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A study on Economic Feasibility of Small cardamom cultivation in Tamil Nadu

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Abstract

In Tamil Nadu, small cardamom is cultivated across 10 districts, out of which, Theni district accounts 37 per cent of both the cultivation area and production in the state. This trend highlights the disparity between increased cultivation area and declining production, emphasizing the need for further analysis and intervention to address the factors contributing to this discrepancy. Assessing the economics of small cardamom production involves establishment costs, maintenance costs, and economic feasibility. However, the computation of the cost of cultivation, particularly for perennial crops like cardamom with long gestation periods, could be contentious. Estimating imputed costs such as family labour further complicates the calculation of the cost of cultivation of agricultural produce. In this context, an effort has been made to estimate the cost of production of cardamom in the Theni district. Additionally, an endeavour has been made to determine the relative profitability of cardamom using various methods including cost benefit analysis (BCR), net present value (NPV), and internal rate of return (IRR).

Key words : Small Cardamom, Growth rate, Cost of cultivation, and Benefit-cost analysis.

Cardamom, a key spice primarily grown in tropical regions. Guatemala leading in production, followed by India. Global production in 2021-22 reached around 62,000 MT (eventellglobal.com). India holds the largest share of cardamom-growing area (27.79 per cent) at world level[4]. Kerala is the primary producer of cardamom (70 per cent), followed by Karnataka (20 per cent) and Tamil Nadu (10 per cent). In 2023, total small cardamom production in Tamil Nadu stood at 1466 tonnes. However, there was a slight increase in cardamom production in 2023 compared to 2022 (Spices Board). Cardamom cultivation spans across several districts in Tamil Nadu including Theni, The Nilgiris, Coimbatore, Dindigul, Salem, Kanyakumari, Tirunelveli, and Namakkal. Theni district

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accounts for 25 per cent share of the total area under cardamom cultivation in the state. Coimbatore and Nilgiris, along with Kanyakumari districts, collectively contribute 45 per cent to the total production volume of cardamom. But Theni district specifically contributes 15 per cent to the overall production volume. However, production volume has decreased due to factors like poor rainfall, replantation, pest attacks, and unregulated agricultural practices. (Spice Board) India, Guatemala, and Indonesia are the major supply sources of cardamom in the international market with a share of more than 85 per cent of the global trade in the commodity. A significant share of the cardamom produced in the country originates from small holdings and hence the trade and market performance of the crop is important for the livelihood security of the primary producer of the commodity. Being a globally traded commodity, the trade competitiveness of cardamom is the key factor in shaping the crop economy in terms of competitiveness and guiding resource allocation decisions by farmers. Apart from price instability which affects farm business income for cardamom producers, the export demand for cardamom can also significantly influence the cardamom economy. Hence the analysis of the area, production, and price of small cardamom is essential to know the status of the cardamom sector in Tamil Nadu. For the preparation of the manuscript relevant literature[1-9] has been consulted.

Objectives

1. To analyse the trend in area and production of small cardamom.
2. To identify the economic feasibility of small cardamom cultivation.

The present study is based on both primary and secondary data. Theni district was purposively selected for the study. A list of cardamom growers was obtained from the records of Department of horticulture and cardamom growers association. From this list 30 growers were selected randomly to collect the details on establishment cost, maintenance cost and returns from cardamom cultivation. The primary data were collected through personal interview method by contacting individual selected cardamom growers. The secondary data on area under cardamom and production of cardamom were collected from the official websites of Spice Board and official website of Tamil Nadu. The collected data were analysed using the following econometric tools.

Growth rate analysis :

The compound growth rate was computed using the exponential growth model.

$$Y = a\ b^t$$

Where, Y=Area/production in year 't', a= Constant, b = Regression co-efficient, t = Time in years.

The Compound Growth Rate (CGR) is given as

CGR = [(Antilog of b)-1] *100

Costs :

The cost incurred for the cultivation of small cardamom was collected from respondents for different years. Since the crop life period in the study area is 10-15 years, the first-year cost was taken as establishment cost. Both establishment cost and maintenance cost were identified and split into two categories *i.e.*, cost of labour for different activities and

cost of materials used in the cultivation of small cardamom.

Establishment cost :

Expenditure on land preparation, pit making, soil filling, seedling, fertilizer, planting, and irrigation were considered in estimating the establishment cost which is incurred one time, in the first year.

