

An Economic Analysis Of Average Cost And Returns Of Arabica Coffee In Chikkamagalur Districts Of Karnataka

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Abstract

Coffee is native of tropical rain forests of Ethiopia and central Africa. Coffee is a major export earning commodity of several coffee growing countries in the world. The Arabs were the first to cultivate and to trade coffee. Coffee nicknamed as “Islamic milk” and & “sage’s milk” has conquered the third most popular drink after water and wine. Botanically, Coffee is a member of the Rubiaceae family and the genus coffee. The genus *Coffea* encompasses more than 70 commercially cultivated species, the majority of which are native to Africa, including two species in India, *Coffea arabica* and *Coffea canephora*. *Coffea liberica* is another plant that is grown to a smaller extent. For optimum credentials, coffee in India is grown as a silvi-horti crop under tree cover. Intercropping with orange, pepper, and cardamom on a coffee plantation provides an additional source of revenue.

The establishment cost incurred per hectare of coffee plantation was estimated considering the quantity of inputs and labour used and their respective market prices and wages prevailed in the study area. The establishment of coffee plantation requires four years. The establishment cost in coffee plantations were classified into investment and maintenance costs. The investment costs were considered for beginning period of the establishment with the maintenance cost was for four years period up to the bearing stage. The investment cost included the cost on land preparation, digging of pits and planting, shade tree planting, cost on sprayer, planting material, pump set, pump house, fencing etc. The maintenance cost included labour cost for various operations and material cost and fixed cost during gestation period. This criterion indicates the rate of return per rupee invested in coffee plantation. The benefit cost ratio at 12 per cent discount rate was 1.46 in small plantation and it was 1.56 and 1.65 in case of medium and large plantation. The result of B:C ratios for both the plantations in Chikkamagalur district were more than unity indicating that investment in coffee plantations was economically viable.

Key Words: *Coffee, Arabica, Robusta, Hassan and Chikkamagaluru, Benefit cost ration.*

INTRODUCTION

Many crops are grown in India, with rice and wheat being the two most important food staples. Indian farmers also cultivate food crops such as pulses, potatoes, sugarcane, and oilseeds, as well as non-food crops such as cotton, tea, coffee, rubber, and jute. Despite the vast size of the agricultural sector, crop yields per hectare in India are generally poor as compared to international standards.

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Plantation farming is a large-scale commercial method characterized by the cultivation of a single cash crop in estate plantations. The term plantation crop refers to crops that are grown on a large scale in a contiguous area and are owned and controlled by a person or a corporation. Tea, coffee, rubber, cocoa, coconut, arecanut, oil palm, palmyrah, and other crops are grown. Since it is a capital-based scheme, it is critical to be technologically advanced and to have effective cultivation methods and equipment, such as fertilizers, irrigation, and transportation facilities. These are high-value commercial crops with greater economic significance, and they play an important role in improving the Indian economy, especially in terms of export potential, job creation, and poverty alleviation, particularly in the rural sector. The Ministry of Agriculture is in charge of coconut, cashew-nut, cocoa, areca-nut, and oil palm, while the Ministry of Commerce is in charge of tea, coffee, and rubber.

Coffee is native of tropical rain forests of Ethiopia and central Africa. Coffee is a major export earning commodity of several coffee growing countries in the world. The Arabs were the first to cultivate and to trade coffee. Coffee nicknamed as “Islamic milk” and “sage’s milk” has conquered the third most popular drink after water and wine.

Botanically, Coffee is a member of the Rubiaceae family and the genus *coffea*. The genus *Coffea* encompasses more than 70 commercially cultivated species, the majority of which are native to Africa, including two species in India, *Coffea arabica* and *Coffea canephora*. *Coffea liberica* is another plant that is grown to a smaller extent. For optimum credentials, coffee in India is grown as a silvi-horti crop under tree cover. Intercropping with orange, pepper, and cardamom on a coffee plantation provides an additional source of revenue.

Annual crops could be grown as intercrops among young coffee in new clearings to supplement revenue in the early years. Intercrop also suppresses weed growth in young clearings, but it can compete for moisture and nutrients with coffee. Ginger and turmeric are two widely grown intercrops. Other annual crops such as cowpea, horse gram, beans, chillies, brinjal, pineapple, and so on are grown to supplement income during the early non-bearing stage of coffee.

The two most popular forms of coffee consumed worldwide are Arabica and Robusta, which grow from the two main species of coffee plants: Coffee Arabica and Coffee Robusta, respectively. Although there are numerous coffee plant varieties, Arabica and Robusta are the most important commercially.

Arabica coffee (or Arabicas) has a delicate flavour and fragrance, as well as a sharp and sweet taste. When compared to Robustas, they have roughly half the caffeine content. Arabicas are usually harvested between November and January and grown at higher altitudes ranging from 600 to 2000 meters in cold, damp, and subtropical weather conditions. To meet the highest international coffee requirements, they require nutrient-rich soil. Kents Coffee, S.795 Coffee Cauvery Coffee, and Sln.9 (Selection 9) Coffee are four common Arabica coffee varieties.

