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**Sachin D Kambale**  
Research Scholar, National  
Institute of Abiotic Stress  
Management, Baramati,  
Maharashtra, India

**AS Gadakh**  
Ph.D. Scholar, Department of  
Agricultural Economics,  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Maharashtra, India

## Economics of production of turmeric in Akola district

**Sachin D Kambale and AS Gadakh**

### Abstract

The present study was carried out to study cost structure, returns and resource use efficiency during the year 2018-2019 based on primary data. The study was conducted in Akola, Patur and Akot tahsils based on purposive sampling. A sample of 90 turmeric growers was selected based on random sampling. It was observed that, Per hectare total cost of cultivation of Turmeric was highest in the large group i.e. Rs. (320584.94) per hectare followed by Medium group (Rs. 311907.23) and small group (Rs. 299825.93). Per hectare total cost of cultivation of turmeric for overall farmers was Rs. 311663.48 /-. The average yield and gross returns per hectare increased with the increase in size of farms The benefit cost ratio of Turmeric at cost 'C<sub>3</sub>' was 1.65 in small group, 1.69 in medium group and 1.72 in large group. This indicates that, Cultivation of turmeric crop was economically profitable. The average main production was 74.12 q/ha.

**Keywords:** Economics of production, turmeric, cost of cultivation

### Introduction

Indian turmeric cultivation and production trend has increased gradually over the past decades and also area of cultivation shows an increasing trend. India accounts for about 80 percent of world turmeric production (Deepa KM). Turmeric (*Curcuma longa* L.), the ancient and sacred spice of India known as "Indian saffron", is an important commercial spice crop grown in India. It is known as the "golden spice" as well as the "spice of life" (Sahoo). India is a major supplier of turmeric to the world with more than 60 percent share in turmeric trade (Angles S). Turmeric was probably cultivated at first as a dye, and then became valued as condiments as well as for cosmetic purposes. The Arab traders took turmeric to Europe in the thirteenth century during his travels in China in 1280 (Babu N.). Use of turmeric dates back nearly 4000 years to the Vedic culture in India.

Maharashtra state in India ranks sixth in area under turmeric cultivation. (National Horticulture Board). The area under crop was 11000 hectares with production of 45000tonnes and productivity of 4.09 tonnes/ha. In Sangli district is the major turmeric production centre in Maharashtra both in area and production. Akola district is well known for growing turmeric traditionally, but during last few years area under this crop has been increased tremendously with commercial production. In Akola district area under turmeric cultivation is 179.00 ha with production 64.20 metric tonnes in year 2017-18.

### Materials and Methods

The present study was conducted in Akola district of vidarbha region of Maharashtra state for the period 2018-19. The selection of district and viz; Murtizapur, Patur and Akot tahsil was purposively made taking into consideration the availability of data since there is concentration of turmeric area in the selected tahsils. The data was collected from primary data. The selected farmers were personally interviewed and required data was collected from them by survey method through a specially designed schedule.

### Cost Concepts

The standard cost concept i.e., Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3 was used in present analysis.

**Cost A1:** All variable cost excluding family labour cost and including depreciation

**Cost A2:** Cost A1+ Rent paid for leased-in land.

**Corresponding Author:**  
**Sachin D Kambale**  
Research Scholar, National  
Institute of Abiotic Stress  
Management, Baramati,  
Maharashtra, India

**Cost B1:** Cost A1 + interest value of owned fixed capital assets (excluding land).

**Cost B2:** Cost B1 + Rental value of owned land (net of land revenue) and rent paid for leased in land.

**Cost C1:** Cost B1 + imputed value of family labour.

**Cost C2:** Cost B2 + Imputed value of family labour.

**Cost C3:** Cost C2 + marketing costs and transportation report.

### Gross and net returns

#### Gross returns

Gross return of the farmers under the present study was estimated from returns obtained from sale of main produce.

#### Net returns

Net returns were computed at different costs i.e. Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3 by deducting respective costs from the gross returns.

#### Benefit-cost ratio

It was calculated at cost A1, cost A2, cost B1, cost B2, cost C1, cost C2 and cost C3 by dividing gross income by respective cost.