Maintenance cost :

The annual operational cost generally includes expenditure on human labour, organic manures, inorganic fertilizers, plant protection chemicals, and irrigation charges and these costs reoccur every year. Investment analysis Since small cardamom is a perennial crop, the estimation of the unit cost of production is difficult compared to annual crops. Hence, to analyse the profitability of small cardamom, discounted financial evaluation measures like Net Present Value (NPV), Benefit Cost Ratio (BCR), and Internal Rate of Return (IRR) were used for the present study.

a. NPV = $\sum$ Present worth benefit - $\sum$ Present worth cost

b. BCR = $\sum$ Present worth benefit / $\sum$ Present worth cost

c. IRR = $$\text{Lowest Discount Rate} + \text{Diference between two discount rate} \left(\frac{\text{NPV at lower discount rate}}{\text{Absolute difference between two NPV at lower discount rates}} \right)$$

The obtained results are discussed in three sections viz., Growth rate analysis, Cost of cultivation, and Investment analysis.

1. *Growth rate in area and Production of Small Cardamom in* Tamil Nadu *:*

Tamil Nadu stood in the third position in the area under Small Cardamom over the study period of 10 years. The results are presented in Table-1, and CGR for area and production of Small Cardamom in Tamil Nadu are -0.005 and 0.056 per cent respectively. It could be observed that, Production of Small Cardamom shows a steady increase from 850 metric tonnes to 1,466 metric tonnes during 2013-14 to 2022-23. Whereas, area under Small Cardamom cultivation shows a declining area under cultivation over the years in the study period.

Table-1. Area and production of Small Cardamom in Tamil Nadu

Year	Area (in ha.)	Production (in MT)
2013-14	5,160	850
2014-15	5,160	950
2015-16	5,160	950
2016-17	5,160	975
2017-18	5,115	850
2018-19	5,115	715
2019-20	5,162	540
2020-21	4,912	1,372
2021-22	4,912	1,373
2022-23	4,930	1,466
CGR	**-0.005**	**0.056**

The trend line (fig. 1&2) for the area of small cardamom in Tamil Nadu showed that

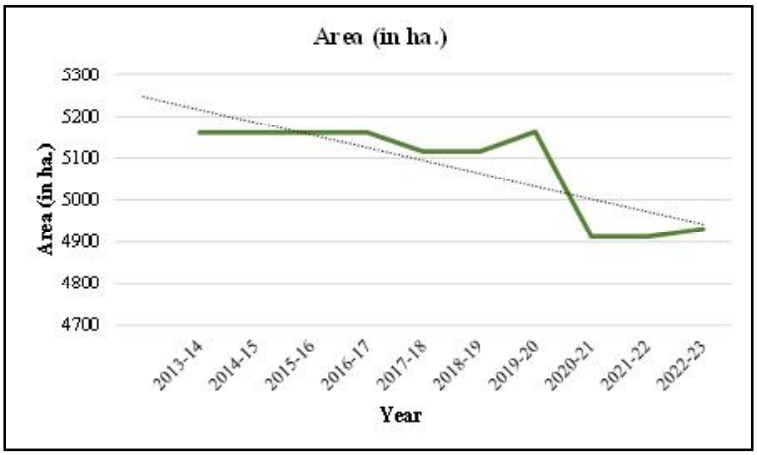

Figure 1. Area under Small Cardamom in Tamil Nadu

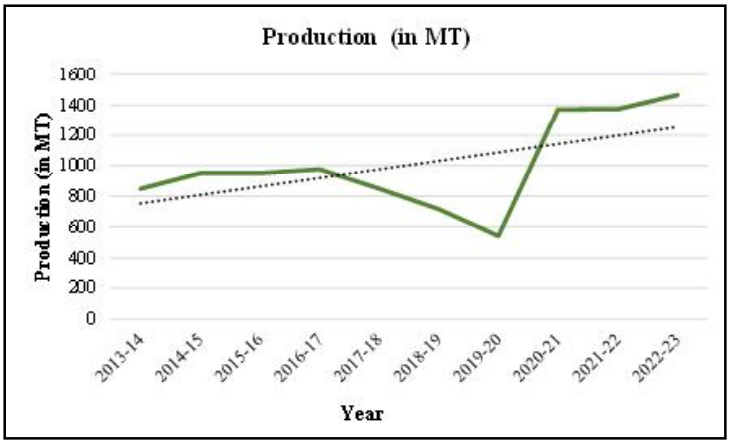

Figure 2. Production of Small Cardamom in Tamil Nadu

there was a decreasing trend after the year 2021 whereas, trend line for production showed that, more or less constant trend in the early years and then showed increasing trend after 2020-21.

District wise data on area under small cardamom and its production for the year 2020-21 was collected and analysed using percentage analysis. The results are summarised in Table-2.