Data analysis strategy

This article has been made by collecting data from different plantation farmers viz, small, medium and large farmers. The technique of tabular analysis was employed for determining the investment pattern in the coffee plantations. This analysis was used to estimate the cost of the establishment of coffee plantation is maintenance cost of coffee plantation, cost structure, returns and

profits. The tabulations were done separately for small, medium and large plantations. The parameters were worked out for per acre basis. The table was made separately for operation wise labour requirements, yield and returns.

The questionnaires used for data collection were designed based on the objectives of the study. The data so collected relate to:

- Investment details for the establishment of coffee plantation, maintenance of coffee plantation, cost incurred in cultivation of coffee and intercrops, output obtained, quality of coffee produced and details on returns of the coffee and other intercrops, investment relating to irrigation equipment, farm equipment and cost structure.

Review of literature

Holla (2000) in his study on the cost of arabica coffee revealed that due to increase in labour wages and cost of inputs as well as gradual reduction in labour efficiency year after year, the cost of cultivation was increasing unless some serious remedial measures were taken to make it economically viable.

Reddy (2001) estimated that the cost of production of Robusta coffee. Data were collected from 31 randomly selected estates in Chikmagalur, Kodagu and Kerala, in 1998-99 and 1999-2000. The findings on cost of production of Robusta coffee in major growing regions of India indicated that the average cost of production per hectare is Rs. 38 775 in Chikmagalur, Rs. 40 096 in Kodagu and Rs. 36 994 in Kerala. However, the cost per kg was low in Kodagu (Rs. 21 per kg) followed by Chikmagalur (Rs. 27 per kg) and Kerala (Rs. 31 per kg) because of varied yield realizations (1922 kg/ha, 1435 kg/ha and 1203 kg/ha, respectively). Further, the analysis revealed that an average yield gap of 830 kg/ha in Chikmagalur, 631 kg/ha in Kodagu and 527 kg/ha in Kerala were observed between irrigated and non-irrigated holdings. Better management practices between the regions will boost the productivity levels of Robusta, which reduces the cost of production per unit of output.

Assumpcao et al. (2002) Studied on the production cost estimate for coffee plots in the Franca region and revealed that the planting, maintenance and harvesting costs of six coffee plots on three farms located in the city of Franca, Brazil, for the 1999/00 and 2000/01 crops. Not only does cost differ highly among the three farming stages, but also three distinct farming systems are detected. It is shown that the coffee farmer must take into account detailed information on each farm plot in order to achieve market competitiveness.

Mali et al. (2003) studied the economics of production and marketing of banana in Jalgaon district of Western Maharashtra and reported that the per hectare cost of cultivation of banana was Rs. 1,33,477.36. The gross and net returns per hectare of banana was Rs. 2,14,867.24 and Rs. 66,761.87 respectively.

Sundaravardarajan and Ramanathan (2003) estimated the establishment cost of cashew plantation for the first year at Rs. 7690, Rs. 8664 and at Rs. 9491 for marginal, small and large farmers respectively. The maintenance costs of cashew plantation in case of marginal farms were Rs. 4059, Rs. 4410, Rs. 4910, Rs. 5385, Rs. 5841, Rs. 6332, Rs. 6771 and Rs. 6990 for second, third, fourth, fifth, sixth,

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seventh, eighth, ninth year respectively and in case of large farms the maintenance cost from second, third, fourth, fifth, sixth, seventh, eighth, ninth years were Rs. 5040, Rs. 5250, Rs. 6764, Rs. 6145, Rs. 6558, Rs. 7021, Rs. 7438 and Rs. 7745. The input output ratio per ha were 1.43, 1.55 and 1.83 for respective farms.

Reddy *et al.* (2003) estimated the cost of production of Arabica coffee in Chikmagalur region, Karnataka, India. The study covered a sample of 63 estates consisting of holdings with different sizes. The results indicated that the average total cost of cultivation of Arabica coffee in Chikmagalur region was Rs. 52 955/ha, which translated into a cost of production of Rs. 51/kg with an average yield of 1040 kg/ha. Among the total cost, labour cost alone accounted for 54 per cent, followed by input cost (30%) and overhead expenditure (16%). Across the holding size groups, the cost of cultivation was highest (Rs. 55,450/ha) in estates with 4-10 ha size of holding, followed by estates with 10-40 ha size of holding (Rs. 54,790/ha), >40 ha (Rs. 53,400/ha) and <4 ha (Rs. 48,045/ ha). Cost of production was Rs. 47, 51, 49 and 53 per kg in estates with <4 ha, 4-10 ha, 10-40 ha, and >40 ha, respectively. The yields were 1020 kg/ha (<4 ha), 1085 kg/ha (4-10 ha), 1125 kg/ha (10-40 ha) and 1015 kg/ha (>40 ha) indicating a yield gap of 110 kg/ha among the different size groups. The average gross return across the holding sizes was Rs. 57200/ha (at a product price of Rs. 55/kg) and there was a net profit of Rs. 4245/ha.

