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Cost and returns structure of turmeric production in *Satara* district of Maharashtra

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ABSTRACT

Turmeric (*Curcuma longa* L.) is an important commercial spice crop and a major source of farm income in parts of Maharashtra. This study examined the cost and returns structure and economic viability of turmeric production in *Satara* district of Maharashtra. Primary data pertaining to 2025–26 were collected from 90 randomly selected turmeric growers from *Satara* and *Karad* tehsils. The sample comprised 30 farmers each in small (up to 0.20 ha), medium (0.21–0.40 ha) and large (0.41 ha and above) size groups. Standard cost concepts were used to estimate Cost A, Cost B and Cost C, while gross income, net returns and benefit-cost ratios were used to assess profitability. At the overall level, Cost A, Cost B and Cost C were ₹299,380.22, ₹393,998.06 and ₹403,001.27 per ha, respectively. Average production was 75.02 qtl per ha and gross income was ₹554,540.79 per ha. Net profit over Cost C was ₹151,539.51 per ha and the benefit-cost ratio at Cost C was 1.38, indicating economic viability of turmeric cultivation. Among farm-size groups, Cost C was highest for medium farms (₹411,545.72/ha), followed by small farms (₹405,749.41/ha) and large farms (₹397,179.58/ha). Net returns over Cost C were ₹219,031.84, ₹195,331.06 and ₹107,259.86 per ha for small, medium and large farms, respectively. The findings demonstrate that turmeric cultivation remained profitable across all farm-size groups, although profitability declined with increasing farm size in the study sample. Improved input management, timely availability of quality planting material and measures to reduce production costs are suggested for strengthening farm profitability.

Keywords: Turmeric, Cost of cultivation, Cost A, Cost B, Cost C, Gross returns, Net returns, Benefit-cost ratio, *Satara*

1. Introduction

Turmeric (*Curcuma longa* L.) is one of the important commercial spice crops cultivated in India and is valued for its culinary, medicinal, industrial and export uses. The crop provides cash income and employment to farm households and forms an important component of diversified commercial farming systems. Because turmeric requires substantial expenditure on planting material, Labor, manures, fertilizers, irrigation and plant protection, its economic performance depends on both the level and composition of production costs. Maharashtra is an important turmeric-producing state, with cultivation concentrated in several districts of Western and Vidarbha regions. *Satara* district has favourable production conditions and turmeric is cultivated as a commercial crop in selected parts of the district. However, rising input prices and variations in productivity can influence the profitability of the enterprise. Therefore, district-level estimates of cost structure and returns are useful for understanding the economic viability of turmeric cultivation and for identifying opportunities for improving farm-level profitability.

Previous studies have reported that turmeric cultivation is generally profitable but that the magnitude and composition of costs vary across regions and farm-size groups. *Zod et al. (2025)* [1], for example, reported an overall cost of ₹4,49,234.09 per ha in Wardha district and found benefit-cost ratios above unity across farm-size groups. *Kadte et al. (2018)* [2] documented the economics of turmeric production in Sangli district, while Paladugu Praveen *Kumar et al. (2018)* [3] reported positive net returns and input-output ratios above unity in Guntur district. A recent study in *Satara* also reported substantial expenditure on seed rhizomes, Labor, fertilizers, manures and other operational inputs. Against this background, the present study estimates the cost and returns structure of turmeric production in *Satara* district using farm-size-wise primary data.

2. Objectives

The specific objective of the study was:

To estimate the cost and returns structure and assess the economic viability of turmeric production in *Satara* district of Maharashtra.

3. Materials and Methods

3.1 Study area and sampling design

Satara district was purposively selected because of its significant area under turmeric cultivation in Western Maharashtra. Satara and Karad tehsils were selected purposively on the basis of maximum area under turmeric cultivation. Three villages from each selected tehsil were selected, namely Vadgaon, Kalwade and Belwade from Karad and Limb, Shivthar and Malgaon from Satara. Five turmeric growers were randomly selected from each of three farm-size groups in each village, giving a total sample of 90 farmers. The size groups were: small (up to 0.20 ha), medium (0.21–0.40 ha) and large (0.41 ha and above), with 30 farmers in each group. The methodology and sampling design are documented in the supplied thesis methodology file.

Primary data were collected through personal interviews using a pre-tested structured schedule. The study used data for the agricultural year 2025–26. The source methodology states that the schedules covered socio-demographic characteristics, land use, resource utilization, cultivation practices, cost components, returns and profitability measures.

3.2 Estimation of production costs

Production costs were estimated on a per-hectare basis using standard cost concepts. Hired Labor was valued at actual wages, while family Labor was imputed at prevailing village wage rates. Rhizomes, fertilizers and purchased manures were valued at prevailing prices or actual prices paid. Own farmyard manure was valued at prevailing village rates. Interest on working capital was charged at 6 per cent per annum and interest on fixed capital at 10 per cent. Cost A represented paid-out cultivation cost; Cost B included Cost A plus rental value of owned land and interest on fixed capital; and Cost C included Cost B plus the imputed value of family labor.

3.3 Measures of returns and profitability

Gross income was calculated as the value of turmeric output. Farm business income was measured as gross income minus Cost A, family Labor income as gross income minus Cost B, and net profit as gross income minus Cost C. The benefit-cost (B:C) ratio was calculated as gross income divided by the respective cost concept. A ratio greater than unity was interpreted as indicating economic viability.