### Results and Discussions

From the Table 1 it is revealed that, number of the selected farmer was 90 out of which 45 farmers belongs to small holding, 30 farmers belong to medium and 15 farmers to large size holding with average size of holding 1.36, 2.94 and 5.92 hectare respectively. The average size of holding of turmeric cultivator was 2.65 ha.

**Table 1:** Average size of holding of selected farmers (ha)

Sr. No.	Size of holding	No. of farmer selected	Average size of holdings
1	Small (Up to 2 Ha.)	45 (50.00)	1.36
2	Medium (2.01 to 4.00 Ha)	30 (33.33)	2.94
3	Large (4.01 & above)	15 (16.66)	5.92
	Total/ Overall	90	2.65

(Figures in parentheses indicate percentage to the total farmers)

#### Cost of cultivation of selected turmeric growers

The cost of cultivation is helpful for crop planning therefore in order to know the cost and profitability, the cost of cultivation of turmeric for small, medium and large farmer was workout.

#### Per hectare cost of cultivation of turmeric for Small farmer

The per hectare cost of cultivation of turmeric for small farmers was workout and presented in Table 2.

**Table 2:** Per hectare cost of cultivation of Turmeric for small farmer (Rs)

Sr. No	Item	Unit/ha	Input	Cost/Input(Rs.)	Total Cost	Percentage to total Cost C3	
		3	4	5	6	7	
1	Hired Human Labour	Male	Days	82.66	200.01	16533.33	5.51
		Female	Days	146.33	150.00	21950.00	7.32
	Subtotal					38483.33	12.84
2	Bullock Labour		(Pair Days)	9.63	511.99	4930.55	1.64
3	Machine charges		Hours	4.09	300.32	1228.33	0.41
4	Rhizomes		qtls	26.44	3000.50	79333.33	26.46
5	Manures		qtls	80.56	100.23	8074.53	2.69
6	Fertilizer	N	Kg.	180.15	24.12	4345.22	1.45
		P	Kg.	84.56	32.15	2718.60	0.91
		K	Kg.	82.26	22.15	1822.06	0.61
7	Irrigation charges	(Rs.)				3325.00	1.11
8	Plant Protection	(Rs.)				5000.00	1.67
9	Incidental charges	(Rs.)				160.55	0.05
10	Repairing Charges	(Rs.)				180.00	0.06
11	Working Capital (1 to 10)	(Rs.)				149601.50	49.90
12	Int.on wor.Cap. @ 6% /annum	(Rs.)				8976.09	2.99
13	Depreciation	(Rs.)				903.05	0.30
14	Land Rev. cess & other taxes	(Rs.)				169.22	0.06
15	COST "A1" (Items 11 to 14)					159649.86	53.25
16	Rental Value Leased in land	(Rs.)				0.00	0.00
17	COST "A2" (Items 15 to 16)					159649.86	53.25
18	Int. on Fix.Cap. @ 10%/annum	(Rs.)				3182.22	1.06
19	COST "B1" (Items 17 + 18)					162832.08	54.31
20	Rental Value of Land	(Rs.)				82223.07	27.42
21	COST "B2" (Items 19 to 20)	(Rs.)				245055.15	81.73
22	Family Human Labour	Male	Days	93.94	200.02	18788.88	6.27
		Female	Days	58.16	149.12	8725.00	2.91
	Subtotal					27513.88	9.18
23	Cost " C1 " (Items 19+22)	(Rs.)				190345.96	63.49
24	Cost " C2 " (Items 21+22)	(Rs.)				272569.03	90.91
25	10% of" Cost C2"	(Rs.)				27256.90	9.09
26	Cost" C3"	(Rs.)				299825.93	100.00
27	Yield per hectare	(Rs.)		70.12	7050.11	494353.71	
28	Per qtl. cost of main produce at Cost C3	(Rs.)				3887.18	

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

Table 2 revealed that per hectare cost of cultivation of turmeric for small farmer was Rs. 299825.93 /-. The major item was rental value of land (27.42 percent) followed by rhizomes (26.46), hired human labour (12.84) percent, family human labour (9.18) manures (2.69) percent share to cost C<sub>3</sub> respectively. The percent share of Cost A<sub>2</sub> and Cost B<sub>2</sub> were Rs 53.25 percent and Rs. 81.73 percent in total cost

respectively.

