

ECONOMICS OF REINVESTMENT ON RUBBER IN THE ESTATE SECTOR

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ABSTRACT

Replanting of rubber is considered as a long term investment. This study investigates the financial viability of reinvestment on rubber with especial reference to estate sector in Sri Lanka. Economic life span of a 33-year period is considered for the discounted cash flow analysis. The sample consisted of 135 rubber fields randomly selected from 15 large estates.

The total investment for the first six years of immature period consisted of Rs.129,500/ha. The cost of mature upkeep ranged from Rs.18,000 to 29,000 per hectare per year. The average cost per tree inclusive of both investment and running cost accounted for Rs.2350 = per life span.

The discounted cash flow analysis revealed a NPV of Rs.65,700 at 15% discount rate. The B/C ratio, Net Benefit-Investment ratio, IRR and Pay Back Period were 1.35, 2.80, 22% and 11 years respectively. Certain parameters were varied through sensitivity analysis to assess the economic viability of reinvestment on rubber under different scenarios.

Key words: economics, replanting, rubber

INTRODUCTION

Generally, a rubber tree is productive for a period of 25-30 years. Maximum yield is reached around the 10th year of tapping. About 10-12 years later, a rapid decline in yield can be observed. This initiates the requirement for reinvestment on rubber where replanting stands as the key option.

In the conventional system of mono crop farming, a considerable amount of capital is fixed during the first 5-8 years of unproductive period which generates a zero income. This can only be recovered gradually during the next 25-30 years of productive phase. The rate of interest has therefore been treated as a crucial cost element in a discounted cash flow analysis.

This study attempts to analyse the returns on investment in replanting of rubber with particular reference to estate sector in Sri Lanka. It further investigates the financial viability of this long-term economic activity by varying certain key parameters through sensitivity analysis.

Economics of replanting

METHODOLOGY

A life span of a 33-year period is considered (RRISL, 1984) for the discounted cash flow analysis. Input data on labour and material and production data were gathered from a sample of 135 fields (planted with RRIC 100 Series Clones) randomly selected from 15 rubber estates located in Kegalle, Kalutara and Ratnapura districts (5 estates from each district).

Average values of pooled data (categorized according to year of planting) were used for the analysis. Recommended fertilizer quantities under the conventional system of fertilization (RRISL, 1995) were used due to lack of reliable data on actual fertilizer usage. The 1995 input prices and an all inclusive wage rate of Rs.83 = per day applicable to estate workers were applied through out the analysis.

In the financial analysis, several measurements of project worth *viz.* Net Present Value (NPV), Benefit-Cost ratio (B/C), Net Benefit-Investment ratio (N-K), Financial rate of return (IRR) and Pay back period were employed as the criteria to determine the return on investment. The methodology involved the calculation of incremental gain of the replanting activity. A discount rate of 15% was used in the standard scenario (ADB,1993). Certain parameters were changed through sensitivity analysis.

RESULTS AND DISCUSSION

Production cost

The total production cost can be split into two categories *viz.* investment cost and running cost. The type of different field operations that fall into these two categories including their labour and material costs are explained below.

Investment cost (Cost of immature upkeep)

Land preparation, field establishment and upkeep during the immature period are the main operations in this category. It broadly consists of uprooting and land clearing (Annex 01), possibly terracing, cutting drains, purchasing of planting materials, fertilizers and pesticides, establishing and maintaining cover crops and the complete taking care of the young plantation until it reaches maturity or tappable stage (Annex 02).

The distribution of the cost of investment (cost of immature upkeep) by labour and material according to year of planting is given in Table 1. In each year, labour accounts for 62 to 87 percent of the total cost with an average of 79 percent. Although a major portion of the expenditure consists of labour wages, the entire sum of money spent during the immaturity period (Rs.129,500/ha) has to be treated as an investment as it will not yield any return during the first 5-6 years.

Of the total investment, almost 54% is invested within the first year of planting (Figure 1). The balance is split according to 12%, 9%, 8%, 8% and 9% during the 2nd, 3rd, 4th, 5th and 6th years respectively.