Jeevarani (2005) estimated cost of production of coffee in Coorg district of Karnataka and reported that cost of cultivation of organic and inorganic coffee per acre was Rs. 4861 and Rs. 6762 respectively and Rs. 5807 for planters cultivating both inorganic and organic coffee. She also reported that net returns per acre was highest for planters cultivating inorganic coffee (Rs. 15693) when compared with planters cultivating only organic coffee (Rs. 11112).

Umesh *et al.* (2005) reported that the establishment cost of cashew was Rs. 15,631 per hectare in all varieties studied during the first three years. The maintenance cost per hectare from fourth year onwards varied from Rs.5,881 to Rs.8,254 in Chintamani-1, Rs. 5,640 to Rs.8,254 in Ullal-4, Rs.5,812 to 7,882 in Ullal-3 and Rs. 5,821 to Rs.7,229 in Ullal-2, the net returns of cashew orchard per hectare were fairly high in the order of Rs.61,314, Rs.60,425, Rs.49,672 and Rs.34,231 in Chintamani-1, Ullal-4, and Ullal-3 and Ullal-2.

Naphade and Tingre (2008) conducted a study in Buldhana district of Maharashtra to find out the costs and returns from guava orchard. The result revealed that the per hectare cost of establishment of guava orchard was Rs. 34,333 (up to 5 years) and per hectare annually cost of production was Rs. 22,522 (after 5 years). Per hectare average yield estimated was 372 quintals with a profit of Rs. 82,036 per year. It was found that profit was increasing with the age of orchard.

Chethana *et al.*, 2010 concluded that productivity of coffee is lower (6 q/ acre) when grown under high shade and native tree cover than under low shade condition (8.9 q/acre). Although, the difference in cost of cultivation between the two shade conditions is not significant, the net gain is to the tune of Rs 10.40/kg for the planters growing under low shade and exotic trees cover. The net loss has been estimated to be around Rs 15.50/kg for the planters growing under high shade and native trees cover. The marginal loss in the productivity of coffee due to shade is not directly reimbursable through the shade benefits. Hence, the coffee planters need to be compensated through a price premium for their products produced under rich biodiversity, thus requiring the GI that ensures quality and price.

Avinash Kumar (2011) analysed the production of coffee in Chikmagalur district of Karnataka. A multistage random sampling procedure was adopted in selection of the sample farmers. Per hectare establishment cost of coffee was found to be 393371.00 and 361860.00 in small and large plantations, respectively. Per hectare maintenance cost during bearing period worked out to be as 110761.90 and 102968.20 in small and large plantations, respectively. The average per ha yield from small plantation was 3143.80 kg and from large plantation it was 3125.96 Kg. Net returns were 201634.40 from small plantation and 215664.67 from large plantation.

Kasula Sekhara (2019) the area under paddy cultivation and its productivity trends were studied during different crop periods. This study showed that paddy production in India has achieved a phenomenal increase in production quantity over the last 65 years (1950- 2014), making India self-sufficient in production. This study recommends that the necessary steps be taken to improve the productivity and production of paddy in India are very necessary.

Result and discussion

The establishment cost incurred per hectare of coffee plantation was estimated considering the quantity of inputs and labour used and their respective market prices and wages prevailed in the study area.

The establishment of coffee plantation requires four years. The establishment cost in coffee plantations were classified into investment and maintenance costs. The investment costs were considered for beginning period of the establishment with the maintenance cost was for four years period up to the bearing stage. The investment cost included the cost on land preparation, digging of pits and planting, shade tree planting, cost on sprayer, planting material, pump set, pump house, fencing etc. The maintenance cost included labour cost for various operations and material cost and fixed cost during gestation period.

Establishment cost of coffee plantations

The results of the analysis of cost of establishment of small, medium and large plantations are presented in Table no.1. The per hectare total cost of establishment incurred by small medium and large plantations were Rs 3,93,372, Rs 3,61,860 and Rs 361860 respectively.

Establishment cost of small plantation

In case of small coffee plantation, the share of investment cost in the total establishment cost (2,35,250.00) worked out to be 59.80 per cent. The major expenditure among the investment cost was on combined cost of labour quarters, go- downs and drying yard (51,914.10) which accounted for 13.20 per cent. The other major components of costs were farm vehicle and fencing, which constituted about 11.15 and 10.49 per cent, respectively. The other items of costs were pump set and pump house, sprinkler and sprayers, digging of pits and planting, well, planting material, land preparation, shade tree planting material and shade tree planting constituted 8.41, 4.69, 2.95, 2.61, 2.23, 2.21, 1.00 and 0.93 per cent respectively.

