Visit us - www.researchjournal.co.in ■ DOI : 10.15740/HAS/IRJAES/8.2/366-375
International Research Journal of Agricultural Economics and Statistics
Volume 8 | Issue 2 | September, 2017 | 366-375 ■ e ISSN-2231-6434

Research Paper

An economic analysis of cost and returns of coffee production in Kodagu district of Karnataka

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Paper History **:**
Received **:** *25.05.2017;*
Revised **:** *11.08.2017;*
Accepted **:** *18.08.2017*

ABSTRACT : Kodagu district is the coffee cup of Karnataka. The present investigation was carried out to study the cost, returns and investment feasibility of coffee plantation in Kodagu district. All three talluks of Kodagu *viz.,* Madikeri, Virajpet and Somavarpet and one village from each talluk was selected. A sample of 60 farmers based on probability proportion to number of farmers available in each groups were selected for the study. The total establishment cost of coffee plantation was Rs. 464947.47 on small farmers, Rs. 442513.24 on large farmers. Maintenance cost of gestation period increased in each year with increase in age of coffee plants. Average yield reported in the study area was 1619.8kg/ha which was sold at an average price of 191.25 Rs./kg.

KEY WORDS : Economic analysis. Cost, Returns, Coffee production

HOW TO CITE THIS PAPER : Thanuja, P. and Singh, N.K. (2017). An economic analysis of cost and returns of coffee production in Kodagu district of Karnataka. *Internat. Res. J. Agric. Eco. & Stat.,* **8** (2) : 366-375, **DOI : 10.15740/HAS/IRJAES/8.2/366-375.**

INTRODUCTION :

The coffee plant is a woody perennial evergreen dicotyledonous that belongs to the Rubiaceae family. Two main species of coffee are cultivated today. *Coffea arabica,* known as Arabica coffee, accounts for 75-80 per cent of the world's production. *Coffea canephora,* known as Robusta coffee, accounts for about 20 per cent and differs from the Arabica coffees in terms of taste. History of coffee usage goes back to the thirteen century. The Arabs were the first to cultivate and also to trade coffee. Coffee, nicknamed as "Islamic milk" and "sage's milk" has conquered the third most popular drink after water and wine. Over 125 coffee consuming countries, about 50 per cent of them produce coffee. With 33.16 per cent of world's total coffee production Brazil stands first and with 4.5 per cent of total coffee production India stands seventh among the toppest coffee producing countries (International coffee organization). With the tune of 4000 crore Rs. of foreign exchange Indian coffee has created itself a niche in the international market. In India, Karnataka, Tamil Nadu and Kerala are the three states cultivating the coffee predominantly. Karnataka accounting for 71.03 per cent of India's total coffee production is owned the pride place.

In Karnataka, coffee cultivation is confined to three districts, namely Kodagu, Chikmagalur and Hassan. These districts, respectively account for 45.66, 38.99 and 15.45 per cent of the area and 54.06, 34.10 and 11.84 per cent of the production of coffee in the state. With that Kodagu stands first in coffee production. It referred to as the 'Coffee Cup of India'. Keeping in view the importance of coffee in the state economy, the present study made an attempt to analyse the Marketing of coffee

in Kodagu district of Karnataka.

– To estimate the costs and returns in coffee production.

MATERIALS AND METHODS :

Kodagu district having first place both in area and production (2013) of coffee in karnataka state was selected purposively. Multistage sampling design was used for the present study. Three talluks namely Madikeri, Virajpet and Somvarpet of the district were purposively selected. From each talluk one coffee growing village was selected randomly for the further sampling. A list of coffee growers from each village was prepared and 20 farmers from each village were selected randomly on the basis of probability to proportion of the coffee growers available in each group. Thus, among 60 total sampled farmers there were 45 small farmers (<10ha) and 15 large (>10ha) farmers. (Criteria fixed by Coffee Board Karnataka).

– Initial years of coffee plantation are gestation period which requires heavy investment. The cost of coffee plantation was divided into establishment cost and maintenance cost. Both include operational cost and fixed cost. Various cost concepts and returns involved in the coffee plantation were studied through tabular analysis.