Table 1. Distribution of cost of immature upkeep by labour and material according to tree age (Rs/ha)

Tree Age (Years)	No of Labour Units ¹	Labour Cost ²	Material Cost ³	Total Cost
1	729.5	60,549 (87%)	8,964 (13%)	69,513 (100%)
2	136	11,288 (76%)	3,653 (24%)	14,941 (100%)
3	104	8,632 (73%)	3,210 (27%)	11,842 (100%)
4	92	7,636 (70%)	3,248 (30%)	10,884 (100%)
5	80	6,640 (62%)	4,123 (38%)	10,763 (100%)
6	90	7,470 (64%)	4,123 (36%)	11,593 (100%)
Total	1231.5	102,215 (79%)	27,321 (21%)	129,536 (100%)

¹ See Annex 02

² @ Rs.83/= per labour unit

³ See Annex 02 and Annex 04

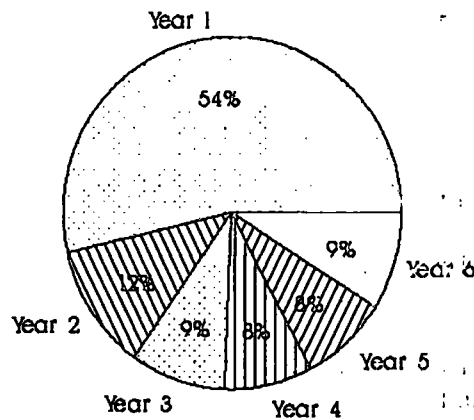


Fig. 1. Distribution of cost of immature upkeep by year of planting.

Economics of replanting

Running cost (Cost of mature upkeep)

During the period of maturity, the major operations are those on field maintenance and extraction of latex. These operations are labour intensive. Besides, material inputs like fertilizer and pesticides are needed (Annex 03).

The distribution of the average cost of mature upkeep (running expenditure) by labour and material classified according to age groups is given in Table 2. The cost of mature upkeep has shown a declining trend during the mature phase. It has varied from approximately Rs.29,000 to Rs.18,000 per hectare per year. The cost of labour component has gradually increased from 87% to 93% during the mature period whereas the material cost has declined from 13% to 7%.

Table 2. *Distribution of Cost of Mature Upkeep¹ by Labour and Material according to Age groups (Rs/ha/year)*

Age Group	No of Mandays ²	Labour Cost ³	Material Cost ⁴	Total Cost
Year 7-12	306	25,398 (87%)	3,744 (13%)	29,142 (100%)
Year 13-18	292	24,236 (87%)	3,619 (13%)	27,855 (100%)
Year 19-24	269.6	22,377 (89%)	2,703 (11%)	25,080 (100%)
Year 25-28	254.6	21,132 (89%)	2,602 (11%)	23,734 (100%)
Year 29-30	236.6	19,638 (94%)	1,231 (6%)	20,869 (100%)
Year 31-33	200	16,600 (93%)	1,220 (7%)	17,820 (100%)

¹ Excluding cost of manufacturing

² See Annex 03

³ @ Rs 83/= per labour unit

⁴ See Annex 03 and Annex 04

The distribution of the cost of mature upkeep by main activity according to age groups is shown in Figure 2. The cost of tapping appears to be the most expensive activity which accounts for 62-68 percent of the total cost. This is followed by the cost associated with processing (manufacturing).

