim brought coffee to India but commercial plantations were established only about 150 years ago. It was at the beginning

of this century, the first rubber plantation in this country was established. Because of its adaptability to grow under varying agro-climatic conditions, there had been a quick expansion of area under rubber.

Moderate success in crop improvement through conventional methods like introduction, selection and hybridisation has been achieved in plantation crops. Improved management practices to suit different agroclimatic conditions have also been developed. However, the productivity of most of these crops did not keep pace with the achievements made in recent years on field crops. In the case of coconut, the trend is very much alarming, since there has been a steady decline in the productivity, during the past two decades. Reasons, such as, the spread of diseases of uncertain etiology like root (wilt), planting in marginal and unsuitable lands and inadequate attention or negligence on the part of the cultivators have been attributed for this decline.

A marked difference has been noticed in the case of tea. A 40% increase in tea production has been achieved in South India during the last five years,

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i. e., from 100 million kg made-tea in 1974-75 to 140 million kg in 1979-80. This achievement was attained not by area expansion but by adoption of improved management practices on tea bushes planted about 80 years ago. The results of research carried out during the late sixties and early seventies by the Tea Research Department of the United Planters' Association of South India on the fertiliser requirements of tea and plant protection measures, were accepted and adopted by the planters of South India. Potash fertilisation was at low levels which had resulted in the debilitation of tea bushes. Although tea comes up well in acidic soils, calcium deficiency was evident when the pH was lower than 4.8, and liming was found necessary. To effectively manage the pests and diseases, as many as 30 sprays of pesticides and fungicides were recommended. This field success in tea production establishes a vital point. In field crops, varieties with high yield potential could be evolved and adopted for cultivation within five years. But in plantation crops which have a life span of 60-80 or more years, the strategy for increasing production has to be the adoption of improved management practices, including plant protection measures for existing plantations and new plantings.

With regard to investment and returns, the plantation crops can be compared to that of an industry. They have a rather long pre-bearing period lasting upto 7-8 years during which the investments are sizeable, but returns are negligible. But once the production starts, there is sustained income round the year for decades.

The performance of large and small holdings of plantation crops differ substantially. Contrary to the assumption that the small plantations are more productive because of the expected better attention, larger plantations under the corporate sector show better productivity compared to small holdings. The small holder farmers fail to give appropriate attention to the crop in time because of the long pre-bearing period, uncertainty of the returns due to wide fluctuations in price, and the response to improved management practices adopted during the productive phase. Whenever there is a slump in the price for a particular commodity, the farmers with small holding divert their available resources to another crop which is more remunerative at the time. This is very much evident even in a crop like tea. The average yield of the corporate sector plantations in the Nilgiris is about 1800 kg made-tea/ha compared to 800 kg made-tea in the small holdings.

There are areas of difference between plantation crops and industry. In industry, the sons or close relatives take over the management from the founder. They are educated and trained to gain expertise in specific areas related to the concerned industry. In farming this is not the case. The brilliant young men and women in the family go after a white collar job. Smart ones may even take up business or trade. It is generally the children who drop out from schools take to farming by the force of circumstances rather than by choice or aptitude. Naturally, there is reluctance on the part of such men to

change over to improved crop production technology. This, according to me, is one of the main reasons for the low productivity and returns in the plantation crops in the noncorporate sector. The planter should consider farming as a business, assess the cost benefit ratio and manage the farm with view to obtaining high production and profit.

Small and big factories coexist in industry. Can a similar situation exist successfully in plantation crops farming? Can the small holdings of plantation crops be prosperous and rewarding to entrepreneurs? The large plantations in tea, coffee or rubber under the corporate sectors need investment of a few million rupees. It may not be in the reach of everyone to invest huge amounts to establish large plantations.

Young and enthusiastic entrepreneurs with limited resources would like to take up farming on a small scale with a view to finding self employment and earning a fairly decent living. These entrepreneurs take up farming by choice and not by chance and naturally such farmers will have sustained interest in the farming and should prosper. It seems appropriate that we must have on hand sufficient guidelines to advise such entrepreneurs on the choice of the crop that could be grown at a given location, the financial and labour requirements, and the time lag between initial investment and stabilised returns.

The agroclimatic requirements of some of the major plantation crops are presented in Table II. The information may enable the young man to choose the crop based on the land and resources

available. Specific recommendations could be obtained from the research institute dealing with the particular crop.

INVESTMENT AND RETURNS

1. Coconut - rainfed

The cost of establishing a one hectare coconut plantation under rainfed condition upto the stabilised bearing, excluding cost of land, and the returns expected are furnished in Table III. West Coast Tall and Laccadive Ordinary are the coconut cultivars suggested. It is expected that the stabilised bearing stage will be attained in the 12th year, although the initial harvest may start from the seventh year. The annual returns are expected to exceed the expenses from the 10th year.

During the first year the expenses will be high amounting to Rs. 10,630/-. A large part of this will have to be spent towards land preparation, cost of seedlings and boundary fencing. The annual recurring expenses will increase gradually because of the increasing doses of fertilisers in the early years and later due to the increasing harvest charges. From 12th year a steady average yield of 50 nuts/palm is expected, giving a gross return of Rs. 10,500/-. On the basis of 1980 prices the annual expenditure will be Rs. 3,560/-. Thus the net profit per hectare works out to Rs. 6,940/- per year (Table III). The gross cost of establishing a one hectare coconut plantation upto the end of the ninth year under rainfed condition is Rs. 33,180/-. Deducting the returns from the seventh to ninth years, the net investment is Rs. 29,730/-. About one third of this

Table II. *Agroclimatic requirements of major plantation crops*

Crop	Altitude in metre	Rainfall in mm	Temperature in centigrade	Soil	Spacing and population/ha	Varieties recommended
Coconut	upto 900	2000	Mean annual temperature 27°. Diurnal variation 6-7°	Moist soil types ranging from coastal sand to laterite, well drained loam or alluvium; preferably 1.0-1.5 m deep	7.5×7.5 m 175	Local Tall, Lacadive Ordinary (Rainfed) T×D, D×T, Malayan Dwarf (irrigated)
Arecanut	upto 1000	2000-3000	Temperature below 10° is harmful. Protection from direct southern and western sun is essential	Well drained loamy soil	2.7×2.7 m 1350	Mangala, South Kanara, Mohinagar
Tea	200-2400	Well distributed rainfall of over 1500	14° - 30°	Well drained soil 1.5-2.0 m deep without hard pans or gravel layers. pH 4-6	75 cm triangular with 150 cm between pairs of rows 13,000	Athrey, Golgonda B/6/182
Coffee						
<i>arabica</i>	1000-1500	1600-2500		Deep, well drained slightly acidic soils, rich in organic matter	2.0×2.5 m 2000	Kents, S.1934
<i>robusta</i>	above 500	1000-2000	15° - 25°		2.5×4.0 m 1000	San Ramon
Rubber	upto 450	2000-3000	21° - 35° with a mean of 27°	Good textured, well drained soil with water table lower than 1 m. pH 4.0-6.5	4.6-4.9 m square, triangular, rectangular or hedge systems 420-450	RR1 208, RR1 203, RR1 105, CT 1, RRIM 600 series TJR 1, PB 5/51, PB/86