### Per hectare cost of cultivation of turmeric for Medium farmers

The per hectare cost of cultivation of turmeric for Medium farmers was workout and presented in Table 3

**Table 3:** Per hectare cost of cultivation of Turmeric for medium farmers (Rs)

Sr. No	Item	Unit/ha		Input	Cost / Input(Rs.)	Total Cost	Percentage to total Cost C <sub>3</sub>
1	2	3	4	5	6	7	8
1	Hired Human Labour	Male	Days	80.78	200.00	16156.66	5.18
		Female	Days	142.38	150.00	21356.25	6.85
	Subtotal					37512.91	12.03
2	Bullock Labour		(Pair Days)	7.20	539.35	3883.33	1.25
3	Machine charges		Hours	5.42	300.27	1627.50	0.52
4	Rhizomes		qtls	27.04	3101.89	83875.00	26.89
5	Manures		qtls	100.12	100.56	10068.07	3.23
6	Fertilizer	N	Kg.	182.36	24.58	4482.41	1.44
		P	Kg.	85.56	32.95	2819.20	0.90
		K	Kg.	84.16	21.95	1847.31	0.59
7	Irrigation charges	(Rs.)				3621.33	1.16
8	Plant Protection	(Rs.)				5000.00	1.60
9	Incidental charges	(Rs.)				171.50	0.05
10	Repairing Charges	(Rs.)				192.50	0.06
11	Working Capital (1 to 10)	(Rs.)				155101.06	49.73
12	Int.on wor.Cap. @ 6% /annum	(Rs.)				9306.06	2.98
13	Depreciation	(Rs.)				1066.66	0.34
14	Land Rev. cess & other taxes	(Rs.)				171.81	0.06
15	COST "A1" (Items 11 to 14)					165645.59	53.11
16	Rental Value Leased in land	(Rs.)				0.00	0.00
17	COST "A2" (Items 15 to 16)					165645.59	53.11
18	Int. on Fix.Cap. @ 10%/annum	(Rs.)				3472.50	1.11
19	COST "B1" (Items 17 + 18)					169118.09	54.22
20	Rental Value of Land	(Rs.)				87536.86	28.07
21	COST "B2" (Items 19 to 20)	(Rs.)				256654.95	82.29
22	Family Human Labour	Male	Days	93.06	200.02	18613.33	5.97
		Female	Days	55.22	149.12	8283.75	2.66
	Subtotal					26897.08	8.62
23	Cost " C1 " (Items 19+22)	(Rs.)				196015.17	62.84
24	Cost " C2 " (Items 21+22)	(Rs.)				283552.03	90.91
25	10% of" Cost C2"	(Rs.)				28355.20	9.09
26	Cost"C3"	(Rs.)				311907.23	100.00
27	Yield per hectare	(Rs.)		74.12	7100.00	526252.00	
28	Per qtl. cost of main produce at Cost C <sub>3</sub>	(Rs.)				3825.58	

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

It is observed from the table that the per hectare cost of cultivation i.e. Cost C<sub>3</sub> was Rs. 311907.23 /-. Among the different items of expenditure rental value of land accounted highest (28.07%) share in total cost C<sub>3</sub> followed by rhizomes (26.89) hired human labour (12.03%), family labour (8.62) Manure (3.24%), Fertilizer (2.94%) and of the total cost. The

per hectare yield obtained by the farmer was (74.12) quintal.