Average cost per tree

The average investment per tree during the immature period (*i.e.* from year 01 to 06) is approximately Rs.43 per year whereas the cost of mature upkeep in the productive phase

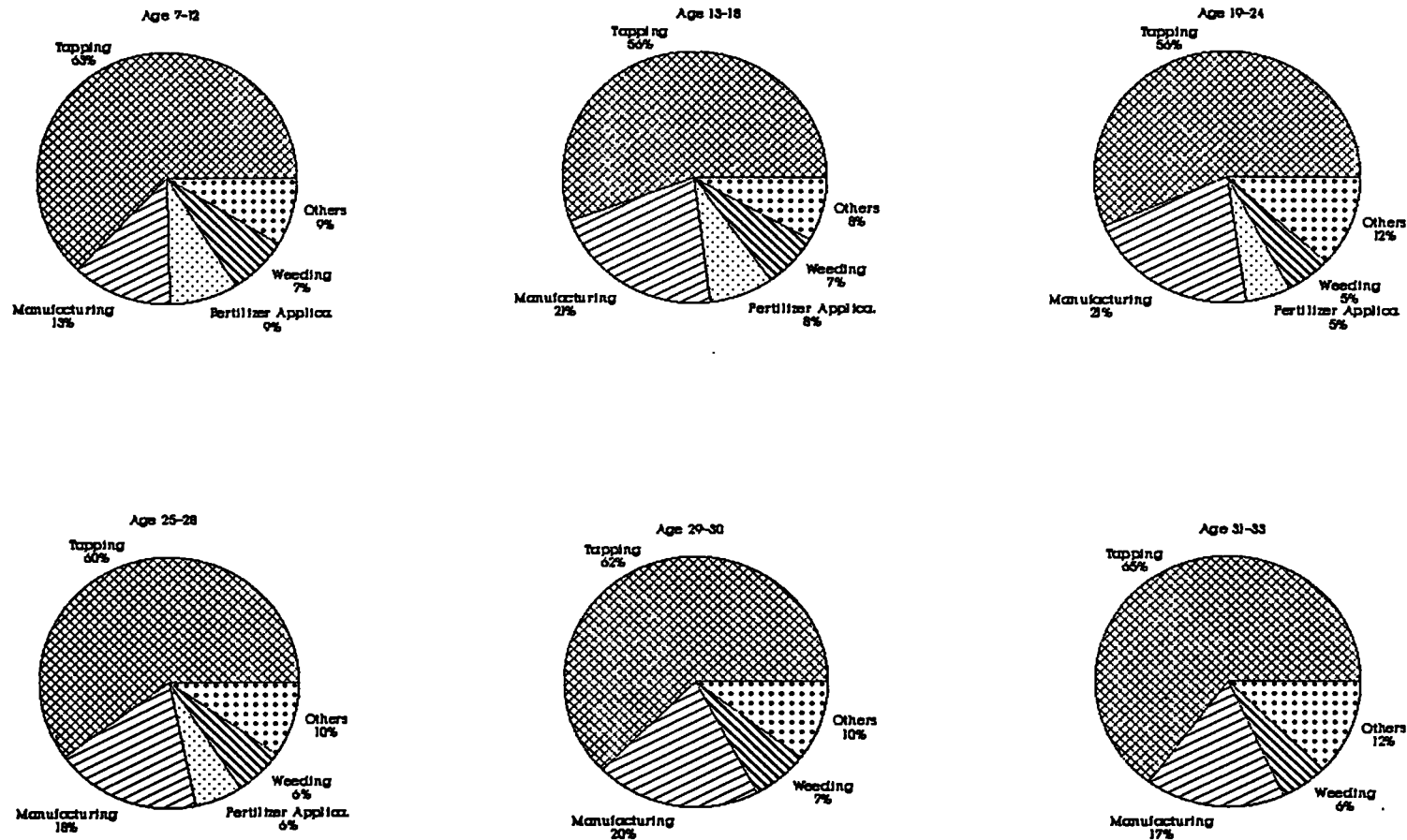


Fig. 2. Distribution of cost of mature upkeep by activity according to age groups

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(i.e. from year 07 to 33) is around Rs.77/= per year (Table 3). Each rubber tree would require inputs worth of approximately Rs.2350/= per life span to cover the entire investment and running costs.