Table III. Cost of cultivation* and returns per hectare of coconut plantation (rainfed)

Particulars	Years since planting																
	1	2	3	4	5	6	7	8	9	10	11	12					
	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	Man- days	Rs.	
COST OF CULTIVATION																	
Clearing, levelling, bundling and fencing	325	7,450	15	210	10	140	10	140	10	140	10	140	10	140	10	140	10
Cost of seedlings, digging pits and planting	90	2,120	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shading, mulching and gap filling	8	170	18	370	6	100	-	-	-	-	-	-	-	-	-	-	-
Cost of fertilisers, manures and appli- cation charges	15	540	20	1,100	20	1,460	25	1,810	25	1,970	25	1,970	25	1,970	30	1,970	30
Ploughing, weeding and digging corners	10	300	15	520	15	520	20	570	15	500	15	500	15	500	15	500	15
Plant protection	2	50	2	50	4	100	4	100	10	200	10	200	10	200	12	250	12
Harvest	-	-	-	-	-	-	-	-	-	-	-	15	210	25	350	50	700
Total	450	10,630	70	2,250	55	2,320	59	2,620	60	2,810	60	2,810	75	3,020	85	3,160	117
Cumulative total	10,630	12,280	15,820	17,820	20,630	23,440	26,460	29,620	33,180	36,740	40,300	43,860					
RECEIPTS																	
Yield of nuts (no.)	-	-	-	-	-	-	-	-	-	250	875	1,750	4,375	6,125	8,750		
Value of nuts @ Rs. 1.20/nut	-	-	-	-	-	-	-	-	-	300	1,050	2,100	5,250	7,350	10,500		
Net returns	(-)	10,630	(-)	2,250	(-)	2,320	(-)	2,620	(-)	2,810	(-)	2,810	(-)	2,720	(-)	2,110	(-)

* Labour wages @ Rs. 14/- per day

amount is to be expended in the first year.

2. Coconut - irrigated

In places where assured water supply is available, coconut hybrids (D×T and T×D) and Malayan Dwarf, which are high yielding and early bearing, may be grown. The investment for establishing one hectare of coconut plantation under irrigated conditions and returns are presented in Table IV.

The investment in the first year will be nearly double than that under rainfed condition mainly on account of the installation of the irrigation system. The annual recurring expenditure will be more than one and half times than that under rainfed conditions.

The gross return in the seventh year will be a little more than the expenses during the year. Hence, the gross investment for establishing one hectare of irrigated coconut plantation upto the end of the sixth year will be Rs. 40,670/-. Deducting the initial returns, the net investment needed is Rs. 36,470/- per hectare. Stabilised yield is expected from the 10th year of planting, when the mean yield would be 90 nuts/palm and the annual net profit Rs. 13,165/- (Table IV).

3. Arecanut

Arecanut is to be grown under good management with irrigation. The cost of establishing a plantation, therefore, is substantial (Table V). Out of the first year expenses of Rs. 15,310/- nearly two-third are towards labour charges (825 mandays). The annual investment increases from Rs. 9,830/- during the second year to Rs. 16,010/-

in the fifth year. The receipts during the sixth year is expected to exceed the expenditure. Yield will stabilise from seventh year at 1800 kg dried husked nuts/ha. The gross annual expense, thereafter, will be Rs. 16,010/- of which over Rs. 11,480/- will go for labour charges. Out of 820 mandays labour required annually, 180 is for irrigation where self employment is possible (Table V).

The annual net returns per hectare after deducting expenses are expected to be about Rs. 10,990/-. The gross establishment charges upto the end of the fifth year will be Rs. 65,185/- and the net investment will be Rs. 57,685/- after deducting the expected returns worth Rs. 7,500/- (Table V).

4. Tea - South India

The minimum operational size of plantation for a tea processing factory is 300 hectares and the cost of setting up a factory would be over Rs. 25 lakhs. Hence, small tea gardens are to be located near tea processing factories.

Tea is a labour intensive crop. The cost of establishing a one hectare tea plantation and the returns are furnished in table VI. The expenditure of Rs. 16,968/- required during the first year is mainly for felling trees, uprooting stumps, digging pits and planting. As plucking of tea starts from the third year, and the receipts during the year will exceed the expenses, the net cost of establishing a one hectare tea garden will be Rs. 20,541/- upto the end of second year. Stabilised returns will be obtained from the sixth year when the mean annual expenses will be Rs. 13,240/- and the net returns Rs. 8,210/-.

Table IV. Cost of cultivation and returns per hectare of coconut plantation (irrigated)

Particulars	Years since planting													
	1	2	3	4	5	6	7	8	9	10				
	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.
COST OF CULTIVATION														
Clearing, levelling bunding and fencing	325	7,450	15	210	10	140	10	140	10	140	10	140	10	140
Installation of irrigation system	25	6,000	-	-	-	-	-	-	-	-	-	-	-	-
Cost of seedlings, digging pits and planting	90	2,640	-	-	-	-	-	-	-	-	-	-	-	-
Shading, mulching and gap filling	8	170	18	375	6	100	-	-	-	-	-	-	-	-
Cost of fertilisers manures and application charges	15	640	20	1,370	25	2,250	30	2,995	30	2,995	30	2,995	30	2,995
Ploughing, weeding and digging corners	10	300	15	520	15	520	15	570	15	500	15	500	15	500
Plant protection	2	50	2	50	4	100	10	200	10	200	10	200	15	400
Irrigation	25	1,000	25	1,000	25	1,000	25	1,000	25	1,000	25	1,000	25	1,000
Harvesting	-	-	-	-	-	-	-	-	15	210	25	350	50	700
Total	500	18,250	95	3,525	85	4,110	95	4,905	90	4,835	105	5,045	120	5,385
Cumulative total	18,250	21,775	25,885	30,790	35,625	40,670	46,055	51,790	57,525	63,260	69,515	75,735	82,015	88,260
RECEIPTS														
Yield of nuts (no.)	-	-	-	-	-	3,500	5,250	8,750	12,250	15,750	19,250	22,750	26,250	29,750
Value of nuts @ Rs. 1.20/nut	-	-	-	-	-	4,200	6,300	10,500	14,700	18,900	23,100	27,300	31,500	35,700
Net returns	(-)18,250	(-)3,525	(-)4,110	(-)4,905	(-)4,835	(-)4,845	915	3,015	8,965	13,165	17,415	21,665	25,915	30,165