### Per hectare cost of cultivation of turmeric for large farmers

The per hectare cost of cultivation of turmeric for Large farmers was workout and presented in Table 4

**Table 4:** Per hectare cost of cultivation of Turmeric for Large Farmer (Rs)

Sr. No	Item	Unit/ha		Input	Cost / Input(Rs.)	Total Cost	Percentage to total Cost C <sub>3</sub>
1	2	3		4	5	6	7
1	Hired Human Labour	Male	Days	81.11	200.00	16222.22	5.06
		Female	Days	142.04	150.00	21306.00	6.65
	Subtotal					37528.22	11.71
2	Bullock Labour		(Pair Days)	6.81	574.72	3913.88	1.22
3	Machine charges		Hours	9.43	284.37	2681.66	0.84
4	Rhizomes		qtls	28.66	3000.00	85983.33	26.82
5	Manures		qtls	120.10	100.12	12024.41	3.75
6	Fertilizer	N	Kg.	183.23	24.12	4419.51	1.38
		P	Kg.	86.70	30.56	2649.55	0.83
		K	Kg.	86.70	22.58	1957.69	0.61
7	Irrigation charges	(Rs.)				3731.38	1.16
8	Plant Protection	(Rs.)				4733.33	1.48
9	Incidental charges	(Rs.)				190.83	0.06
10	Repairing Charges	(Rs.)				203.72	0.06
11	Working Capital (1 to 10)	(Rs.)				160017.51	49.91
12	Int.on wor.Cap. @ 6% /annum	(Rs.)				9601.05	2.99
13	Depreciation	(Rs.)				116.83	0.04
14	Land Rev. cess & other taxes	(Rs.)				181.50	0.06
15	COST "A1" (Items 11 to 14)					169916.89	53.00
16	Rental Value Leased in land	(Rs.)				0.00	0.00
17	COST "A2" (Items 15 to 16)					169916.89	53.00
18	Int. on Fix.Cap. @ 10%/annum	(Rs.)				3619.33	1.13
19	COST "B1" (Items 17 + 18)					173536.22	54.13
20	Rental Value of Land	(Rs.)				91961.87	28.69
21	COST "B2" (Items 19 to 20)	(Rs.)				265498.08	82.82
22	Family Human Labour	Male	Days	89.08	200.02	17817.77	5.56
		Female	Days	54.16	149.12	8125.00	2.53
	Subtotal					25942.77	8.09
23	Cost " C1 " (Items 19+22)	(Rs.)				199478.99	62.22
24	Cost " C2 " (Items 21+22)	(Rs.)				291440.85	90.91
25	10% of" Cost C2"	(Rs.)				29144.09	9.09
26	Cost"C3"	(Rs.)				320584.94	100.00
27	Yield per hectare	(Rs.)		77.54	7130.00	552860.20	
28	Per qtl. cost of main produce at Cost C <sub>3</sub>	(Rs.)				3758.59	

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

It is seen from the Table that per hectare expenditure of Rs. 320584.94 /- was incurred in the cultivation of turmeric as Cost C<sub>3</sub> by the cultivators. The major item of cost were rental value of land, rhizomes, hired human labour, family labour, manure, fertilizer which accounted 28.69, 26.82, 11.73, 8.09, 3.75, and 2.82 percent respectively. The per hectare yield was

(77.54) quintal.

#### Per hectare cost of cultivation of turmeric for Overall farmers

The per hectare cost of cultivation of turmeric for Overall level was workout and presented in Table 5

**Table 5:** Per hectare cost of cultivation of Turmeric for Overall farmers (Rs)

Sr. No	Item	Unit/ha		Input	Cost / Input(Rs.)	Total Cost	Percentage to total Cost C <sub>3</sub>
1	2	3		4	5	6	7
1	Hired Human Labour	Male	Days	81.77	200.00	16355.92	5.25
		Female	Days	144.29	150.00	21644.86	6.94
	Subtotal					38000.78	12.19
2	Bullock Labour		(Pair Days)	8.52	527.62	4495.37	1.44
3	Machine charges		Hours	5.48	295.67	1620.27	0.52
4	Rhizomes		qtls	27.29	3033.67	82788.88	26.56
5	Manures		qtls	100.25	100.12	10037.03	3.22
6	Fertilizer	N	Kg.	182.12	24.25	4416.41	1.42
		P	Kg.	85.25	31.12	2652.98	0.85
		K	Kg.	84.10	22.14	1861.97	0.60
7	Irrigation charges	(Rs.)				3491.50	1.12
8	Plant Protection	(Rs.)				4955.55	1.59
9	Incidental charges	(Rs.)				171.47	0.06
10	Repairing Charges	(Rs.)				192.56	0.06
11	Working Capital (1 to 10)	(Rs.)				154684.77	49.63
12	Int.on wor.Cap. @ 6% /annum	(Rs.)				9281.09	2.98
13	Depreciation	(Rs.)				1013.22	0.33