Table 3. Average cost (investment + mature upkeep) per tree by age/age groups

Age/Age group (year/s)	Average cost (Rs/tree/year)
1	139.03
2	29.88
3	23.68
4	21.77
5	21.53
6	23.19
7-12	72.05
13-18	83.62
19-24	80.05
25-28	77.37
29-30	74.71
31-33	71.57

Returns from latex production and rubber wood

The computed average yield curve for RRIC 100 series clones is presented in Figure 03. Certain approximations were made in constructing the yield curve due to lack of sufficient data for the latter part of the life span (age 26 to 33) in particular. The NSA for rubber is taken as Rs.65. = per kg.

The revenue from rubber wood is calculated by taking the following average values into consideration:

- a market value of Rs.300/= per tree at the time of uprooting and
- a stand of 255 trees/ha at the time of uprooting.

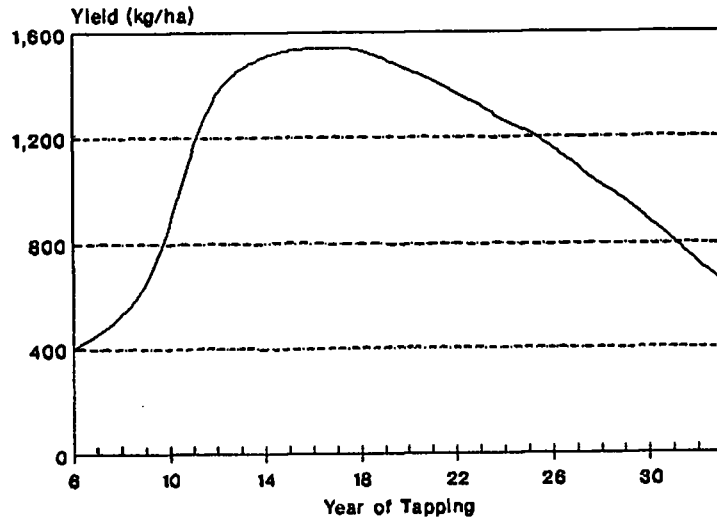


Fig. 3. Computed average yield curve for RRIC series clones under estate management

Financial analysis

A life span of a 33-year period and a discount rate of 15% are considered for the financial analysis. The cost and revenue streams were compiled using Annexes 01, 02, 03 and 04. The results of the financial analysis are given in Table 4.

At the end of a 33-year life cycle, one hectare of land replanted with rubber generates a NPV of Rs.65,700. The B/C ratio and Pay Back Period are 1.35 and 11 years respectively. The Financial Rate of Return is around 22% and Net Benefit-Investment ratio is approximately 2.80. The study therefore reflects the financial viability of reinvestment on rubber. However, the comparative figures reported by Yogaratnam, *et al.* (1995) for a project consisting of interplanting rubber with tea (at the end of a 25-year cycle) appear to be more attractive. The study revealed a NPV of Rs.162,145 with a B/C ratio of 1.24 and a Pay Back Period of 5 years. Moreover, the reported Net Benefit-Investment Ratio and IRR are around 3.73 and 31% respectively.

Sensitivity analysis

The price of latex has fluctuated regularly in the past. Meanwhile, the selling price of uprooted rubber trees (rubber wood) has shown an upward trend. Also, the lending rates of financial institutions may vary from time to time. Moreover, in the case of replanting, the income from rubber wood is realized in the first year of planting or at the end of the replanting cycle.