RESULTS AND DATA ANALYSIS :

Results of the study will be discussed with fallowing sub headings.

Cost and returns in coffee plantations :

The establishment cost incurred per hectare of coffee plantation was estimated considering the quantity of various physical inputs and labour (both manual and machine) used at their respective market prices and wages prevailed in the study area.

Being perennial crop coffee requires heavy establishment cost. Coffee continues to yield upto 30 years under good management conditions (Avinash Kumar, 2011). For the established plantation it requires four years as gestation period. During this period both investment and maintenance cost was included.

Table 1: Investment pattern on establishment of coffee plantation **(Rs./ha)**

Sr. No.	Particulars	Small plantation			Large plantation		
		Qty.	Value (Rs. /ha)	%	Qty.	Value (Rs. /ha)	%
Investment costs							
1.	Well (Nos)	1	11764.7	2.53	2	6637.16	1.49
2.	Pump set + Pump house(Nos)	1	34313.73	7.38	3	26448.36	5.97
3.	Sprinklers + Sprayer (Nos)	1	32679.738	7.02	2	22704.33	5.12
4.	Labour quarters + Go downs + Drying yard (Nos)		58823.53	12.65		50377.83	11.38
5.	Farm vehicle (Nos)		76470	16.44		68010.07	15.36
6.	Pulping unit(Nos)		-		1	25188.91	5.69
7.	Land preparation (Man days)	57.88	11334.06	2.43	58.63	11480.92	2.58
8.	Digging of pits and planting (Man days)	75	14686.5	3.15	68	13315.76	3.00
9.	Shade tree planting (Man days)	24.5	4797.59	1.03	24.5	4797.59	1.07
10.	Planting material (Number of plants)	2150	21500	4.624	2030	20300	4.57
11.	Shade tree planting material (No.)	750	7500	1.61	800	8000	1.79
	Total		273869.84	58.9		257260.9	58.08
Maintenance cost during gestation period							
	I year		35523.96	7.64		34789.06	7.85
	II year		48666.93	10.46		47587.13	10.74
	III year		50489.81	10.85		48844.8	11.02
	IV year		56397.93	12.12		55031.31	12.42
	Subtotal (I+II+III+IV)		191077.63	41.09		186252.31	41.92
	Total establishment cost (A+B)		464947.47			442513.24	

Investment viability of coffee plantation:

Investment cost includes cost made on well, pump set, pump house, sprinklers, sprayers, labour quarters, godown, drying yard, vehicle, fencing, pulping unit, land preparation, manures and fertilizers, digging of pits, planting and planting material and these costs are incurred during zero year.

Various cost incurred in the establishment of coffee plantation have been worked out for both small and large plantation and presented in the Table 1. The total cost of establishment incurred by small and large plantations were 464947.47 Rs./ha and 442513.24 Rs./ha, respectively.

In case of small coffee plantation, the share of investment cost in the total establishment cost worked out to be 58.90 per cent (Rs. 273869.85) and it was 58.13 per cent (Rs. 257260.93) in the case of large farmers. It reveals that investment cost incurred in small coffee plantation and large plantation was the same of the total establishment cost.

The component wise investment share on all components in total establishment cost was higher on small farmers in comparison to the large farmers. Among all the cost components the highest cost was spent on farm vehicle which was Rs. 76470 (16.44%) on small

Table 2: Maintenance cost of small coffee plantation during gestation period **(Rs./ha)**

