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# An Economic Analysis on Cost and Returns of Guava Production in Tamil Nadu

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## ABSTRACT

Guava is a most important fruit crop and it has higher adaptability as well as productivity. Even though, Guava cultivation was introduced in the seventeen centuries, the farmers were unaware of the improved cultivation practices. Hence an attempt was made in this study, to analyze cost and returns of guava cultivation in Villupuram district of Tamil Nadu at farm level with the following objectives: i) To estimate cost and returns in Guava production in the study area, ii) To give policy suggestions based on the results of the study. The present study was conducted in Thiruvannainallur block of Villupuram district. Further, in block, four villages were selected for the study and finally, 120 growers randomly selected. In this study, CCPC Method of Cost of Cultivation and Benefit-Cost Ratio was worked out to analyze the profitability in guava cultivation. The results indicated that the per unit cost of cultivation is declining as size group increases, since it is a perennial crop, one has to wait for five years for first yielding of Guava. This problem could be better managed by cultivating intercrops in guava plantations.

**Key words:** Guava production, Establishment costs, Cost of cultivation, Benefit-Cost ratio, Economic analysis

Guava (*Psidium guajava*) is one of the important commercial fruits in India. Guava had been produced in all parts of the Nation since a very long period of time. Guava is also known as 'Poor man's apple' and it plays a pivotal role in strengthening the country's nutritional security besides generating employment avenues [1]. Even though, Guava cultivation was introduced in the seventeen centuries, the farmers were unaware of the improved cultivation practices. They have many problems relating to production and they have to manage with uncertainty and other natural calamities like cyclone and drought [2]. Hence an attempt was made in this study, to analyse cost and returns of guava in Villupuram district of Tamil Nadu at farm level with the following objectives: i) To estimate cost and returns in Guava production in the study area and ii) To give policy suggestions based on the results of the study.

## MATERIALS AND METHODS

In Tamil Nadu, Villupuram district is one of the major district in producing Guava was selected purposively and also it has own problems of production and marketing of Guava. From the district, based on the first rank in area among the

blocks, Thiruvannainallur block of Villupuram district was selected. On the basis of information getting from the respective block statistical office, the guava growing villages list were selected. From the listed villages, four top ranking villages were selected.

From the revenue records of each of the villages, a list of guava growers was prepared for selection of the sample Farmers. They were grouped into the three categories on the basis of their area under guava viz., small farmers (0.01 ha – 0.40 ha), medium farmers (0.41 ha - 0.80 ha) and large farmers (0.81 ha and above). From each group, 10 farmers were selected in each village randomly.

### ii) Tools of analysis

#### Cost of cultivation

It includes all the costs incurred for the production of the Guava. The production costs were divided into variable cost and fixed cost. The variable cost included the farmyard manure, plant protection chemicals, weeding, irrigation, labour cost for various operations. The fixed cost included the revenue, depreciation cost and rental value of land [3]. The CCPC Method of Cost of Cultivation consist of Cost A, Cost B and Cost C and Benefit-Cost Ratio was worked out to analyze the profitability in guava production in the study area.

## RESULTS AND DISCUSSION

Guava is a perennial crop and tree starts bearing after five years from planting. The tree has to be nourished from the planting time till it starts bearing fruits. It requires, however a

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relatively high investment of capital in the initial stages, that is during the first five years of the establishment of guava orchard. The net costs of the first five years constitute the total cost of establishment of guava orchard and it needs to be spread over the economic life span of garden. In view of this, the cost of cultivation is divided into two parts viz., establishment cost and maintenance cost [4].

#### 1) Non-recurring expenditure of guava plantation (Establishment cost)

During the first year of plantation farmers have to incur expenditure on various items such as preparation of land,

digging out and filling up of pits, planting, planting material, manures, fertilizers, protective irrigation, plant protection and imputed costs i.e., land revenue and cesses, depreciation and repairs, interest on working capital and rental value of land, etc. The items of expenditure for the second year are gap filling, training and pruning, manures and fertilizers, protective irrigation, plant protection and all imputed costs. In order to work-out the annualized establishment cost, the total establishment cost of gestation period has been apportioned over 35 years which is considered to be the economic life of guava orchard. The Establishment cost for different size of groups is presented in (Table 1).