Table 4. Results of financial analysis under the standard scenario (at 15% D.R.)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 32	Year 33'
COST																
Investment cost ¹	69,513	14,941	11,842	10,884	10,763	11,593										
Running cost ¹							31,670	32,020	32,570	33,670	35,320	36,345	35,583		21,417	21,092
Total cost (at 0% D.R.)	69,513	14,941	11,842	10,884	10,763	11,593	31,670	32,020	32,570	33,670	35,320	36,345	35,583		21,417	21,092
Total discounted cost (at 15% D.R.)	60,449	11,297	7,786	6,223	5,351	5,012	11,905	10,467	9,260	8,323	7,590	6,793	5,782		244	209
RETURNS																
Rubber yield (kg)							450	520	630	850	1,180	1,385	1,465		715	650
Revenue from rubber yield (at Rs 65/kg)							29,250	33,800	40,950	55,250	76,700	90,025	95,225		46,475	42,250
Revenue from old rubber trees ¹	76,500															
Total revenue (at 0% D.R.)	76,500						29,250	33,800	40,950	55,250	76,700	90,025	95,225		46,475	42,250
Total discounted revenue (at 15% D.R.)	66,524						10,995	11,049	11,642	13,658	16,483	16,826	15,474		530	418
Total net returns (at 0% D.R.)	6,987	(14,941)	(11,842)	(10,884)	(10,763)	(11,593)	(2,420)	1,780	8,380	21,580	41,380	53,680	59,642		14,412	10,512
Discounted net returns (at 15% D.R.)	6,076	(11,297)	(7,786)	(6,223)	(5,351)	(5,012)	(910)	582	2,382	5,335	8,893	10,033	9,692		286	209
Accumulated discounted returns	66,524	66,524	66,524	66,524	66,524	66,524	77,519	88,569	100,211	113,869	130,351	147,177	162,651		255,578	255,996
Accumulated discounted cost	60,449	71,745	79,532	85,755	91,106	96,118	108,023	118,490	127,750	136,073	143,663	150,456	156,238		190,087	190,296

Measures of Project Worth

NPV (at 15% D.R.)	65,700
Benefit-Cost ratio	1.35
Net Benefit-Investment ratio	2.80
Financial Rate of Return	22%
Pay Back Period	11 years

¹ Analysis is based on a 33 year life span

As per Table 01

² As per Annexes 03 and 04, Table 02 and Figure 03

³ Sold @ Rs 300 per tree x 255 trees/ha

The following parameters have therefore varied through sensitivity analysis :

- a) sale value of rubber latex: 4 levels (Rs.45, 55, 65 and 75)
- b) sale value of old rubber trees: 3 levels (Rs 300, 500, and 700 per tree)
- c) year of receiving revenue from sale of old rubber trees: 2 levels (year 1 and year 33)
- d) discount rate: 3 levels (12%, 15% and 20%)

Results of the sensitivity analysis comprising of nearly 50 combinations are presented in Table 5. Financial returns of replanting with rubber appear to be attractive under most economic scenarios.

Table 5. *Results of sensitivity analysis*

SCENARIO			MEASUREMENT OF PROJECT WORTH					
NSA OF RUBBER (Rs/kg)	Income from rubber wood		Discount Rate	Discounted Measurements				Pay Back Period (Years)
	Price (Rs tree)	Year of selling		NPV	B/C Ratio	S.K ratio	IRR	
75	300	01	12%	156.807	1.67	5.00	23	10
65	300	01	12%	113.628	1.48	3.82	22	1
55	300	01	12%	70.450	1.30	2.61	21	12
45	300	01	12%	27.272	1.12	1.55	18	13
75	500	01	12%	202.345	1.86	6.16	27	7
65	500	01	12%	159.166	1.68	4.95	26	9
55	500	01	12%	115.988	1.49	3.65	25	10
45	500	01	12%	72.810	1.31	2.47	24	12
75	700	01	12%	247.883	2.05	7.32	35	1
65	700	01	12%	204.704	1.87	6.08	31	1
55	700	01	12%	161.526	1.69	4.69	29	1
45	700	01	12%	118.348	1.50	3.40	28	1
75	300	01	15%	94.850	1.50	3.66	23	10
65	300	01	15%	65.700	1.35	2.80	22	11
55	300	01	15%	36.551	1.19	1.93	21	12
45	300	01	15%	7.401	1.04	1.17	18	13
75	500	01	15%	139.200	1.73	4.90	27	7
65	500	01	15%	110.050	1.58	4.01	26	9
55	500	01	15%	80.901	1.43	3.05	25	10
45	500	01	15%	51.751	1.27	2.18	24	12