Sr. No	Particulars	I year	II year	III year	IV year	Total	%
Variable cost							
Material cost							
1.	Planting material		2000	500		2500	1.31
2.	Manure		5400	6000	6600	18000	9.42
3.	Fertilizer	936	1872	3744	7488	14040	7.35
4.	PPCs	396	792	1584	1980	4752	2.48
5.	Planting material (shade tree)		750			750	0.39
6.	Lime	1664	1680	1700	1714	6758	3.54
7.	Weedicide	825	780	750	690	3045	1.59
8.	Others	2500	2500	2500	2500	10000	5.23
Total material cost (A)		6321	15774	16778	20972	59845	31.31
Labour cost							
1.	Gap filling		979.1	391.64		1370.74	0.72
2.	Application of manure and fertilizer	391.64	1723	2977.3	3916.4	9008.34	4.71
3.	Weeding	5874.6	5091.32	4503.86	4308.04	19777.82	10.35
4.	Application of PPCs	979.1	783.28	1958.2	2937.3	6657.68	3.48
5.	Liming	1174.92	1223.87	1272.83	1321.78	4993.4	2.61
6.	Gap filling (shade trees)		587.46			587.46	0.31
7.	Irrigation, watch and ward	1958.2	1958.2	1958.2	1958.2	7832.8	4.11
8.	Fencing		979.1	979.1	979.1	2937.3	1.54
9.	Miscellaneous	2992.2	2992.2	2992.2	2992.2	11968.8	6.3
	Total labour cost (B)	13370.66	16317.53	17033.33	18413.02	65134.54	34.08
	Interest on working capital @ 6 %	1181.49	1925.49	2028.67	2363.10	7498.75	3.92
	Total variable cost (I)	20873.15	34017.12	35840	41748.12	1,32,478.3	69.33
Fixed cost							
1.	Land rent	9500	9500	9500	9500	38000	19.88
2 .	Land revenue	125	125	125	125	500	0.26
3.	Depreciation	3693	3693	3693	3693	14772	7.73
4.	Interest on fixed capital @ 10 %	1331.81	1331.81	1331.81	1331.81	5327.24	2.78
	Total fixed cost (II)	14649.81	14649.81	14649.81	14649.81	58599.24	30.67
	Total cost (I+II)	35523.96	48666.93	50489.81	56397.93	191077.63	

plantation and Rs. 68010.07(15.36%) on large plantation. The next most important cost component of investment cost was labour quarters, godowns and drying yard on these items small and large farmers invested Rs. 58823.53 and 50377.83 Rs. This accounts 12.65 per cent and 11.38 per cent, respectively. The other important items of investment cost were pumpset including pump house, sprinkler system and machine used for the plant protecting materials (sprayers). These items together accounted Rs. 66993.47(14.40%) on small plantation and Rs. 49152.69 Rs. (11.1%) on large plantation. Cost on planting material was worked out to be Rs. 21500 on small farmers and Rs. 20300 on large farmers.

Thus, it was also observed from the Table 1 that, investment on all components mentioned above was more for small plantation, than large plantation. Except for, investment on shade tree planting (4.58%). It may be because of higher land holding in case of large plantation, which decreased the investment cost when it was considered for per hectare basis. However, investment on shade tree plantation was more on large plantation comparatively as the large farmers practiced well shading, and also they preferred to cultivate pepper (requires climbing support of the tree).

Maintenance cost of coffee plantation during gestation period:

The maintenance cost occurred on various inputs used in coffee production during gestation period for small and large farms presented in the Table 2 and 3, respectively. The analysis of the cost incurred on various items to maintain the coffee plants for each year (For four years of gestation period) shows that the total maintenance cost for 4 year gestation period was Rs. 191077.63 on small plantation and Rs. 186252.31 on large farms for cultivation of coffee in per hectare area.

The maintenance cost of coffee plantation increased in each year during gestation period on both seize of plantation. The total maintenance cost in I year, II year, III year and IV year was worked out to be Rs. 35523.06, Rs. 48666.93, Rs. 50489.84 and Rs. 56397.93 on small plantation and the maintenance cost during gestation period on large plantation was estimated to be Rs. 34789.06 in I year, Rs. 47587.13 in II year, Rs. 48844.8 in III year, Rs. 55031.31 in IV year. Per year maintenance cost of the coffee plantation during gestation period was increased from 7.86 per cent to 12.43 per cent on large plantation. Thus, comparatively the total maintenance cost (Rs./ha) during gestation period was found more on small plantation than the large plantation.