Table 1 Establishment cost of guava (Rs/ha)

Operation	Size of holding			Overall (n = 120)
	Small (n = 40) (0.01-0.40) ha	Medium (n = 40) (0.41-0.80) ha	Large (n = 40) (0.81 ha and above)	
Preparation of land	2800 (6.75)	3200 (7.43)	3400 (7.39)	3133 (7.19)
Digging and filling of pits	1856 (4.48)	1960 (4.55)	2120 (4.61)	1978 (4.54)
Seedling cost	4180 (10.08)	4200 (9.75)	4452 (9.67)	4277 (9.83)
Transplanting cost	827 (1.99)	850 (1.97)	930 (2.02)	869 (2.00)
Manures and fertilizers	14750 (35.57)	15120 (35.09)	16120 (35.03)	15330 (35.23)
Irrigation charges	2425 (5.85)	2420 (5.62)	2480 (5.39)	2441 (5.61)
Intercultural charges	4200 (10.13)	4350 (10.10)	4500 (9.78)	4350 (9.99)
Land revenue	360 (0.87)	430 (0.99)	460 (1.00)	416 (0.96)
Depreciation and repairs	7720 (18.62)	8120 (18.84)	8950 (19.45)	8263 (18.99)
Interest on working capital @ 6 per cent	2347 (5.66)	2439 (5.66)	2605 (5.66)	2463 (5.66)
Total expenditure	41465 (100.00)	43089 (100.00)	46017 (100.00)	43520 (100.00)

Figures in parentheses indicate percentage to total cost

It could be seen from the table that amongst the various items of per hectare establishment cost of guava for the sample farms, the most expensive cost items were manures and fertilizers, depreciation and repairs, intercultural charges, seedling cost, preparation of land, interest on working capital,

irrigation charges, digging and filling of pits contributing 60 per cent to the total cost. However, the magnitude of these cost items, varied among the different size groups. The per hectare establishment cost for small, medium, large and overall group was Rs. 41465, Rs. 43089, Rs. 46017 & Rs. 43520 respectively.

Table 2 Estimation of cost and returns for guava

Cost items	Small (n = 40) (0.01-0.40) ha			Medium (n = 40) (0.41-0.80) ha			Large (n = 40) (0.81 ha and above)			Overall (n = 120)		
	Quantity	Value (Rs.)	Percent	Quantity	Value (Rs.)	Percent	Quantity	Value (Rs.)	Percent	Quantity	Value (Rs.)	Percent
Hired human labour												
a) Male	36.93	7386	7.39	69.98	13996	14.55	85.63	17126	19.33	64.18	12836	13.53
b) Female	40.89	4089	4.09	71.23	7123	7.41	81.76	8176	9.23	64.63	6462.67	6.81
Bullock power (per days)	9.78	3423	3.43	1.57	549.5	0.57	6.12	2142	2.42	5.82	2038.17	2.15
Machine power in hours	7.83	939.6	0.94	11.18	1341.6	1.39	19.92	2390.4	2.69	12.98	1557.2	1.64
Manures (q)	42.54	5955.6	5.96	68.78	9629.2	10.01	52.36	7330.4	8.27	54.56	7638.4	8.05
Nitrogenous Fertilizer (kg)	33.60	424.03	0.42	65.35	824.72	0.86	43.13	544.30	0.61	47.36	597.68	0.63
Phosphorus Fertilizer (kg)	67.41	1147.32	1.15	118.38	2014.83	2.09	89.31	1520.06	1.72	91.70	1560.74	1.64
Potassium Fertilizer (kg)	52.17	427.79	0.43	119.08	976.46	1.02	79.25	649.85	0.73	83.50	684.7	0.72
Irrigation charges (Rs.)		5900	5.90		6900	7.17		3692	4.17		5497.33	5.79
Bio-fertilizers + weedicide		130	0.13		180	0.19		150	0.17		153.33	0.16
Plant protection charges (Rs.)		3256.12	3.26		2259.69	2.35		2764.98	3.12		2760.26	2.91
Incidental charges (Rs.)		1068.98	1.07		499.00	0.52		297.91	0.34		621.96	0.66
Repairs		802.91	0.80		423.18	0.44		217.62	0.25		481.24	0.51
Working capital		34950.35	34.98		46717.18	48.57		47001.52	53.05		42889.68	45.20
Interest on working capital @ 6%		2097.02	2.10		2803.03	2.91		2820.09	3.18		2573.38	2.71
Depreciation on farm implements		756.36	0.76		715.60	0.74		428.16	0.48		633.37	0.67
Land revenue and other taxes		80.23	0.08		78.53	0.08		76.30	0.09		78.35	0.08
Cost – A		37883.96	37.92		50314.34	52.31		50324.07	56.80		46174.12	48.66
Rental value of land		21968.43	21.99		22797.46	23.70		23796.18	26.86		22854.02	24.08
Interest on fixed capital		2280.50	2.28		2359.16	2.45		2430.06	2.74		2356.57	2.48
Amortization cost		7975.63	7.98		8139.14	8.46		7952.20	8.98		8022.32	8.45
Cost – B		70108.52	70.17		83610.10	86.92		84502.51	95.38		79407.04	83.67
Family labour												
a) Male	113.52	22704	22.72	46.60	9320	9.69	16.97	3394	3.83	59.03	11806	12.44
b) Female	71.09	7109	7.11	32.57	3257	3.39	6.98	698	0.79	36.88	3688	3.89
Cost – C		99921.52	100		96187.10	100		88594.51	100		94901.04	100
Output- Main produce (q)	108.54	130274.05		179.72	138822.90		181.25	141712.13		156.50	136936.37	
Per quintal cost		920.60			535.21			488.80			606.40	

#### 2) Cost of cultivation of guava

The cost of cultivation of guava includes fixed cost and working cost. The cost of production mainly influenced by the

relationship between output and inputs. The yearly expenses incurred on the maintenance of bearing garden such as utilization of all material inputs, human labour, bullock labour,

machine power and all imputed cost are included in this cost. The per hectare cost of cultivation of guava was worked out by using standard cost concepts. The item wise cost of cultivation of guava for different size of holding is presented in (Table 2).