SCENARIO			MEASUREMENT OF PROJECT WORTH						
NSA OF RUBBER (Rs/kg)	Income from Rubber wood		Discount Rate	NPV	Discounted B/C Ratio	Measurment N/kalko	IRR	Pay Back Period (Years)	
	Price (Rs/tree)	Year of selling							
75	700	01	15%	183,549	1.96	6.15	35	1	
65	700	01	15%	154,400	1.81	5.22	31	1	
55	700	01	15%	125,250	1.66	4.18	29	1	
45	700	01	15%	96,101	1.51	3.19	28	1	
75	300	01	20%	40,532	1.28	2.32	23	10	
65	300	01	20%	24,386	1.17	1.78	22	11	
55	300	01	20%	8,240	1.06	1.25	21	12	
45	300	01	20%	-7,906	0.95	0.78	18	13	
75	500	01	20%	83,030	1.58	3.71	27	8	
65	500	01	20%	66,884	1.46	3.13	26	9	
55	500	01	20%	50,738	1.35	2.52	25	10	
45	500	01	20%	34,592	1.24	1.94	24	12	
75	700	01	20%	125,528	1.87	5.09	35	1	
65	700	01	20%	109,382	1.76	4.49	31	1	
55	700	01	20%	93,236	1.65	3.79	29	1	
45	700	01	20%	77,090	1.53	3.10	28	1	
75	300	33	12%	90,321	1.38	1.89	18	12	
65	300	33	12%	47,142	1.20	1.46	16	13	
55	300	33	12%	3,964	1.02	1.04	12	14	
45	300	33	12%	-39,214	0.83	0.65	11	16	
75	500	33	12%	91,534	1.39	1.90	18	12	
65	500	33	12%	48,356	1.21	1.47	16	13	
55	500	33	12%	5,178	1.02	1.05	12	14	
45	500	33	12%	-38,001	0.84	0.66	12	16	
75	700	33	12%	92,748	1.39	1.92	18	11	
65	700	33	12%	49,570	1.22	1.48	16	13	
55	700	33	12%	6,392	1.03	1.06	12	14	
45	700	33	12%	-36,787	0.84	0.67	12	16	
75	300	33	15%	29,083	1.15	1.30	18	12	
75	500	33	15%	29,588	1.16	1.31	18	12	
75	700	33	15%	30,093	1.16	1.31	18	12	

LIMITATIONS AND CONCLUSIONS

This study clearly demonstrates the financial viability of reinvesting on rubber under estate management. The measurements employed in this study to analyse the feasibility of replanting of rubber is from the view point of individual entrepreneurs. It therefore does not take into consideration the impact on external factors that would bring about to the society and environment.

The study has ignored certain expenditure components in compiling the investment and running costs. For instance, investment expenditure on buildings (factory, offices, workshops and housing), machinery and vehicles are ignored. Unless an estate sells its crop directly as field latex, it will require a factory with machinery to process the latex into any form of marketable rubber. Moreover, housing is always provided for staff employees. Whether tappers and field workers will be housed on the estate depends on its remoteness from villages and nature of the labour market. Furthermore, some investment is needed in purchasing of vehicles such as trucks, tractors and trailers. The aggregate of all such unaccounted expenditure components usually signifies a considerable variation from one estate to another. Therefore, it was not possible to incorporate such costs into the present analysis. Nevertheless, it is apparent that establishment of an estate is rather capital intensive even though both immature and mature upkeep needs a considerable amount of labour.

With regard to running expenditure, tapping wages reflected the largest single expenditure item. Yet, so-called fringe benefits such as medical care, annual bonuses, *etc.*, are not included in the analysis. Similarly, management and other overhead charges such as staff salaries, maintenance of buildings, land taxes, insurance, security, water and electricity, marketing costs, *etc.*, are not taken into consideration.

The results and general conclusions derived from this study are therefore of a general nature while they appear to be representative of the estate sector. If they are to be applied by individual estates, necessary changes and adjustments have to be made based on available data to meet their specific needs.