Table V. Cost of cultivation and returns per hectare of arecanut plantation

Particulars	Years since planting													
	1		2		3		4		5		6		7	
	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.	Man-days	Rs.
COST OF CULTIVATION														
Clearing, levelling, bunding and fencing	160	2,740	20	280	20	280	20	280	20	280	20	280	20	280
Cost of seedlings, digging pits, planting and shading	420	6,760	-	-	-	-	-	-	-	-	-	-	-	-
Digging, weeding and drainage	50	700	225	3,150	225	3,150	225	3,150	225	3,150	225	3,150	225	3,150
Cost of fertilisers and fertiliser applications	80	3,300	80	3,720	80	5,010	80	5,010	80	5,010	80	5,010	80	5,010
Plant protection	15	310	20	480	30	720	50	1,190	115	2,100	115	2,100	115	2,100
Irrigation	100	1,500	150	2,200	150	2,225	180	2,670	180	2,670	180	2,670	180	2,670
Harvesting, drying and curing	-	-	-	-	-	-	25	350	200	2,800	200	2,800	200	2,800
Total	825	15,310	495	9,830	505	11,385	580	12,650	820	16,010	820	16,100	820	16,010
Cumulative total	15,310	25,140		36,525		49,175		65,185		81,195		97,205		97,205
RECEIPTS														
Yield (kg)	-	-	-	-	-	-	100	400	1,200	1,800	1,800	1,800	1,800	1,800
Receipts	-	-	-	-	-	-	1,500	6,000	18,000	27,000	27,000	27,000	27,000	27,000
Net returns	(-)15,310	(-)9,830	(-)11,385	(-)11,150	(-)10,010	1,990	10,990	10,990	10,990	10,990	10,990	10,990	10,990	10,990

Table VI. Cost of cultivation and returns per hectare of tea plantation - South India

Particulars	Years since planting											
	1		2		3		4		5		6	
	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.
COST OF CULTIVATION												
Clearing the jungle, making foot paths, drains and fencing	352	6,904	-	-	-	-	-	-	-	-	-	-
Cost of seedlings, digging pits and planting	272	9,006	-	-	-	-	-	-	-	-	-	-
Cost of seedlings and planting of shade trees	5	206	-	-	-	-	-	-	-	-	-	-
Mulching	-	852	-	-	-	-	-	-	-	-	-	-
Centring	-	-	5	70	-	-	-	-	-	-	-	-
Cost of fertilisers and fertiliser application	-	-	32	1,833	44	2,470	44	3,382	20	2,113	20	2,113
Weed control	-	-	47	658	47	658	19	718	12	688	5	255
Plant protection	-	-	50	960	64	1,192	32	744	32	744	32	744
Manuring shade plants	-	-	-	52	-	104	-	104	-	104	-	104
Cut across	-	-	-	-	7	98	-	-	-	-	-	-
Pruning	-	-	-	-	-	-	-	-	100	1,400	-	-
Plucking charges	-	-	-	-	267	3,738	531	7,434	576	8,064	716	10,024
Total	629	16,968	134	3,573	429	8,260	626	12,382	740	13,113	775	13,240
Cumulative total	16,968		20,541		28,801		41,183		54,296		67,536	
RECEIPTS												
Yield of green leaf kg/ha	-	-	-	-	6,640		13,280		14,390		14,300	
Value @ Rs. 1.50/kg green leaf	-	-	-	-	9,960		19,920		21,585		21,450	
Net returns	(-)	16,968	(-)	3,573	1,700		7,538		8,472		8,210	

Tea yield is estimated as 14,300 kg fresh green leaf/ha. The yield and expenses during the pruned year (in five year cycles) are also considered for calculating the mean receipts and expenses per year. Seven hundred and sixteen mandays are required annually for plucking and self employment in this operation is feasible, as the work does not involve much physical strain.

5. Tea - North Eastern India

Tea cultivation in North Eastern India is slightly different from the method followed in South India. During the first year, the land is prepared and a cover crop is raised as a soil ameliorative measure. Actual planting of tea clones is done during the second year. The first year expenditure is comparatively low, but the gross expenditure for establishing a one hectare tea garden is much higher than that in South India. The labour requirement is also more. Although tea plucking starts during the third year, stability in yield will be obtained only by the seventh year. The net investment to be made is Rs. 36,500/- for the first four years. From the seventh year, a mean annual yield of 12,800 kg green leaf is expected. Thereafter, the mean annual expenditure will be Rs. 15,235/- and the receipts Rs. 19,200/-, leaving a net return of Rs. 3,965/- (Table VII).

6. Coffee - *robusta*

Partial clearing of jungle and developmental operations are required initially to establish a coffee plantation. As *robusta* coffee is more remunerative, it is preferred over *arabica* for new plantings. The expense during the first year is Rs. 8,950/-, and two-thirds is

spent towards labour charges (Table VIII). A bearing coffee plantation requires about 255 mandays labour/ha/year and of these 100 mandays are for harvesting. This operation offers opportunity for self employment to a limited extent, as the plucking period is short. The *robusta* coffee comes to bearing in the fourth year and from the fifth year onwards the receipts are expected to exceed the expenses. Hence, the net investment required for establishing a *robusta* coffee plantation, upto the end of the fourth year will be Rs. 18,270/-. The stabilised mean annual yield is taken at 1000 kg dry berries/ha and value of coffee bean at Rs. 12/kg. From the seventh year, the net profit would be Rs. 7,370/- per ha (Table VIII).

7. Coffee - *arabica*

Establishing *arabica* coffee plantation is more expensive and requires greater attention than that of *robusta*. The cost of establishing a one hectare *arabica* coffee plantation and returns are given in Table IX. A major portion of the first year expenses of Rs. 12,412/- is towards labour (683 mandays). The receipts would exceed the expenses from the sixth year. The net investment needed upto the end of the fifth year will be Rs. 29,222/-. The annual expenses from the seventh year will be Rs. 7,655/- and receipts Rs. 12,000/-, leaving a net profit of Rs. 4,345/- per ha.

8. Rubber

Rubber trees attain the tappable girth by the sixth year of planting and most trees in a plantation can be tapped from the seventh year. The total cost of establishing a plantation upto the end of fifth year will be Rs. 16,000/- per ha.