Maintenance cost of coffee plantation during bearing period:

Maintenance cost of coffee plantation during bearing period started from the fifth year and assumed to be constant till the end of the economic life span of coffee plantation (30 years). The maintenance cost during bearing period for sample farmers are presented in the Table 4. It can be depicted from the table that the total annual maintenance cost of coffee plantation per hectare was Rs. 134295.64 per hectare and Rs. 133161.2 hectare, respectively for small and large coffee plantation. Maintenance cost was divided into operating and fixed cost. The analysis showed that the maintenance cost during bearing period on various cost components increased, than the maintenance cost during gestation period for each year. It was due to the increased canopy with increased age required more quantity of inputs for the maintenance. It was assumed that the maintenance cost of coffee plantation during bearing period remained same throughout the economic life span of 30 years.

The share of labour cost in total maintenance cost was more for both small (49.9%) and large (48.64%), than the share of material cost of both small (28.82%) and large (29.11%) plantation. It was due to the labour cost incurred shade regulation, soil management, fencing which were usually do not demand any inputs, but demanded labour only. Different cost incurred for the maintenance of coffee plantation during period has shown in the Table 4.

Annual yield and returns from coffee plantations:

The average yield obtained per hectare of coffee (parchment coffee) was 1620.2 kg/ha on small plantation and 1619.2 kg/ha in case of large farmers (Table 5). However, on an average the yield or productivity of sample farmers of the study area was 1619.8 kg/ha.

Thus, the per hectare gross value of coffee production at farmer's level was Rs.309863.25 and Rs. 309683.48 on small and large plantation, respectively. However, net return was worked out to be Rs. 175624.98 on small plantation and Rs. 176525.28 on large plantation. The overall net return from the parchment coffee obtained was Rs. 176586.92 on per hectare coffee plants.

Costs and returns in coffee crop production:

Serpa (1999) studied the impact of environmental measures on coffee production costs in Latin America and concluded that Coffee growing, processing and distribution have both positive and negative environmental impacts. Life-cycle analysis is one of the instruments that can be used to find ways to mitigate the negative impacts. The systematization of a simple model should be complemented by additional analyses of a socio-economic nature.

Karanja *et al.* (2000) Studied on Economic reforms and cost efficiency of coffee farmers in Central Kenya and revealed that the farmers in the region are cost efficient with a mean cost inefficiency level of 8 per cent. There are, however, wide dispersions of the farm-specific inefficiency levels, which range from 1 per cent to 66 per cent with 90 per cent of the farm households having inefficiencies below 15 per cent. Farm-specific cost inefficiencies are significantly influenced by farm size, amount of farm income and availability of credit.

Pereira *et al.* (2001) revealed that 1999, 20 000 seedlings of different varieties were grown. In September 2000, 15 000 seedlings were cultivated (10 700 Acaia Cerrado MG 1474 and 4300 Catuai Rubi MG

Table 3: Maintenance cost of large coffee plantation during gestation period **(Rs./ha)**

Sr. No.	Particulars	I year	II year	III year	IV year	Total	%
Variable cost							
Material cost							
1.	Planting material		2000	300		2300	1.23
2.	Manure		4800	5400	6000	16200	8.69
3.	Fertilizer	954	1908	3816	7632	14310	7.68
4.	PPCs		281.25	562.5	1125	1968.75	1.05
5.	Planting material (shade tree)		800			800	0.43
6.	Lime	1612	1620	1640	1660	6532	3.51
7.	Weedicide	720	690	660	600	2670	1.43
8.	Others	2500	2500	2500	2500	10000	5.37
Total material cost (A)		5786	14599.25	14878.5	19517	54780.75	29.41
Labour cost							
1.	Gap filling		979.1	192.5		1171.6	0.63
2.	Application of manure and fertilizer	391.64	1566.56	2741.48	3916.4	8616.08	4.63
3.	Weeding	5091.32	4503.86	4308.04	3916.4	17819.62	9.56
4.	Application of PPCs	979.1	783.28	1958.2	2545.66	6266.24	3.64
5.	Liming	1174.92	1214.084	1233.66	1253.25	4875.91	2.62
6.	Gap filling (shade trees)		479.76			479.76	0.26
7.	Irrigation, watch and ward	2150.02	2150.02	2150.02	2150.02	8600.08	4.62
8.	Fencing		1370.74	1370.74	1370.74	4112.22	2.21
9.	Miscellaneous	2560	2560	2560	2560	10240	5.49
	Total labour cost (B)	12347	15607.4	16514.64	17712.47	62181.51	33.38
	Interest on working capital @6 %	1087.98	1812.4	1883.58	2233.76	7017.73	3.76
	Total variable cost (I)	19220.90	32019.05	33276.72	39463.23	123979.9	66.56
Fixed cost							
1.	Land rent	9500	9500	9500	9500	38000	20.4
2.	Land revenue	125	125	125	125	500	0.26
3.	Depreciation	4527.8	4527.8	4527.8	4527.8	18111.2	9.72
4.	Interest on fixed capital @ 10 %	1415.28	1415.28	1415.28	1415.28	5661.12	3.04
	Total fixed cost (II)	15568.08	15568.08	15568.08	15568.08	62272.32	33.43
	Total cost (I+II)	34789.06	47587.13	48844.8	55031.31	186252.3	