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Labour requirements for uprooting and clearing of rubber lands (Labour Units/ha)

ACTIVITY	RATE OF LABOUR USAGE	NO OF LABOUR UNITS
1. Felling of old rubber trees	@ 6 trees/labourer for 255 trees/ha (85% of existing stand of 300 trees)	42.5
2. Removal of stumps	@ 2 stumps/labourer for 45 stumps/ha (15% of existing stand of 300 trees)	22.5
3. Cutting and stacking of firewood	@ 2 firewood yrds/tree, 510 yrds of firewood/ha from 255 trees: @ 3 firewood yrds/labourer for 510 yrds	170.0
4. Removal of roots		
A) Digging of roots	@ 6 roots/labourer for 255 tree roots/ha	42.5
B) Removal of earth + cutting of laterals	@ 14 roots/labourer for 300 roots/ha	21.4
C) Stacking of roots	@ 15 roots/labourer for 300 roots/ha	20.0
D) Burning of roots	@ 35 roots/labourer for 300 roots/ha	8.6
Total No of mandays needed for uprooting and clearing		327.5

Assumptions: The initial stand = 500 trees/ha

Stand at uprooting = 60% of initial stand

Guidelines for calculation of investment cost (Cost of Immature Upkeep)

TYPE OF OPERATION/INPUT	REMARKS
1. Uprooting and Clearing:	see Annex 01
2. Removal of Fomes Infected Patches:	@ 12.5 labourers/ha for demarcation of infected area, digging out Fomes infected patches and application of sulphur, assuming an infected area of 10% of holes
3. Lining:	@ 75 holes/labourer for 500 holes (includes lining for drains and terraces
4. Drains and Silt Pits:	@ 40 labourers/ha to re-cut old drains and cut new drains where required
5. Terracing:	@ 10 labourers/ha (includes construction of silt traps and contour terracing where required)
6. Holing:	@ 8 holes/labourer for 500 holes
7. Filling Holes: A) Material (Basal Mixture) B) Labour	50g U12:14:14 + 100g Rock phosphate + 25g Kieserite per plant mixed with top soil, applied 2-3 weeks prior to planting x 500 holes @ 15 holes/labourer for 500 holes
8. Planting:	@ 15 plants/labourer; assuming the use of bare root plants for replanting for 500 plants
9. Cover Establishment: A) Material B) Labour	5kg of Pureria seeds/ha) + 75kg of Rock Phosphate (IRP)/ha @ 7.5 labourers/ha for preparing beds and putting out seeds
10. Cover Fertilizer: A) Material B) Labour	150kg of Rock phosphate (IRP)/ha/year in the first two years @ 3 labourers/ha/year

TYPE OF OPERATION/INPUT	REMARKS
11. Rubber Fertilizer: A) Material B) Labour	during the 1 st year: 275g of U12:14:14 mixture/plant in 4 applications and 75g of Kieserite/plant to be applied with one application of U12:14:14 mixture x 500 plants during the 2 nd year: 550g of U12:14:14 mixture/plant in 4 applications and 150g of Dolomite/plant in one separate application x 500 plants during the 3 rd and 4 th years: 880g of U12:14:14 mixture/plant/year in 3 applications and 200g of Dolomite/plant/year in one separate application x 500 plants from 5 th year until tapping: 1100g of U12:14:14 mixture/plant/year in 3 applications and 250g of Dolomite/plant/year in one separate application x 500 plants @ 2.5 labourers/ha per application
12. Supply Vacancies: A) Material B) Labour	10% in the 1 st year and 5% in the 2 nd year: assuming the use of poly bag plants to fill the vacancies @ 15 plants/labourer
13. Weeding: 1 st year 2 nd year 3 rd year 4 th year 5 th year 6 th year	8 rounds: initial round: @ 62 labourers/ha 2 nd round: @ 30 labourers/ha 3 rd round: @ 20 labourers/ha 4 th to 8 th rounds: @ 12 labourers/ha/round 12 rounds: @ 9 labourers/ha/round 12 rounds: @ 7 labourers/ha/round 12 rounds: @ 6 labourers/ha/round 12 rounds: @ 5 labourers/ha/round 12 rounds: @ 5 labourers/ha/round