Table VII. Cost of cultivation and returns per hectare of tea plantation (North Eastern India)

Particulars	Years since planting							
	1	2	3	4	5	6	7	
	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	
COST OF CULTIVATION								
Clearing, levelling, laying drains and fencing	265	4,060	45	3,680	-	-	-	-
Ploughing and sowing cover crops	70	1,580	-	-	-	-	-	-
Cost of seedlings/clones, preparing land, digging pits and planting	-	300	10,560	-	-	-	-	-
Cost of shade plants and planting	-	13	340	10	290	10	290	10
Clearing drains	-	-	20	280	20	280	15	210
Pruning/pegging	-	-	50	1,230	50	1,230	40	560
Infilling	-	-	20	1,120	20	1,120	15	510
Mulching	-	40	560	35	490	35	490	30
Fertilisers and fertiliser application	-	17	940	15	1,140	15	1,140	15
Weed control	-	65	1,420	55	1,380	55	1,380	40
Pest and disease control	-	15	500	10	650	10	650	10
Plucking charges	-	-	250	3,500	500	7,000	600	8,400
Total	335	5,640	495	18,000	465	10,080	715	13,550
Cumulative total	5,640	23,640	33,720	47,300	61,135	76,370	91,605	
RECEIPTS								
Yield of green leaf kg/ha	-	-	1,600	5,600	9,200	10,400	12,800	
Value @ Rs. 1.50/kg	-	-	2,400	8,400	13,800	15,600	19,200	
Net returns	(-)5,640	(-)18,000	(-)7,680	(-)5,180	(-)35	365	3,965	

Table VIII. Cost of cultivation and returns per hectare of robusta coffee plantation

Particulars	Years since planting						
	1	2	3	4	5	6	7
	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.
COST OF CULTIVATION							
Clearing, bunding and fencing	95	3,330	-	-	-	-	-
Cost of seedlings, digging pits and planting of coffee and dadaps	160	2,840	-	-	-	-	-
Hutting/removing huts and topping	30	420	25	350	-	-	-
Hot weather scuffing and lime wash for dadaps	60	840	20	280	20	280	20
Cost of fertilisers and fertiliser application	20	680	25	1,000	25	1,200	25
Weeding and mulching	60	840	60	840	30	420	30
Trenching/trench clearing	-	60	840	60	840	20	280
Shade regulation	-	25	350	25	350	25	350
Pruning and desuckering	-	-	-	25	350	25	350
Plant protection	-	10	250	10	350	10	350
Harvesting	-	-	-	-	75	1,050	100
Total	425	8,950	225	3,910	230	4,130	230
Cumulative total	8,950	12,860	16,990	21,270	25,900	30,530	35,160
RECEIPTS							
Yield of dry berries (kg)	-	-	-	250	500	750	1,000
Value @ Rs. 12.00/kg	-	-	-	3,000	6,000	9,000	12,000
Net returns	(-)	8,950	(-)	4,130	(-)	1,280	4,370

Table IX. Cost of cultivation and returns per one hectare of arabica coffee plantation

Particulars	Years since planting						
	1	2	3	4	5	6	7
	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.	Mandays Rs.
COST OF CULTIVATION							
Clearing the jungle, bunding and fencing	95	3,330	-	-	-	-	-
Cost of seedlings, digging pits and planting of coffee and dadap	243	3,852	-	-	-	-	-
Hutting/dehutting and topping	100	1,400	25	350	-	-	-
Cover digging, weeding and mulching	160	2,240	100	1,400	30	420	30
Cost of fertilisers and fertiliser application	25	750	25	950	30	1,685	30
Hot weather scuffing and forking	50	700	60	840	20	280	20
Liming/lime wash for dadaps	10	140	-	-	10	440	10
Trenching and clearing trenches	-	-	60	840	20	280	20
Shade regulation	-	-	15	210	20	280	40
Desuckering and pruning	-	-	-	-	40	560	40
Plant protection	-	-	15	800	15	800	70
Harvesting	-	-	-	-	100	1,400	125
Total	683	12,412	300	5,390	305	5,460	385
Cumulative total	12,412	17,802	23,262	30,567	38,222	45,877	53,532
RECEIPTS							
Yield-dry berries kg/ha	-	-	-	250	500	750	1,000
Value Rs. 12/kg	-	-	-	3,000	6,000	9,000	12,000
Net returns	(-)12,412	(-)5,390	(-)5,460	(-)4,305	(-)1,655	1,345	4,345

out of which the expenditure during the first year alone will be Rs. 6,220/- per ha. The maintenance expenditure during the mature phase of the crop will be Rs. 4,515/- per ha annually. The expected dry rubber yield will be 1200 kg/ha and its value will be Rs. 12000/- at the rate of Rs. 10/- per kg, giving a net profit of Rs. 8,485/- (Table X).

PROJECTS PROPOSED

Based on the cost of establishing some of the plantation crops and the net returns detailed earlier, a few projects have been formulated to meet the requirements of entrepreneurs who are interested in taking up small scale farming. At 1980 price level, a monthly earning of around Rs. 1500/- would be attractive. Assuming that the entrepreneur would stay in the farm and that the land is already in his posses-

sion, the optimum size of the holding, investment and labour requirements are projected with a fair level of confidence.

Project 1: Coconut - rainfed

A coconut garden of 2.5 ha requiring a net investment of Rs. 83,000/- is advocated. The annual requirement of labour, investment and returns upto the 12th year are depicted in Fig. 1. The investment is spread over a period of nine years, but the first year expenditure would be about one-third of the total *i. e.*, Rs. 26,600/-. From the 10th year income will exceed the expenditure and from the 12th year a steady mean monthly income of Rs. 1450/- is expected. Labour requirement during the first year would be as high as 1125 mandays. From the 12th year about 293 mandays labour per annum will be needed. Opportunities for self-employment are limited.

Fig. 1 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM 2.5 ha COCONUT PLANTATION (RAINFED) (PROJECT.1)