1192). Plants were cultivated on the same conditions in the nursery of Embrapa Cerrados. Production cost was estimated to be R$ 101.38/thousand. Including the cost of transporting the seedlings, the total cost was R$ 160.00/ thousand.

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.

Reddy and Naidu (2001) analyzed the comparative

Table 4 : Maintenance cost of coffee plantation during bearing period **(Rs./ha)**

Sr. No.	Particulars	Unit	Small farmers			Large farmers		
	Variable cost		Qt.(/ha)	Value (Rs./ha)	%	Qty. (Rs./ha)	Value (Rs./ha)	%
Material cost								
1.	Manure	ton	6.9	8280	6.16	5.63	6756	5.07
2.	Fertilizer	Qtl	10.5	18900	14.1	11.3	20340	15.28
3.	PPCs	ltr	5.3	1590	1.18	3.75	1125	0.84
4.	Lime	Kg	645	1677	1.25	625	1625	1.22
5.	Weedicide	Ltr	2.56	768	0.57	2.1	630	0.47
6.	Miscellaneous			7500.5	5.58		8320.2	6.25
	Total material cost (A)			38715.5	28.82		38796.2	29.12
Labour cost								
1.	Application of manure and fertilizer	MD	33.5	6559.97	4.88	32	6266.24	4.7
2.	Irrigation, watch and ward	MD	10	1958.2	1.46	11	2150.02	1.61
3.	Weeding	MD	27.5	5385.05	4	26.07	5105.02	3.83
4.	Application of PPCs	MD	15	2937.3	2.18	13	2545.66	1.92
5.	Pruning	MD	20	3916.4	2.92	21	4112.22	3.09
6.	Harvesting and processing	MD	94.1	18426.66	13.72	90	17623.8	13.24
7.	Shade regulation	MD	24	4699.68	3.5	25	4895.5	3.67
8.	Soil management		75	14686.5	10.93	73	14294.86	10.74
9.	Fencing	MD	5	979.1	0.73	7	1370.74	1.02
10.	Miscellaneous			7480.5	5.57		6400	4.8
	Total labour cost (B)			67029.36	49.9		64764.06	48.63
	Interest on working capital@6%			6344.69	4.72		6213.61	4.68
	Total variable cost (I)			112089.55	83.45		109773.87	82.44
Fixed cost								
1.	Amortized establishment cost			6369.26	4.75		6208.41	4.66
2.	Land rent			9500.00	7.07		9500.00	7.13
3.	Land revenue			125.00	0.09		125.00	0.09
4.	Depreciation			4193.1	3.12		5427.8	4.08
	Interest on fixed capital @10 %			2018.73	1.5		2126.12	1.6
	Total fixed cost (II)			22206.09	16.54		23387.33	17.56
	Total cost (I+II)			134295.64	100		133161.2	100