4. Results and Discussion

4.1 Cost and returns structure

Table 1 presents the farm-size-wise cost and returns structure of turmeric production. At the overall level, Cost A was ₹299,380.22 per ha, while Cost B and Cost C were ₹393,998.06 and ₹403,001.27 per ha, respectively. Thus, the inclusion of rental value of owned land and interest on fixed capital substantially increased Cost B, while the imputed value of family Labor further increased total economic cost under Cost C.

The average production was 75.02 qtl per ha, with small farms recording the highest output (80.21 qtl/ha), followed by medium farms (79.67 qtl/ha) and large farms (70.85 qtl/ha). Gross income followed the same broad pattern, amounting to ₹624,781.25 per ha on small farms, ₹606,876.78 on medium farms and ₹504,439.44 on large farms. At the overall level, gross income of ₹554,540.79 exceeded Cost C by ₹151,539.51 per ha, indicating positive net returns.

The B:C ratio at Cost C was 1.38 at the overall level, with values of 1.54, 1.47 and 1.27 for small, medium and large farms, respectively. Thus, every rupee spent under the comprehensive Cost C generated ₹1.38 in gross income at the overall level. The B:C ratio being above unity across all size groups confirms that turmeric cultivation was economically viable under the prevailing production conditions in Satara district.

Table 1. Table 1. Farm-size-wise cost and returns structure of turmeric cultivation in Satara district

Particulars	Small	Medium	Large	Overall
Cost A (₹/ha)	287,583.19	299,253.21	302,645.90	299,380.22
Cost B (₹/ha)	393,947.33	402,507.21	388,954.23	393,998.06
Cost C (₹/ha)	405,749.41	411,545.72	397,179.58	403,001.27
Profit at Cost A (₹/ha)	337,198.06	307,623.57	201,793.54	255,160.57
Profit at Cost B (₹/ha)	230,833.92	204,369.57	115,485.21	160,542.72
Profit at Cost C (₹/ha)	219,031.84	195,331.06	107,259.86	151,539.51
Production (q/ha)	80.21	79.67	70.85	75.02
Gross income (₹/ha)	624,781.25	606,876.78	504,439.44	554,540.79
B:C ratio at Cost A	2.17	2.03	1.67	1.85
B:C ratio at Cost B	1.59	1.51	1.30	1.41
B:C ratio at Cost C	1.54	1.47	1.27	1.38

4.2 Farm-size-wise profitability

Small farms recorded the highest net return over Cost C (₹219,031.84/ha), followed by medium farms (₹195,331.06/ha) and large farms (₹107,259.86/ha). The relatively higher profitability of small farms in the present sample was associated with their higher physical output and gross income rather than with the lowest production cost. Large farms recorded the lowest production (70.85 qtl/ha), gross income (₹504,439.44/ha), net return (₹107,259.86/ha) and B:C ratio at Cost C (1.27). This suggests that increasing farm size did not automatically translate into greater profitability in the sampled turmeric enterprise, highlighting the importance of productivity and efficient cost management.

4.3 Comparison with earlier studies

The present finding of a B:C ratio greater than unity is consistent with [Zod et al. \(2025\)](#) ^[1], who reported economically profitable turmeric cultivation in Wardha district with an overall B:C ratio of 1.44 at Cost C. [Kadte et al. \(2018\)](#) ^[2] also documented the cost and returns of turmeric production in Sangli district of Maharashtra, supporting the evidence that turmeric is a remunerative commercial crop in Maharashtra. Similarly, [Paladugu Praveen Kumar et al. \(2018\)](#) ^[3] reported positive net returns and input-output ratios above unity for turmeric farms in Guntur district. Although absolute cost and return levels differ across studies because of differences in production systems, prices, productivity, sample composition and study periods, the common finding is that turmeric cultivation can remain economically viable when output and market prices are sufficient to cover comprehensive production costs.

4.4 Key Economic indicators

Table 2. Table 2. Key economic indicators of turmeric production

Indicator	Value
Overall Cost C (₹/ha)	403,001.27
Overall gross income (₹/ha)	554,540.79
Overall net profit at Cost C (₹/ha)	151,539.51
Overall production (q/ha)	75.02
Overall B:C ratio at Cost C	1.38
Highest net return by size group	Small: ₹219,031.84/ha
Lowest B:C ratio at Cost C	Large: 1.27

5. Conclusion and Policy Implications

The study established that turmeric cultivation was economically viable in *Satara* district during 2025–26. At the overall level, Cost C was ₹403,001.27 per ha against gross income of ₹554,540.79 per ha, resulting in net profit of ₹151,539.51 per ha and a B:C ratio of 1.38. Profitability was positive across all farm-size groups, although the small group recorded the highest net return and B:C ratio at Cost C. Large farms recorded comparatively lower output and profitability, indicating the need for greater emphasis on productivity and cost efficiency rather than farm size alone.

Based on these findings, extension programmes should emphasize balanced input use, timely availability of quality rhizomes, efficient Labor management and improved agronomic practices. Cost-reducing technologies and access to reliable input and output price information can further strengthen farm profitability. Future studies may incorporate multi-year farm-level data to distinguish persistent cost differences from year-specific price and yield effects.

6. Limitations of the Study

The analysis is based on primary data from 90 turmeric growers in two selected tehsils of *Satara* district for the 2025–26 agricultural year. Accordingly, the results should be interpreted as evidence for the sampled production environment and period. Year-to-year variations in output prices, input prices, weather and production conditions may influence the estimated costs and returns.

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