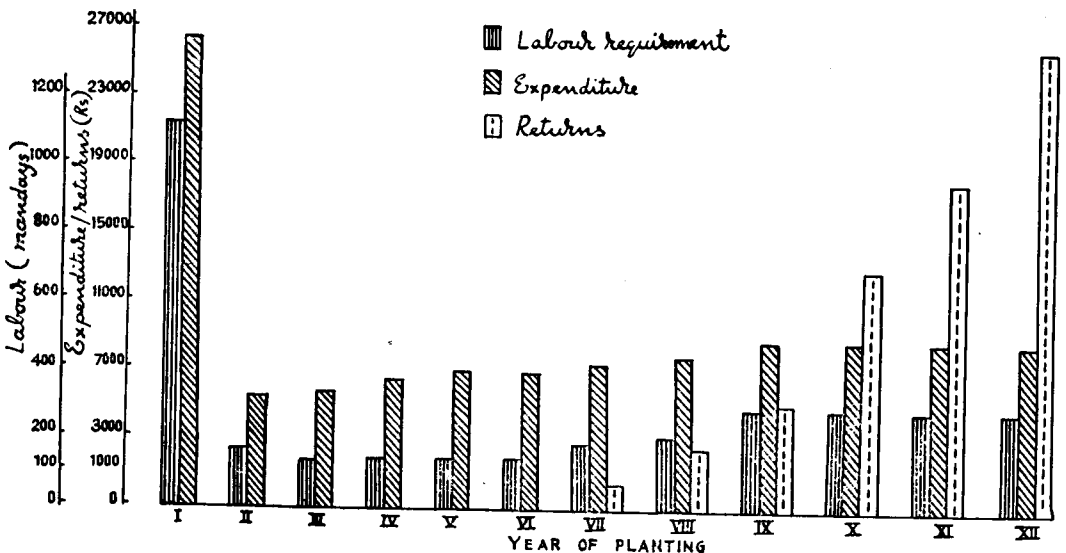


Table X. Cost of cultivation and returns per one hectare of rubber plantation

Particulars	Years since planting													
	1	2	3	4	5	6	7							
	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.	Mandays	Rs.						
COST OF CULTIVATION														
Clearing and fencing	20	350	-	-	-	-	-	-						
Terracing, cutting and filling	40	560	-	-	-	-	-	-						
Digging pits and refilling	125	1,750	-	-	-	-	-	-						
Cost of planting material and planting	10	800	-	-	-	-	-	-						
Cost of shade baskets and shading	10	500	-	-	-	-	-	-						
Weeding and mulching	45	630	130	1,820	100	1,400	90	1,260	65	910	35	490	35	490
Cost of seeds and establishment of cover crops	5	300	-	-	-	-	-	-	-	-	-	-	-	-
Drainage and laying foot path	70	980	-	-	-	-	-	-	-	-	-	-	-	-
Cost of fertilisers and manuring	5	150	15	590	15	780	15	590	13	525	15	525	15	525
Plant protection	5	200	10	400	10	500	10	500	10	500	15	700	15	700
Tapping, collection and processing	-	-	-	-	-	-	-	-	-	-	85	1,190	200	2,800
Total	335	6,220	155	2,810	125	2,680	115	2,350	90	1,935	150	2,905	265	4,515
Cumulative total	6,220		9,030		11,710		14,060		15,995		18,900		23,415	
RECEIPTS														
Yield of dry rubber (kg/ha)	-	-	-	-	-	-	-	-	-	-	-	500	1,200	
Value @ Rs. 10/kg.	-	-	-	-	-	-	-	-	-	-	-	5,000	12,000	
Net returns	(-)	6,220	(-)	2,810	(-)	2,680	(-)	2,350	(-)	1,935	(-)	2,395	7,485	

Project 2: Coconut - irrigated

It is essential to have an assured source of irrigation throughout the year. The land required is only 1.5 ha and the details of the yearly requirement of labour, expenditure and returns upto the 10th year are illustrated in Fig. 2. The capital required for six years is Rs. 54,700/- and half the amount is to be spent during the first year. Yield establishes from the 10th year when a mean monthly income of Rs. 1650/- will be obtained. The scope for self employment is limited to about 40 mandays for irrigating the palms during summer months.

Project 3: Arecanut

From a 1.5 ha *Areca* plantation, one can obtain a mean monthly income of Rs. 1375/- from the seventh year. The yearly requirement of labour, investment and returns are shown in Fig. 3. The investment required in the course of five years, totals to Rs. 86,500/-. The opportunities for self-employment are more especially in irrigating palms and if the entire 270 mandays required for irrigation could be supplied by the family, the monthly earnings would increase to Rs. 1650/-. The project is labour intensive and about 1200 mandays are required every year.

Fig. 2 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM
1.5 ha COCONUT PLANTATION (IRRIGATED)
(PROJECT-2)

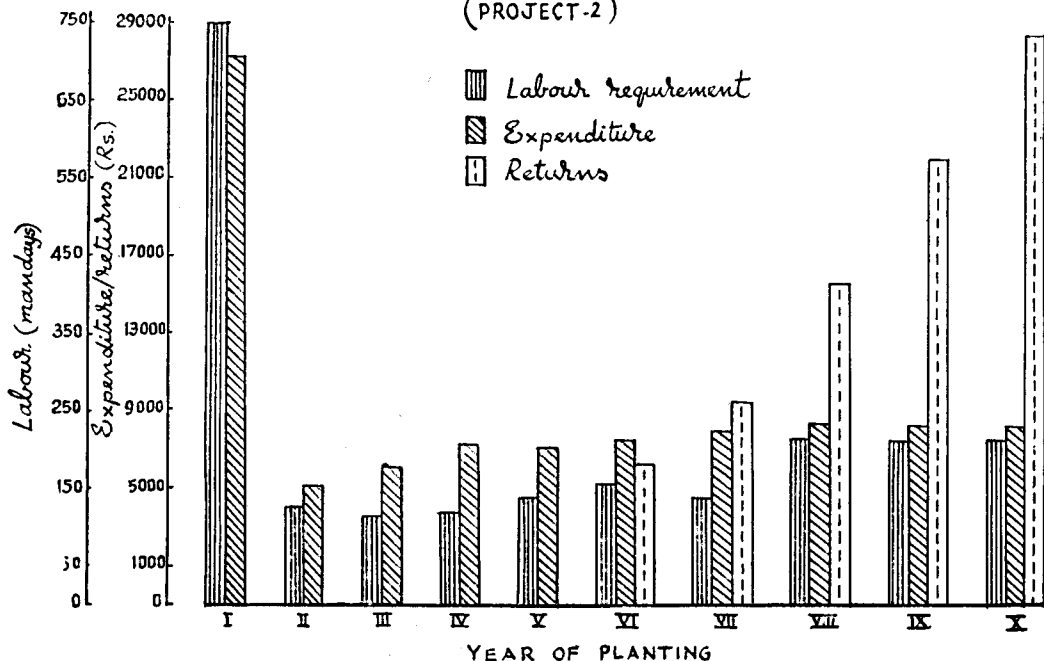
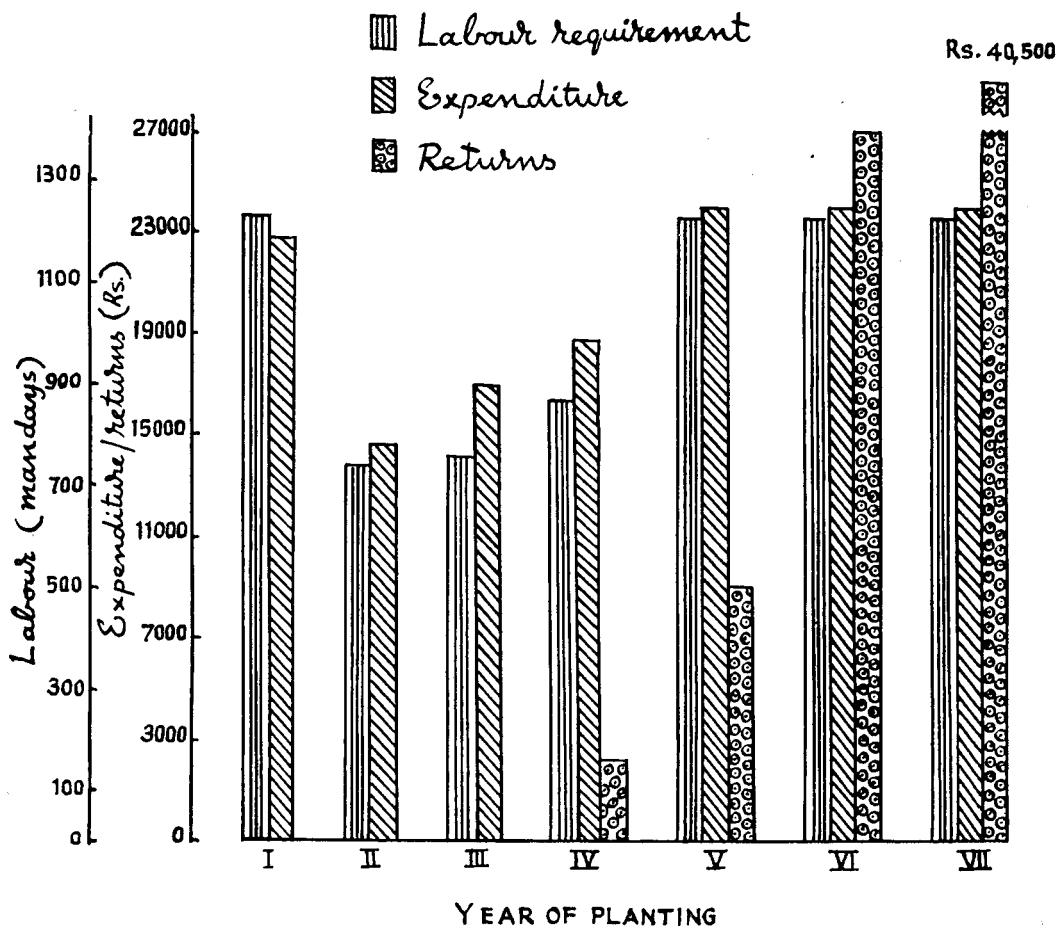