study on coffee of production of Robusta coffee across the size of holdings in India is presented. Data are obtained from 88 selected estates (31 in Chikmagalur, 20 in Kodagu and 37 in Kerala) for a minimum of 2 years (1998-99 and 1999-2000). Results revealed that the cost of production increased with the increase in size of holding from Rs. 32 695 per ha (<4 ha) to Rs. 46 360 per ha (>40 ha). The cost of production per kg was low in 4 to 10 ha category (Rs. 25/kg) followed by below 4 ha (Rs. 27/ kg), 10-40 ha (Rs. 29/kg) and above 40 ha (Rs. 36/kg) which was reflected by varied yield realizations and cost components. The yield realizations were 1225 kg/ ha (<4 ha), 1655 kg/ha (4-10 ha), 1520 kg/ha (10-40 ha) and 1275 kg/ha (>40 ha). The coffee yield among small (<4 ha) and large (>40 ha) growers of Robusta can be increase d to efficient levels through irrigation infrastructure development, as irrigation is the major factor for improving Robusta productivity.

Silva and Reis (2001) estimated the production coffee of the coffee in the region of Lavras - MG, Brazil, and to analyse the economic situation of this activity. The survey was carried out in the five coffee entrepreneur's, identifying the cases of study, in this period from 1996 to 1997 and from 1997 to 1998. The economic results pointed out the profit situation, which and the farming's coffee formation, inputs and labour represented the coffee that more affected the coffee production.

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 cooffee farmer must take into account detailed information on each farm plot in order to achieve market competitiveness.

Coelho *et al*. (2002) evaluated production cost of irrigated coffee (*Coffee arabica* cv.CATUAI) field in the FAEPE-UFLA farm in Muquem, Brazil, during the years 1997-98, 1998-99 and 1999-2000. The aim was to identify what irrigation time would provide the smallest production cost the experiment consisted of three replications in four plots. Three sub-plots representing different irrigation times were fertilized manually while two sub-plots without irrigation (plots D and E) were fertilized through fertigation and manual application, respectively. Sub-plots A had the smallest production cost, R$91.10 per 60kg-bag of coffee for a production of 67.7 bags of coffee per hectare.

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.

Dumer *et al*. (2004) pointed that to evaluate, along with a group of coffee producers,. Questionnaires with closed questions were applied to forty farmers and from the data collected the importance-performance matrix of Slack (2002) was formed to try and comprehend how these farmers evaluate some tools and attributes related

Table 5 : Yield and returns of coffee plantations

Sr. No.	Particulars	Small	Large	Overall
1.	Yield obtained (kg/ha)*	1620.2	1619.2	1619.8
2.	Sale price (Rs./kg)	191.25	191.25	191.25
3.	Total returns realized (Rs./ha)	309863.25	309672	309799.5
4.	Annual costs (Rs. /ha)	134295.64	131161.2	133250.82
5.	Net returns (Rs./ha)	175624.98	178510.8	176586.92

*Parchment coffee refers to the pulped coffee berry (Removal of pulp)

to cost accounting, applied to the coffee production management. The results found shows that the coffee producers consider the cost accounting an important tool for decision making, but it is still not much used and known by them. The only tool that showed a satisfactory situation was the knowledge of the break-even point in the agricultural enterprise.

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. 4861and 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).

Delgado *et al.* (2006) determined the the benefit-cost ratio and to estimate the energy invested by obtained product. The hypothetical models were obtained by means of a cluster analysis of 39 farms. The first group was named farms of organic technology (TO),. The second group was characterized as conventional farms, which in turn was subdivided into 2 easily distinguished sub-groups: farms of mixed technology(TM) and farms of conventional technology (TC). The TC farms use conventional technologies and resources. The TM group is a mixture of conventional coffee production systems, but also uses some practices and resources used in the organic agriculture model. The highest financial benefits, in the short term, were obtained in the TC model compared to the TO and TM models. However, from the point of view of energy efficiency, the TO model showed the best results, since in this system 0,51 MJ kg^{-1} were invested to produce 1 kg ofcoffee in cherry, which represents 50 per cent of the energy required to produce the same 1 kg in the TC model (1,06 MJ kg^{-1}) and TM model (0,97 MJ kg^{-1}).