From the table, overall level per hectare cost of cultivation of Guava i.e., cost 'C' worked out to be Rs. 94901.04. At the overall level, amongst the different items of cost, rental value of land was the highest Rs. 22854.02 (24.08 per cent). The other important items of cost were hired human labour Rs. 19298.67 (20.34 per cent), family human labour Rs. 15494 (16.33 per cent), manures Rs. 7638.4 (8.05 per cent), amortized establishment cost Rs. 8022.32 (8.45 per cent), irrigation cost Rs. 5497.33 (5.85 per cent), fertilizers cost Rs. 2843.12 (2.99 per cent), Interest on working capital Rs. 2573.38 (2.71 per cent), plant protection Rs. 2760.26 (2.91 per cent), bullock labour Rs. 2038.17 (2.15 per cent), and machine power Rs. 1557.2 (1.64). Interest on fixed capital had negligible share Rs. 1376.72 (2.48 per cent). The cost 'A' was Rs. 46174.12 (48.66 per cent) and cost 'B' was Rs. 78427.19 (83.67 per cent).

As regards these items the similar trend observed among different size groups. The cost 'C' was minimum in large followed by medium and small size of holding [5].

The cost 'A' was maximum in large size group (Rs. 50324.07) followed by medium size group (Rs. 50314.34) and small size group (Rs. 37883.96) respectively. The cost 'B' was Rs. 70108.52, Rs. 83610.10 and Rs. 84502.51 for small, medium and large groups, respectively. The total cost i.e., cost 'C' was Rs. 99921.52, Rs. 96187.10 and Rs. 88594.51 for small, medium and large groups, respectively. It could be revealed from the above discussion that pattern of cost on various items of cost of cultivators of guava was declining over the different size group of holdings. It indicates economics of scale.

### 3) Return from guava orchard

An attempt has been made to compare the per hectare yield, cost of cultivation, gross value of the produce and net profit in guava cultivation in different size of holdings. The details are given in (Table 3).

Table 3 Per hectare total costs, gross returns, net returns and B:C ratio of guava (Rs. /ha)

Particulars	Size of holding			
	Small	Medium	Large	Overall
Total cost				
Cost 'A'	37883.96	50314.34	50324.07	46174.12
Cost 'B'	70108.52	83610.10	84502.51	79407.04
Cost 'C'	99921.52	96187.10	88594.51	94901.04
Profit at				
Cost 'A'	92390.09	43615.09	54159.56	63388.25
Cost 'B'	60165.53	55212.82	57209.62	57529.33
Cost 'C'	30352.53	42635.82	53117.62	42035.33
Production (q)	108.54	179.72	181.25	156.50
Gross returns	130274.05	138822.92	141712.13	136936.37
B:C ratio	1.30	1.44	1.60	1.44

From the table, per hectare total yield obtained from guava at the overall level was 156.50 quintals. Among the size of holdings, the per hectare yield was 108.54 quintals, 179.72 quintals and 181.25 quintals in small, medium and large size groups, respectively. It indicates that the per hectare yield of Guava increased with an increase in the size of holdings.

The gross income received from Guava was observed to be Rs. 132567.29, Rs. 138822.92 and Rs. 141712.13 in small, medium and large size groups, respectively, while an overall level, it was Rs. 136936.37. The gross returns also depicted the similar trend as that of per hectare yield [6].

The per hectare net profit at cost 'A' was highest in small group (Rs. 92390.09) followed by large group (Rs. 54159.56) and medium group (Rs. 43615.09). At the overall, it was Rs. 63388.25. The net returns at cost 'C' were highest in large group (Rs. 53117.62), followed by medium group (Rs.

42635.82) and small group (Rs. 30352.53) respectively. At the overall level, it was Rs. 42035.33. The per hectare net profit increased at increasing size of groups [7].

## CONCLUSION

At the overall level B:C ratio was 1.44 and it was highest in large group (1.60), followed by medium (1.44) and small groups (1.30) respectively; it is indicated that the per unit cost of cultivation is declining as size group increases and that the results into the more profitability in large size group. From the cost of cultivation, it was revealed that cultivation of Guava is more beneficial for farmers in the study area. But since it is a perennial crop, one has to wait for five years for first yielding of Guava. This problem could be better managed by cultivating intercrops in guava plantations.

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