Fig.3 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM 1.5 ha ARECANUT PLANTATION (PROJECT - 3)

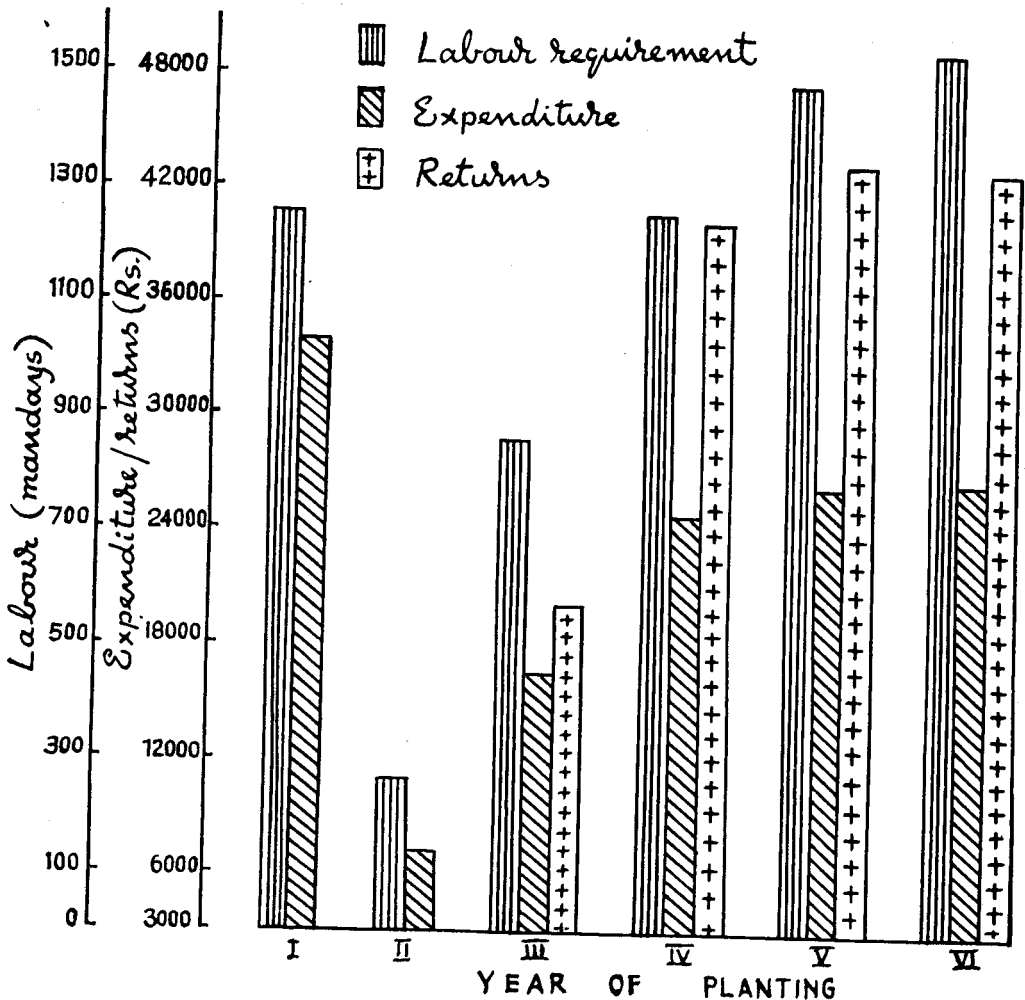


Project 4: Tea - South India

A two hectare of tea garden would ensure a monthly income of Rs. 1370/- from the fifth year. Fig. 4 illustrates the labour, capital and returns of the holdings each year. The capital investment would be Rs. 41,000/- in two years. This is also a labour intensive

crop and about 1550 mandays labour per annum is required. The scope for self employment is more especially for plucking which is done round the year. If the family could put in 600 mandays for the purpose, the income would go upto Rs. 2,100/- per month.

Fig. 4 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM 2 ha TEA PLANTATION (SOUTH INDIA) (PROJECT 4)



Alternatively, if family labour is utilised, a one hectare tea garden could provide the farmer a monthly income of Rs. 1300/- from the fourth year. The capital requirement will be only Rs. 20,000/- of which nearly Rs. 17,000/- has to be spent in the first year and the

balance in the second year. He may still have to engage outside help for carrying out the farm operations.