The maintenance cost incurred during gestation period has increased from 30,041.50 to 45,797.70 (fourth year). The total maintenance cost (1,58,121.00) up to bearing period accounted for 40.20 per cent of the total establishment cost.

Establishment cost of medium plantation

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In case of medium coffee plantation, the share of investment cost in the total establishment cost (Rs 2,18,754.30) worked out to be 48.49 per cent. The major expenditure among the investment cost was on combined cost of labour quarters, go-downs and drying yard (48859.85) which accounted for 13.06 per cent. The other major components of costs were farm vehicle and fencing, which constituted about 10.10 and 10.80 per cent, respectively.

The maintenance cost incurred during gestation period has increased from 29592.25 to 44883.05 (fourth year). The total maintenance cost (155238.5) up to bearing period accounted for 41.51 per cent of the total establishment cost.

Establishment cost of large plantation

Similar trend was observed in the case of large plantation with respect to establishment cost as that of small and medium plantation. It was observed that, the share of investment cost (2,09,505.00) in the total establishment cost was 57.90 per cent. The major item contributed for the investment cost was combined cost of labour quarters, go-downs and drying yard (41,805.60) which accounted for 11.55 per cent. The other items of costs were fencing, farm vehicle, pump set and pump house, pulping unit, sprinkler and sprayers, digging of pits and planting, land preparation, planting material, well, shade tree planting material and shade tree planting constituted 1.53, 10.36, 8.19, 6.60, 5.46, 4.29, 3.10, 2.42, 2.37, 1.10 and 0.92 per cent, respectively.

The maintenance cost considered for the gestation period increased from 29,143.00 to 43,968.40 (fourth year). The total maintenance cost up to bearing period was 1,52,355.00 which accounted for 42.10 per cent of the total establishment cost.

Maintenance cost of coffee plantation during gestation period.

The maintenance cost incurred by small, medium and large coffee plantations during gestation period is presented in Table no. 2,3 and 4 respectively.

Small plantation

It was observed from Table no. 2, that the total per hectare maintenance cost incurred by small coffee plantation during gestation period was 1,58,121.00, of which, the share of variable cost was 1,18,195.00 which contributed nearly 74.75 per cent of total maintenance cost. The total variable cost comprised of two components *viz.*, material cost and labour cost.

In the total variable cost, the share of labour component was found to be the highest (38.25 %) followed by material cost (30.96 %) and interest on working capital (5.54 %). Among labour cost, the expenditure incurred towards weeding was found to be the highest 17,212.50 (10.89 %) followed by manures & fertilizers application (6.91%) and miscellaneous cost (5.69 %). The expenditure incurred towards these three accounted nearly 62.00 per cent of the total labour cost. Similarly, among the material cost, the expenditure on manure was found to be the highest 15,000.00 (9.49%) followed by fertilizers, others, plant protection chemicals and lime constituting 6.44, 6.32, 3.56 and 3.52 per cent, respectively.

The share of fixed cost in the total maintenance cost of small coffee plantation during four years gestation period was one fourth of total maintenance cost (25.25%) of which rental value of land alone accounted for about 17.08 per cent. The analysis of the year-wise expenditure incurred towards maintenance of small coffee plantation by the sample growers showed an increasing trend which was 30,041.50 during first year and 45,797.70 during fourth year of plantation.

Medium plantation

It was observed from Table no. 3, that the total per hectare maintenance cost incurred by medium coffee plantation during gestation period was Rs 1,55,238.40, of which the share of variable cost was Rs

1,13,247.04 which contributed nearly 72.95 per cent of total maintenance cost. The total variable cost comprised of two components *viz.*, material cost and labour cost.

In the total variable cost, the share of labour component was found to be the highest (37.27 %) followed by material cost (30.28 %) and interest on working capital (5.40 %). Among labour cost, the expenditure incurred towards weeding was found to be the highest 16293.75 (10.50 %) followed by manures & fertilizers application (6.78 %) and miscellaneous cost (5.31 %). The expenditure incurred towards these three accounted nearly 62.00 per cent of the total labour cost. Similarly, among the material cost, the expenditure on manure was found to be the highest 14062.05 (9.06 %) followed by fertilizers, others, plant protection chemicals and lime constituting 6.26, 6.44, 3.48 and 3.43 per cent, respectively.

The share of fixed cost in the total maintenance cost of medium coffee plantation during four years gestation period was one fourth of total maintenance cost (28.92 %) of which rental value of land alone accounted for about 17.39 per cent. The analysis of the year-wise expenditure incurred towards maintenance of medium coffee plantation by the sample growers showed an increasing trend which was 29592.31 during first year and 44882.92 during fourth year of plantation.