It could be seen that the small cardamom was cultivated in 10 districts of Tamilnadu viz., Theni, The Nilgiris, Coimbatore, Virudhunagar, Dindigul, Tirunelveli, Salem, Tenkasi, Kanyakumari, and Namakal due to the suitable soil and weather condition prevailing in these districts. Among the districts, Theni occupied 37 per cent of the area with 37 per cent of production followed by The Nilgiris and Coimbatore, and these three districts were recognized as major districts suited for the

Table-2. District-wise Area and Production of Small Cardamom (2020-21)

S.no	Districts	Area (in ha.)	Production (in tonnes)
1.	Theni	1,492 (37.01)	135 (36.88)
2.	Nilgiris	900 (22.32)	81 (22.13)
3.	Coimbatore	813 (20.16)	74 (20.21)
4.	Virudhunagar	329 (8.16)	30 (8.19)
5.	Dindigul	240 (5.95)	22 (6.01)
6.	Tirunelveli	112 (2.77)	10 (2.73)
7.	Salem	40 (0.99)	4 (1.09)
8.	Tenkasi	33 (0.81)	3 (0.81)
9.	Kanyakumari	21 (0.52)	2 (0.54)
10.	Nammakal	51 (1.26)	5 (1.36)
Total		**4,031 (100.00)**	**366 (100.00)**

Figures in parentheses indicate the percentage to total

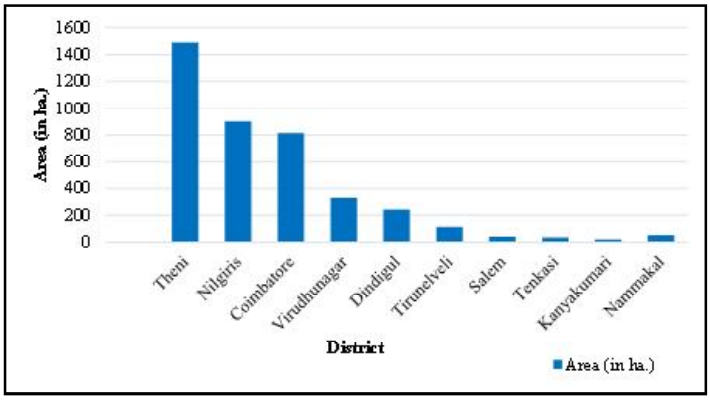

Figure 3. Area under Small Cardamom in Major Districts in Tamil Nadu

production of small cardamom. The lowest percentage (0.53) of the area was seen in the Kanyakumari district with the lowest production (0.56 per cent) for the year 2020-21. The results are depicted in Figs 3 and 4.

2. *Cost of cultivation of Small cardamom :*

Cost of cultivation and maintenance costs of small cardamom is presented in Tables 3 and 4 respectively. The table revealed that the average total cost incurred to establish one hectare of small cardamom estate in the first year was Rs. 3,05,885 of which, the cost of labour for various activities occupied 54 per cent and the cost of materials occupied 46 percent of total cost. The cost of labour for taking pits occupied first position (12 per cent) in the total cost followed by plant protection (8.49 per cent) and weeding (7.98 per cent).

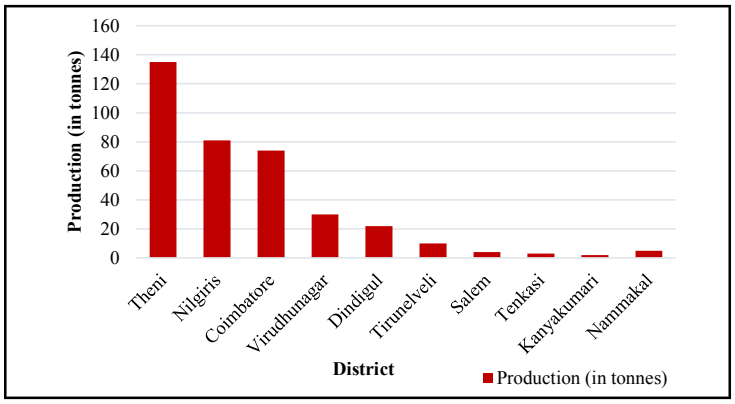

Figure 4. Production of Small Cardamom in Mmjor Districts Tamil Nadu

Table-3. Cost of Cultivation of Small Cardamom (in Rs. per ha.)

S. no	Particulars	I Year	II Year
I	**Cost of Labour**		
1.	Cleaning site	19,000 (6.21)	-
2.	Marking lines	3,600 (1.18)	-
3.	Shade regulation	11,000 (3.60)	6,600 (2.31)
4.	Taking pits	36,800 (12.03)	-
5.	Filling pits	18,200 (5.95)	4,400 (1.54)
6.	Planting/Staking/mulching	12,600 (4.12)	-
7.	Manuring	13,600 (4.45)	22,400 (7.84)
8.	Weeding	24,400 (7.98)	31,600 (11.07)
9.	Plant protection	26,000 (8.49)	21,600 (7.56)
10.	Irrigation	-	30,800 (10.79)
11.	Gap filling	-	3,600 (1.26)
12.	Harvesting and cleaning	-	52,000 (18.21)
13.	Trashing	-	6,000 (2.10)
	Sub total	**1,65,200 (54.01)**	**17,90,00 (62.68)**
II	**Cost of Materials**		
14.	Cost of planting material	44,000 (14.38)	4,400 (1.54)
15.	FYM	30,000 (9.81)	30,000 (10.50)
16.	Neem cake/Ground nut cake,	33,000 (10.79)	33,000 (11.56)
	bone meal, vermicompost, etc.,		
17.	Chemical fertilizer	12,035 (3.93)	15,314 (5.36)
18.	Chemicals + Bioagents	11,650 (3.81)	23,860 (8.36)
	(Trichoderma, Pseudomonas)		
19.	Lime	10,000 (3.27)	-
	Sub total	**1,40,685 (45.99)**	**1,06,574 (37.32)**
	Grand Total	**3,05,885 (100.00)**	**2,85,574 (100.00)**