TYPE OF OPERATION/INPUT	REMARKS
14. Shoot Cutting:	2 nd year: @ 2.5 labourers/ha 3 rd year: @ 2 laborers/ha
15. Pest & Disease Control: A) Material B) Labour	Rs 100/= per ha per year for chemicals @ 8 labourers/ha/year
16. Girth Census and Numbering of Trees:	4 th year: @ 1 labourer/ha for girth census and for numbering of trees 5 th and 6 th years: 2 rounds of girth census/year; @ 1 labourer/round
17. Tools:	a set of basic tools used in upkeep of rubber
18. Wage Rate:	Rs 83/= per Manday
19. Cost of Fencing:	not included in the study
20. Cost of Maintenance of Existing Roads and Cutting of New Roads:	not included in the study
21. Cost of buildings : Factory, offices, workshops, housing	not included in the study
22. Cost of machinery (in the factory)	not included in the study
23. Cost of vehicles (Trucks, tractors, trailers, etc.)	not included in the study

Guidelines for calculation of running cost (Cost of Mature Upkeep)

TYPE OF OPERATION/INPUT	REMARKS
1. Fertilizer Application: A) Material While tapped on virgin bark: (year 7-18) While tapped on renewed bark, upto 5 years before uprooting: (year 19-28) In the last 5 years before uprooting B) Labour	@ 800g of U12:14:14 mixture/plant/year in one application and 100g of Kieserite/plant/year in one application x No. of plants @ 550g of U12:14:14 mixture/plant/year in one application and 50g of Kieserite/plant/year in one application x No. of plants Fertilizers are not being applied @ 4 labourers per ha per year
2. Pest and Disease Control:	A mixture of Brunolium and Red Powder is applied along with tapping: @ Rs 500/ha/year for chemicals
3. Marking of Tapping Panels:	@ 3 labourers/ha/year from year 7 to 24 and 2 lab/ha/yr from year 25 to 30
4. Tapping:	S/2 d/2 system with 280 tapping days/ha/year assuming a stand of 500 trees/ha and a tapping task of 250 trees/labourer/day
5. Tapping Utensils:	coconut shells (600), spouts (500), tapping knives (2), GI buckets-2.5 gal (2) and small collecting buckets (2)
6. Anti-coagulant (Na ₂ SO ₄):	@ 125g per 100kg of latex
7. Manufacturing:	@ Rs 5 per kg of latex crepe (labour cost + material cost); where an average annual yield for each period (tapping panel) is calculated using the yield curve given in Figure 03
8. Weeding: While tapped on virgin bark: While tapped on renewed bark: While slaughter tapping:	@ 2.5 labourers/ha/month @ 1.8 labourers/ha/month @ 1.25 labourers/ha/month
9. Tools:	a set of basic tools used in upkeep of rubber
10. Wage Rate :	Rs 83/= per Manday

A summary of input prices

TYPE OF INPUT	UNIT COST (Rs)
1. Planting material	
- bare root plants	8.00/plant
- poly bag plants	20.00/plants
2. Pureria seeds	90.00/kg
3. Fertilizers	
- Imported Rock Phosphate (IRP)	4.50/kg
- U 12 : 14 : 14	5.70/kg
- Kieserite	10.00/kg
- Dolomite	00.80/kg
4. Chemicals for pest and disease control	
- Sulphur	100.00/ha/year
- Mixture of Brunolium and Red powder	500.00/ha/year
5. Tar	75.00/gallon
6. Anti - Coagulant (Na ₂ SO ₃)	36.00/kg
7. Tapping utensils	150.00/ha/year
8. Tools	
- for immature period	750.00/ha/year
- for mature period	500.00/ha/year