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.

Fehr *et al*. (2012) conducted their study on variable costs of Arabic culturecoffee in the main producing regions of Brazil. Physiological and environmental aspects, the cultivation and the market are some non-controllable factors that influence this culture. But there are others that can be controlled by the enterprise.The methodology used was a quantitative approach, consisting of descriptive research and the data collection procedure employed was documentary research. Using the analysis of variance and the Scott-Knott test (1974), no fluctuation in costs was observed between the years analyzed. The items that most influenced the total costs were temporary and fixed labour (32%) as well as fertilizers and pesticides (30%).

Mamata and Reddy (2013) studied the economics organic and in organic coffee production in Kodagu district. Results indicated that organic coffee production was labour intensive. The productivity of organic coffee was lower (6.88q/acre) than that of inorganic coffee (8.30q/acre). Although, cost of cultivation (Rs. 22485/acre) and gross returns (Rs. 44214/acre) were higher in inorganic coffee, the net return was higher in organic coffee production (Rs. 21729/acre) because of premium price enjoyed by the latter. The partial budget analysis revealed that net incremental benefit from organic coffee production was positive at Rs. 2625 per acre and even producer surplus also turned out to be positive at Rs. 1353.62 per acre.

Mohammed *et al.* (2013) studied the economics of coffee production in Kabba/Bunu local government area of Kogi state. 100 farmers were purposively selected from the villages considered based on the predominance of coffee production. The tools used for data analysis were descriptive statistics, net farm income and multiple regression analysis. The cost and return analysis shows that coffee production in the area has a profitability index of 0.29 with a return margin of N8,855.40 per household per hectare. The result of the regression analysis shows that five variables gender (x1), age (x2), household size (x5), farming experience (x7) and farm size (x8) were significant at 1 per cent level and have positive effect on the income of coffee farmers. It was concluded that coffee production is profitable in the study area. Based on findings, it was recommended that land ownership system in the study area should be revisited, the cost of inputs especially hired labour should be regulated and extension agents should encourage and educate the

farmers on the use of fertilizer.

Alvarenga *et al.* (2014) studied on methodological role in the process of cost management of coffee. The present work was carried out to demonstrate the methodology of detailing and direction of the main factors in the process of performance management cost of coffee and by means of indicators, identify possible causes of problems, with the aim of assist in management and administrative practices and technical activity. To demonstrate the methodology, we used the Total Operating Cost (TOC) of properties located in the city of Monte Carmelo, MG, from October 2010 to September 2011. For properties, the research methodology allowed us to analyze the details of the major fundamental factors and directly linked to the production process so simple and efficient and thereby directs the decision making, allowing the detection of possible causes and their effects on business.

Swamy *et al*. (2016) analysed the cost of coffee cultivation in Kodagu. In an average planters incurred around Rs. 17041 per acre. The result shows that, the coffee productivity in medium plantations was 1051.2 kg per acre as against 758.5 and 789.2 kg in the case of small and large plantations. An annual net return per acre was highest in the case of medium planters (Rs. 26109.3) as against Rs. 20566.7 and Rs. 18572.7 in the case of small and large planters. Cost of production was lowest in the case of small planters (Rs. 18.9 per kg of output) followed by medium planters (Rs. 21.2 per kg of output) and large planters (Rs. 22.5 per kg of output).

Conclusion :

Coffee being a perennial plantation crop requires heavy investment and cost for maintaining the plantation. This study revealed that total establishment cost was 464947.47 Rs./ha (small plantation) and 442513.24 Rs./ha in case of large plantation. The gestation period of coffee was assumed to be 4 years for the present study. Higher land holding in case of large farmers resulted to low establishment cost per hectare. Average yield reported in the study area for small and large plantation was 1620.2 kg/ha and 1619.8 kg/ha, respectively. It can be occluded that the productivity of coffee in the study area found to be almost same for both type of plantation. Returns from the plantation was also positive shown by the values 176586.92 Rs./ha in an average.

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