Large plantation

It was observed from the Table no. 4, that in case of large plantation the total per hectare cost incurred for the maintenance during gestation period was 1,52,355.00 of which, the share of variable cost was 1,08,299.00 which accounted for 71.08 per cent of total maintenance cost which was less than the maintenance cost incurred in small plantation during gestation period. Here also, the total variable cost comprised of two components *viz.*, material cost and labour cost. In the total variable cost, the share of labour component was found to be the highest (36.25%) followed by material cost (29.57%) and interest on working capital (5.26%). Among labour cost, the expenditure incurred towards weeding was found to be the highest 15,375.00 (10.09%) followed by manures & fertilizers application (6.65%) and miscellaneous cost (4.92%). The expenditure incurred towards these three accounted nearly 60.00 per cent of the total labour cost. Similarly, among the material costs, the expenditure on manure was found to be highest 13,125.00 (8.61%) followed by others, fertilizers, plant protection chemicals and lime constituting 6.56, 6.07, 3.41 and 3.35 per cent, respectively.

The share of fixed cost in the total maintenance cost of the large coffee plantation during four years gestation period was 44,056.30 (28.92%) of which rental value of land alone accounted for about 17.72 per cent.

The analysis of the year-wise expenditure incurred towards maintenance of large coffee plantation by the sample growers showed an increasing trend which was 29,143.00 during first year and 43,968.40 during fourth year of plantation.

Maintenance cost of coffee plantation during bearing period

The coffee plants start bearing from fifth year. The maintenance cost during bearing period included expenditure on labour, material cost and fixed costs such as apportioned establishment cost, land rent, land revenue and depreciation on machinery. The labour cost included the expenditure on labour in performing various operations like weeding, manure & fertilizer application, irrigation, watch and ward, pruning, application of plant protection chemicals, harvesting and processing, shade regulation, soil management, fencing and miscellaneous charges. The material costs included the expenditure on material inputs such as fertilizers, manures, plant protection chemicals, lime, weedicide and miscellaneous items.

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It can be observed from Table no. 5, that the total maintenance cost of small coffee plantation was Rs 1,02,968.00 and for large plantation, Rs 1,06,957.00 for medium farmers and it was Rs 1,10,904.00 for small plantation farmers.

In the total maintenance cost of small plantation, the variable cost (94,480.43) constituted the highest proportion (85.19%). While, the fixed cost (16,423.90) constituted 14.83 per cent. Among the variable cost, the expenditure on labour and material inputs cost constituted 50.68 and 26.56 per cent respectively. On an average, the labour cost was 56,206.25 per hectare for small plantation which accounted 50.68 per cent of total maintenance cost. A major portion of the labour cost was incurred on harvesting and processing (14,437.50) which accounted for 13.02 per cent of the total maintenance cost followed by soil management, shade regulation, miscellaneous, application of manure and fertilizers, pruning and weeding which accounted for 10.14, 7.19, 5.85, 4.23, 2.87 and 2.87 per cent, respectively.

In case of large plantation also, the variable cost (85,179.00) constituted the highest proportion (82.72%) which was less than the small plantation, while the fixed cost (17,789.16) constituted about 17.28 per cent and was greater than small plantation (16,423.90). The total labour cost incurred in the maintenance of a hectare of large coffee plantation was 48,765.75 which constituted 47.36 per cent of total maintenance cost. Among the labour cost, harvesting and processing cost (13,125.00) accounted for 12.75 per cent of the total maintenance cost followed by soil management (10.20%), shade regulation (6.98%), application of manure and fertilizers (4.37%), miscellaneous (3.49%), weeding (2.55%) and pruning (2.54%). The shares of these costs were more or less similar to that of small plantation.

When small and large plantations were compared with respect to labour cost per hectare, it was observed that small plantation incurred slightly higher cost than the large counterpart, which was 56,206.25 and 48,765.75, respectively for small and large coffee plantations.

Among material cost, fertilizer, miscellaneous and manure cost constituted 11.00, 5.71 and 5.60 per cent in case of small plantation whereas, it was 11.00, 6.99 and 5.46 per cent in that order in case of large plantation. Small farmers were found to be applying more quantity of manures and fertilizers (6,200.00 and 12,200.00 respectively) as compared to large farmers (5,625.00 and 11,325.00). On the whole, the material cost in case of small and large plantations constituted 26.53 and 27.58 per cent, respectively of the total maintenance cost.

Among the fixed costs, the share of depreciation charges was more in case of large plantation (3,992.18) than the small plantation (2,581.00). The amortised establishment cost per annum accounted for 4.76 and 4.93 per cent of the total maintenance cost, respectively for small and large plantation. The value of land rent and land revenue were same in both cases.

Annual yield and returns from coffee plantations

The yield obtained and returns realized from the sale of coffee are presented in Table 6. It can be seen from the table that the per hectare average quantity of coffee obtained by the sample farmers from small plantation was 3,125.00 kg which yielded an average gross return of Rs 6,60,937.50 per hectare. The average net returns per hectare was worked out to be Rs. 3,91,912.50. Whereas in medium farmers, yield obtained was 3,138.00 kg/ha, which yielded an average gross return of Rs 6,69,963.00 and net returns per ha calculated to be, Rs. 4,07,767.60.