Note: Figures in parentheses indicate per cent to total cost

Similarly, the cost of planting material was 14.38 per cent of total cost followed by neem cake and FYM. Among the cost of materials, the cost of planting material occupied first portion (31 per cent) followed by biofertilizer like neem cake, bone meal, vermicompost (23 per cent) and FYM (21 per cent). Both chemical fertilizer and plant protection chemicals occupied eight per cent of material cost.

However, the costs of those chemicals were increased in the second year but it was less than the percentage share of bio fertilizers. The percentage share of planting material in the second year was only four per cent of material cost because the farmers were filling the gap with new seedlings. The total cost of labour in the second year was Rs.1,79,000 which accounted for 63 per cent of the total cost in that year. Lime was applied in the first year only. Third year onwards the growers in the study area incurred costs only for maintaining the estate. The average maintenance cost was Rs. 4,27,118 which was split into two costs namely the cost of labour (80 per cent) and the cost of materials (20 per cent). This indicated that the cultivation of small cardamom was labour-intensive. Among the components of the cost of labour, harvesting accounted first

Table-4. Maintenance cost of Small Cardamom (in Rs. per ha.)

S.no	Particulars	Amount
I	**Cost of Labour**	
1.	Maintenance drainage and footpaths	3,000 (0.70)
2.	Shade regulation	13,600 (3.18)
3.	Digging rain water pits	18,000 (4.21)
4.	Mulching (2 times)	34,000 (7.96)
5.	Manuring	16,000 (3.75)
6.	Trashing	30,000 (7.02)
7.	Weeding	25,000 (5.85)
8.	Soil application	18,000 (4.21)
9.	Plant protection	27,000 (6.32)
10.	Irrigation (4 months with 15 days interval)	24,000 (5.62)
11.	Harvesting and processing	1,33,000 (31.14)
	Sub total	**3,41,600 (79.96)**
II	**Cost of materials**	
12.	Organic manure	40,825 (9.56)
13.	Fertilizers	19,093 (4.47)
14.	Chemicals + Bio agents	25,600 (6.00)
	Sub total	**85,518 (20.03)**
	Grand Total	**4,27,118 (100.00)**

Note: Figures in parentheses indicate per cent to total cost

i.e., 39 per cent of the total cost of labour and 31 per cent of the total maintenance cost. Among the three components of material cost, the cost of organic manure occupied first position with 48 per cent in the cost of materials and ten percent in the total maintenance cost. Chemical fertilizers were given the least importance. The total maintenance cost varies as the year passes depending on the management skill of cardamom growers which also determines the yield of cardamom. Hence, the study identified that the farmers in the study area were aware of organic manures and they used very less chemical fertilizers.

Investment Analysis :

For any perennial crop, identification of economic feasibility is essential to know the profitability of that crop. Hence, the average costs and benefits for 10 years were collected from selected respondents and analysed using discounted measures. The results are given in Table-5.

Table-5. Investment analysis of Small Cardamom

S. no	Particulars	Value
1.	NPV at 15 % discount rate	12,09,866
2.	BCR at 15 % discount rate	1.63
3.	IRR (Percentage)	76

The net present value at 15 per cent discount rate was positive and the benefit-cost ratio at 15 per cent discount rate was greater than one. The result revealed that the cultivation of small cardamom was profitable though it was labour-intensive and there was zero benefit in the first year. The internal rate of return was 76 per cent which indicated that the small cardamom cultivation would generate income up to 76 per cent of the discount rate since, at this rate, only the net present value is equal to zero and it was higher than that of the opportunity cost of capital *i.e.*, 15 per cent.

- The investment analysis revealed that, small cardamom farming generates significant returns, confirming the profitability of cultivation in the study area. Therefore, the agricultural extension system shall support farmers in achieving high profits taking the appropriate actions to advance scientific methodologies.

- Cardamom farmers face significant production challenges due to limited credit support and high rainfall variability. Hence, government may support them through providing low-interest loans, and local weather forecasts.

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