Project 5: Tea - North Eastern India

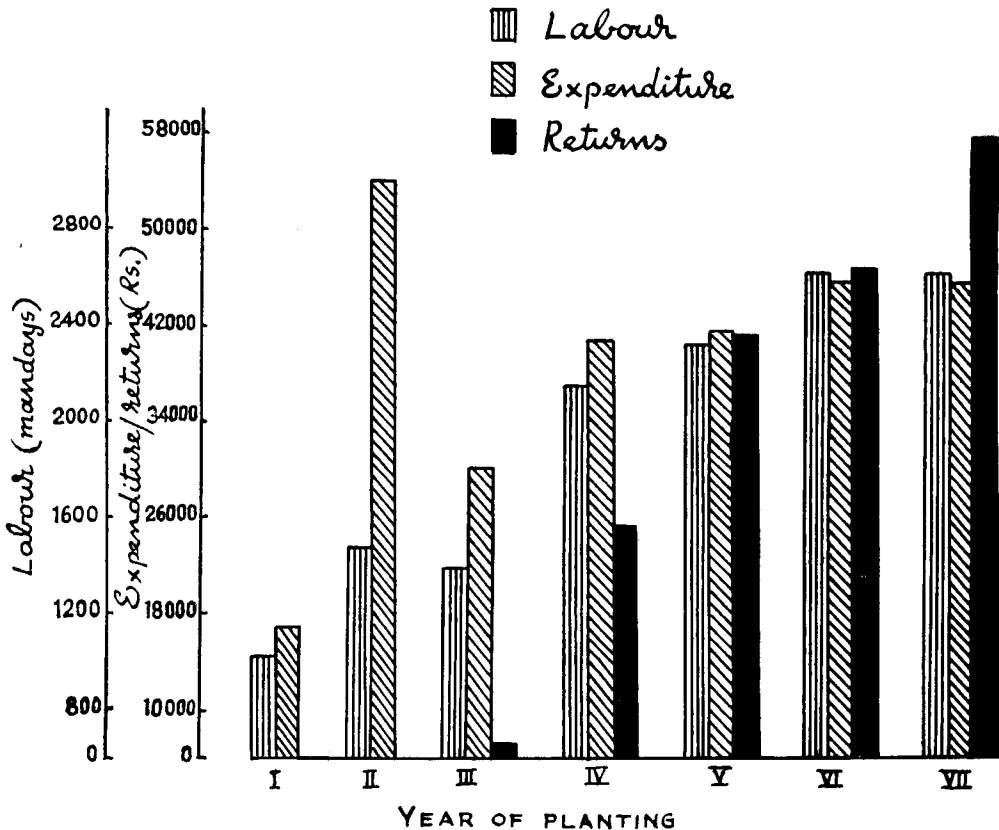
The optimum size of a small tea plantation under North Eastern India

condition is three hectares and the annual requirement of labour and investment and returns from the holdings are depicted in Fig. 5. The investment spread over the first four years in establishing the tea garden is estimated at Rs. 1,09,500/-, and a net income of Rs. 1,000/- per month could be obtained from the seventh year. If the plucking operation could be carried out by the family, the monthly income can easily go upto Rs. 1,500/- per month.

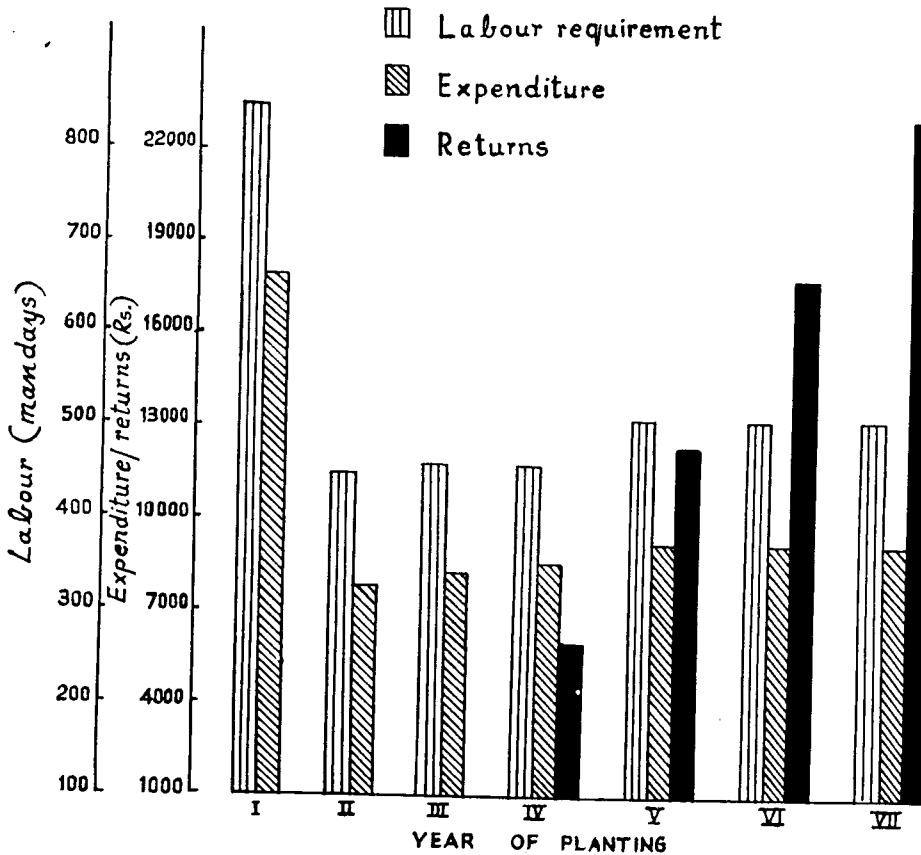
Project 6: Coffee - robusta

A good *robusta* plantation of two hectares would give a net profit of Rs. 14,740/- per year or Rs. 1230/- per month from the seventh year. Fig. 6 shows the yearly requirement of labour and investment and returns from the holding upto the stabilised bearing. The cost of establishing the plantation would be Rs. 36,540/- for four years. Nearly half of this amount has to be spent during the first year. The annual labour requirement

Fig. 5 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM 3 ha TEA PLANTATION (NE INDIA) (PROJECT-5)



**Fig.6 LABOUR REQUIREMENT EXPENDITURE AND RETURNS FROM
2 ha COFFEE (ROBUSTA) PLANTATION
(PROJECT-6)**



for the two hectare plantation is estimated at 510 mandays.