Similarly in large plantation also, the per hectare average quantity of coffee obtained was 3,145.00 kg which yielded an average gross return of Rs. 6,77,747.50 per hectare. The average net return per hectare was Rs. 4,22,424.50.

Benefit Cost Ratio (BCR)

This criterion indicates the rate of return per rupee invested in coffee plantation. The benefit cost ratio at 12 per cent discount rate was 1.46 in small plantation and it was 1.56 and 1.65 in case of medium and large plantation. The result of B:C ratios for both the plantations in Chikmagalur district were more than unity indicating that investment in coffee plantations was economically viable.

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Tables :-

Table no 1. Investment pattern in Coffee plantations

Sl. No.	Particulars	Small plantation			Medium plantation			Large plantation		
		Qty.	Value (Rs/ha)	%	Qty.	Value (Rs/ha)	%	Qty.	Value (Rs/ha)	%
A.	Investment costs									
1	Well		10258	2.61		8589.415	2.30		5520.83	1.53
2	Pump set + Pump house		33074.9	8.41		29478.5	7.88		23882.1	6.6
4	Sprinklers + Sprayer		18462.9	4.69		17502.3	4.68		15541.7	4.29
6	Labour quarters + Go downs + Drying yard		51914.1	13.2		48859.85	13.06		41805.6	11.55
9	Farm vehicle		43875	11.15		37758.95	10.10		29642.9	8.19
10	Fencing		41250	10.49		40375	10.80		37500	10.36
11	Pulping unit		-	-		-	-		19745	5.46
12	Land preparation (Man days)	57.88	8681.25	2.21	58.01	8700.625	2.33	58.33	8750	2.42
13	Digging of pits and planting (Man days)	77.45	11618.8	2.95	75.42	11485.05	3.07	74.88	11231.3	3.1
14	Shade tree planting (Man days)	22.76	3418.75	0.93	22.25	3357.125	0.90	22.505	3337.5	0.92
15	Planting material (No.)	2187	8759.15	2.23	2142	8691.235	2.32	2164.5	8573.32	2.37
16	Shade tree planting material (No.)	875	3937.5	1	879	3956.25	1.06	883	3975	1.1
	Total		235250	59.8		218754.3	58.49		209505	57.9
B.	Maintenance cost during gestation period									
	I year		30041.5	7.64		29592.25	7.91		29143	8.05
	II year		40155.1	10.21		39359	10.52		38562.9	10.66
	III year		42127.5	10.71		41404.2	11.07		40680.9	11.24
	IV year		45797.7	11.64		44883.05	12.00		43968.4	12.15
	Sub Total (I+II+III+IV)		158121	40.2		155238.5	41.51		152355	42.1
	Total establishment cost (A+B)		393372	100		373993	100		361860	100

Sl. No.	Particulars	I year	II year	III year	IV year	Total	%
I	Variable cost						
A.	Material cost						
1	Planting material		875.83	192.50		1068.33	0.68
2	Manure		4375	5000.00	5625.00	15000.00	9.49
3	Fertilizer	656.95	1313.88	3284.70	4927.03	10182.50	6.44
4	PPCs	750.00	1125.00	1500.00	2250.00	5625.00	3.56
5	Planting material (shade tree)		281.25			281.25	0.18
6	Lime	1367.48	1382.70	1398.83	1414.50	5563.50	3.52
7	Weedicide	368.33	334.75	301.18	234.00	1238.25	0.78
8	Others	2500.00	2500.00	2500.00	2500.00	10000.00	6.32
	Total material cost (A)	5642.75	12188.40	14177.20	16950.50	48958.90	30.96
B.	Labour cost						
1	Gap filling		775.00	500.00		1275.00	0.81
2	Application of Manure & fertilizer	1593.75	2362.50	3075.00	3900.00	10931.30	6.91
3	Weeding	5025.00	4500.00	3937.50	3750.00	17212.50	10.89
4	Application of PPCs	750.00	1162.50	1500.00	1875.00	5287.50	3.34
5	Liming	1312.50	1406.25	1575.00	1687.50	5981.25	3.78
6	Gap filling (shade trees)		543.75			543.75	0.34
7	Irrigation, watch and ward	2000.00	2000.00	2000.00	2000.00	8000.00	5.06
8	Fencing		750.00	750.00	750.00	2250.00	1.42
9	Miscellaneous	2250.00	2250.00	2250.00	2250.00	9000.00	5.69
	Total labour cost (B)	12931.30	15750.00	15587.50	16212.50	60481.30	38.25
	Interest on working capital @ 8 %	1485.90	2235.05	2381.15	2653.03	8755.20	5.54
	Total variable cost (I)	20059.90	30173.50	32145.90	35816.10	118195.00	74.75
II	Fixed cost						
1	Land rent	6750.00	6750.00	6750.00	6750.00	27000.00	17.08
2	Land revenue	62.50	62.50	62.50	62.50	250.00	0.16
3	Depreciation	2099.65	2099.65	2099.65	2099.65	8398.60	5.31
4	Interest on fixed capital @ 12 %	1069.45	1069.45	1069.45	1069.45	4277.80	2.71
	Total fixed cost (II)	9981.60	9981.60	9981.60	9981.60	39926.40	25.25
	Total cost (I+II)	30041.50	40155.10	42127.50	45797.70	158121.00	100.00

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Sl. No.	Particulars	I year	II year	III year	IV year	Total	%
I	Variable cost						
A.	Material cost						
1	Planting material		866.76	179.42		1046.17	0.67
2	Manure		4062.50	4687.50	5312.50	14062.50	9.06
3	Fertilizer	624.98	1224.94	3154.85	4713.52	9718.28	6.26
4	PPCs	712.50	1087.50	1453.13	2156.25	5409.38	3.48
5	Planting material (shade tree)		288.75			288.75	0.19
6	Lime	1309.97	1325.05	1340.59	1355.90	5331.51	3.43
7	Weedicide	332.59	306.56	282.77	224.90	1146.82	0.74
8	Others	2500.00	2500.00	2500.00	2500.00	10000.00	6.44
	Total material cost (A)	5480.03	11662.05	13598.25	16263.05	47003.40	30.28
B.	Labour cost						
1	Gap filling		680.00	475.00		1155.00	0.74
2	Application of Manure & fertilizer	1406.25	2306.25	2990.63	3825.00	10528.13	6.78
3	Weeding	4762.50	4218.75	3750.00	3562.50	16293.75	10.50
4	Application of PPCs	750.00	1143.75	1500.00	1781.25	5175.00	3.33
5	Liming	1218.75	1359.38	1490.63	1593.75	5662.50	3.65
6	Gap filling (shade trees)		540.63			540.63	0.35
7	Irrigation, watch and ward	2000.00	2000.00	2000.00	2000.00	8000.00	5.15
8	Fencing		750.00	750.00	750.00	2250.00	1.45
9	Miscellaneous	2062.50	2062.50	2062.50	2062.50	8250.00	5.31
	Total labour cost (B)	12200.05	15061.25	15018.75	15575.00	57855.05	37.27
	Interest on working capital @ 8 %	1414.39	2137.85	2289.35	2547.03	8388.61	5.40
	Total variable cost (I)	19094.47	28861.15	30906.35	34385.08	113247.04	72.95
II	Fixed cost						
1	Land rent	6750.00	6750.00	6750.00	6750.00	27000.00	17.39
2	Land revenue	62.50	62.50	62.50	62.50	250.00	0.16
3	Depreciation	2560.58	2560.58	2560.58	2560.58	10242.30	6.60
4	Interest on fixed capital @ 12 %	1124.77	1124.77	1124.77	1124.77	4499.06	2.90
	Total fixed cost (II)	10497.84	10497.84	10497.84	10497.84	41991.36	27.05
	Total cost (I+II)	29592.31	39358.99	41404.19	44882.92	155238.40	100.00

Table no 2. Maintenance cost of small coffee plantation during gestation period

Table 3. Maintenance cost of medium coffee plantation during gestation period

Table 4. Maintenance cost of large coffee plantation during gestation period

Sl. No.	Particulars	I Year	II Year	III Year	IV Year	Total	%
I	Variable cost						
A.	Material cost						
1.	Planting material		857.68	166.33		1024.00	0.67
2.	Manure		3750.00	4375.00	5000.00	13125.00	8.61
3.	Fertilizers	593.00	1136.00	3025.00	4500.00	9254.00	6.07
4.	PPCs	675.00	1050.00	1406.25	2062.50	5193.75	3.41
5.	Planting material (shade tree)		296.25			296.25	0.19
6.	Lime	1252.45	1267.40	1282.35	1297.30	5099.50	3.35
7.	Weedicide	296.85	278.37	264.35	215.80	1055.38	0.69
8.	Others	2500.00	2500.00	2500.00	2500.00	10000.00	6.56
	Total material cost (A)	5317.30	11135.70	13019.30	15575.60	45048.00	29.57
B.	Labour cost						
1.	Gap filling		585.00	450.00		1035.00	0.68
2.	Application of Manure & fertilizer	1218.75	2250.00	2906.25	3750.00	10125.00	6.65
3.	Weeding	4500.00	3937.50	3562.50	3375.00	15375.00	10.09
4.	Application of PPCs	750.00	1125.00	1500.00	1687.50	5062.50	3.32
5.	Liming	1125.00	1312.50	1406.25	1500.00	5343.75	3.51
6.	Gap filling (shade trees)		537.50			537.50	0.35
7.	Irrigation, watch and ward	2000.00	2000.00	2000.00	2000.00	8000.00	5.25
8.	Fencing		750.00	750.00	750.00	2250.00	1.48
9.	Miscellaneous	1875.00	1875.00	1875.00	1875.00	7500.00	4.92
	Total labour cost (B)	11468.80	14372.50	14450.00	14937.50	55228.80	36.25
	Interest on working capital @ 8 %	1342.88	2040.65	2197.54	2441.02	8022.13	5.26
	Total variable cost (I)	18128.90	27548.80	29666.80	32954.30	108299.00	71.08
II	Fixed cost						
1	Land rent	6750.00	6750.00	6750.00	6750.00	27000.00	17.72