Project 7: Coffee - arabica

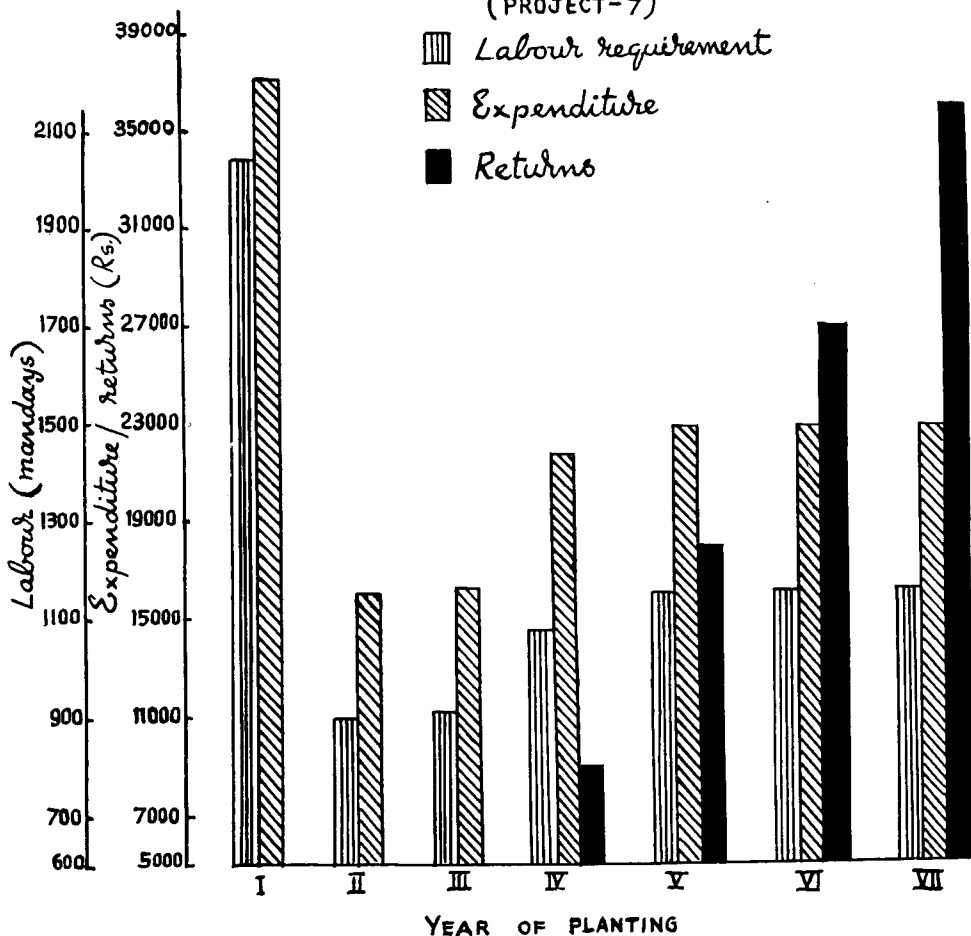
A three hectare plantation of *arabica* coffee can provide a monthly income of Rs. 1,080/- from the seventh year of its establishment. The details regarding the labour and capital required and returns each year upto stabilised bearing are shown in Fig. 7. The amount of Rs. 87,700/- has to be invested during a

period of five years, out of which nearly Rs. 37,000/- has to be spent in the first year itself. The annual labour requirement will be 1155 mandays.

Project 8: Rubber

A two hectare rubber plantation can provide a net return of Rs. 1,250 per month from the seventh year. Fig. 8 shows the annual requirements of labour and investments and returns upto the stabilised yield. The cost of establishing

Fig.7 LABOUR REQUIREMENT, EXPENDITURE AND RETURNS FROM 3 ha COFFEE (ARABICA) PLANTATION (PROJECT-7)



the plantation would be Rs. 27,800/- during the first six years. There is ample scope for family labour in the tapping operation. A couple can tap about 600 trees daily and the income in this case would go up by Rs. 500/- per month.

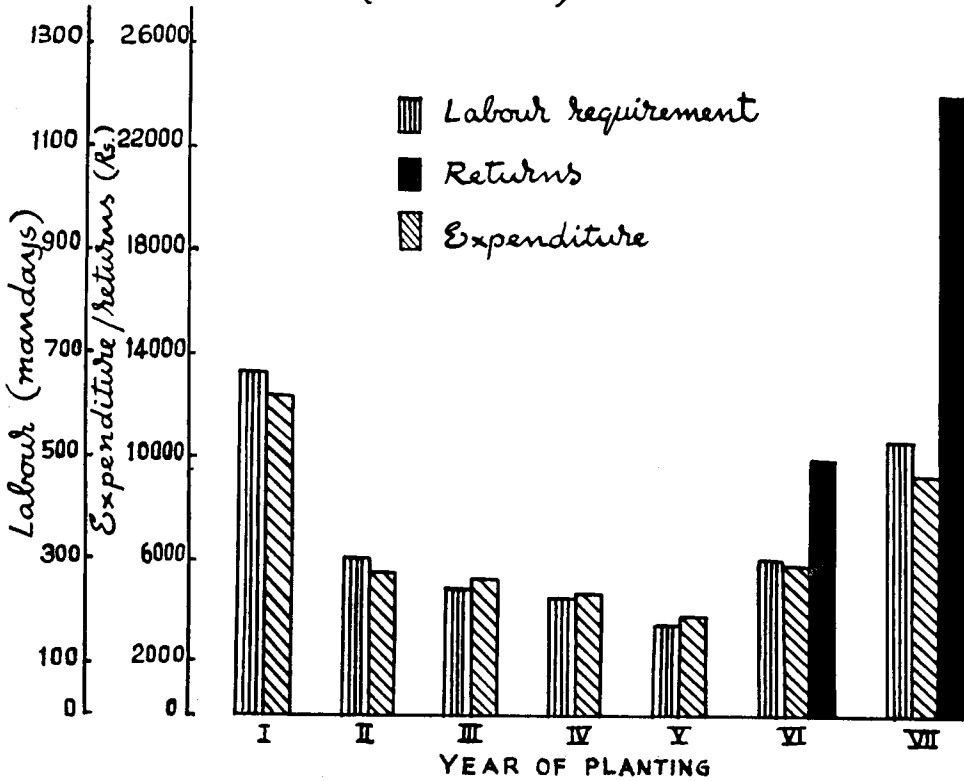
1,200/- per month to the family. The capital needed is only Rs. 14,000/-, of which Rs. 6,200/- will have to be spent during the first year and the balance during the next five years.

CONCLUSION

If the family labour is assured, even a one hectare rubber plantation can provide a decent income of Rs.

The projects described envisage a net monthly income ranging from Rs. 1000/- to Rs. 2100/-. The scope for involvement of the family labour in

Fig. 8 LABOUR REQUIREMENT EXPENDITURE AND RETURNS FROM
2 ha RUBBER PLANTATION
(PROJECT - 8)



farm operations is also indicated. The entrepreneur can select the appropriate project based on his aptitude and resources. The agroclimatic conditions of the location, marketability of the produce and availability of labour will have to be given due consideration while the choice is made.

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