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1.	Land revenue	62.50	62.50	62.50	62.50	250.00	0.16
2.	Depreciation	3021.50	3021.50	3021.50	3021.50	12086.00	7.93
3.	Interest on fixed capital @ 12 %	1180.08	1180.08	1180.08	1180.08	4720.32	3.10
	Total fixed cost (II)	11014.10	11014.10	11014.10	11014.10	44056.30	28.92
	Total cost (I+II)	29143.00	38562.90	40680.90	43968.40	152355.00	100.00

Sl.No.	Particulars	Unit	Small farmer			medium farmer			Large farmer		
			Qty. (Rs/ha)	Value (Rs / ha)	%	Qty. (Rs/ha)	Value (Rs/ ha)	%	Qty. (Rs/ha)	Value (Rs/ ha)	%
I	Variable cost										
A.	Material cost										
1	Manure	Ton	6.20	6200.00	5.59	5.92	5920.00	5.53	5.63	5625.00	5.46
2	Fertilizer	Qt.	12.20	12200.00	11.00	11.74	11740.00	10.98	11.33	11325.00	11.00
3	PP chemicals	Kg.	20.00	3000.00	2.71	18.29	2743.50	2.57	17.50	2625.00	2.55
4	Lime	Kg.	481.70	1445.10	1.30	474.84	1424.52	1.33	465.40	1396.13	1.36
5	Weedicide	Lt.	0.98	254.80	0.23	0.95	247.00	0.23	0.91	235.30	0.23
6	Miscellaneous			6322.23	5.70		6783.92	6.34		7194.43	6.99
	Total Material cost(A)			29422.13	26.53		28858.94	26.98		28400.86	27.58
B.	Labour cost										
1	Application of manure & fertilizer	MD	31.25	4687.50	4.23	30.58	4587.00	4.29	30.00	4500.00	4.37
2	Irrigation, watch and ward	MD	10.00	2000.00	1.80	10.00	2000.00	1.87	10.00	2000.00	1.94
3	Weeding	MD	21.25	3187.50	2.87	19.50	2925.00	2.73	17.50	2625.00	2.55
4	Application of PPCs	MD	15.00	2250.00	2.03	14.50	2175.00	2.03	12.50	1875.00	1.82
5	Pruning	MD	21.25	3187.50	2.87	20.25	3037.50	2.84	19.38	2612.50	2.54
6	Harvesting & Processing	MD	96.25	14437.50	13.02	93.50	14025.00	13.11	87.50	13125.00	12.75
7	Shade regulation	MD	31.88	7968.75	7.19	29.83	7456.71	6.97	28.75	7187.50	6.98
8	Soil management	MD	75.00	11250.00	10.14	73.25	10987.50	10.27	70.00	10500.00	10.20
9	Fencing	MD	5.00	750.00	0.68	5.00	750.00	0.70	5.00	750.00	0.73
10	Miscellaneous			6487.50	5.85		5039.17	4.71		3590.83	3.49
	Total labour cost(B)			56206.25	50.68		52486.00	49.07		48765.75	47.36
	Interest on working capital @ 8%			8852.05	7.98		8523.84	7.97		8012.43	7.78
	Total variable cost(I)			94480.43	85.19		89868.78	84.02		85179.04	82.72
II	Fixed cost										
1	Amortized establishment cost			5270.70	4.75		5135.40	4.80		5078.50	4.93
2	Land rent			6750.00	6.09		6750.00	6.31		6750.00	6.56
3	Land revenue			62.50	0.06		62.50	0.06		62.50	0.06
4	Depreciation			2581.00	2.33		3279.08	3.07		3992.18	3.88
	Interest on fixed capital @ 12 %			1759.70	1.59		1861.51	1.74		1905.98	1.85
	Total fixed costs (II)			16423.90	14.81		17088.49	15.98		17789.16	17.28
	Total cost (I+II)			110904	100		106957	100		102968	100

Table 5. **Maintenance cost of coffee plantation during bearing period**

Table 6. **Yield obtained and returns in coffee plantations**

Sl.No.	Particulars		Small	Medium	Large
1	Yield obtained (Kg. /ha)		3125.00	3138.00	3145.00
2	Sale price (Rs/ha)		211.50	213.50	215.50
3	Total Returns realized (Rs/ha)		660937.50	669963.00	677747.50
4	Cost of cultivation (Rs/ha)		269025.00	262195.40	255323.00
5	Net returns (Rs/ha)		391912.50	407767.60	422424.50
6	Benefit cost ratio		1.46	1.56	1.65