14	Land Rev. cess & other taxes	(Rs.)				178.46	0.06
15	COST "A1" (Items 11 to 14)					165157.54	52.99
16	Rental Value Leased in land	(Rs.)				0.00	0.00
17	COST "A2" (Items 15 to 16)					165157.54	52.99
18	Int. on Fix.Cap. @ 10%/annum	(Rs.)				3407.38	1.09
19	COST "B1" (Items 17 + 18)					168564.92	54.09
20	Rental Value of Land	(Rs.)				87530.21	28.08
21	COST "B2" (Items 19 to 20)	(Rs.)				256095.13	82.17
22	Family Human Labour	Male	Days	93.78	200.02	18757.40	6.02
		Female	Days	56.51	149.12	8477.91	2.72
	Subtotal					27235.31	8.74
23	Cost " C1 " (Items 19+22)	(Rs.)				195800.23	62.82
24	Cost " C2 " (Items 21+22)	(Rs.)				283330.44	90.91
25	10% of" Cost C2"	(Rs.)				28333.04	9.09
26	Cost"C3"	(Rs.)				311663.48	100.00
27	Yield per hectare	(Rs.)		74.12	7100.00	526252.00	
28	Per qtl. cost of main produce at Cost C3	(Rs.)				3822.59	

(Figures in parentheses indicates the percentage to cost C<sub>3</sub>)

It is seen from the Table that the overall level the cost of cultivation was Rs. 311663.48 /-. The major item contributed to total cost C<sub>3</sub> were Rental value of land (28.08 percent), Followed by followed rhizomes(26.56) hired human labour (12.69 percent),family labour(8.74) Manure(3.22 percent), fertilizer (2.87). The average main production was (74.12)

q/ha.

#### Per hectare cost and returns from Turmeric

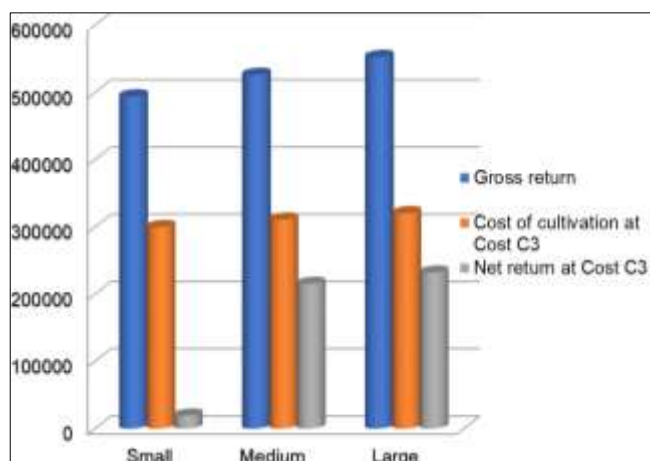
The per hectare cost and return of the turmeric was workout for small, medium and large farmers were presented in Table 6

**Table 6:** Per hectare cost and returns from Turmeric (Rs)

Sr. No.	Particulars	Small	Medium	Large	Overall
1	Main produce (q/ha)	70.12	74.12	77.54	74.12
2	Value of Main Produce	494353.71	526252.00	552860.20	526252.00
3	Gross Return	494353.71	526252.00	552860.20	526252.00
<b>4 Cost of Cultivation at</b>					
	Cost "A1"	159649.86	165645.59	169916.89	165157.54
	Cost "A2"	159649.86	165645.59	169916.89	165157.54
	Cost "B1"	162832.08	169118.09	173536.22	168564.92
	Cost "B2"	245055.15	256654.95	265498.08	253842.24
	Cost "C1"	190345.96	196015.17	199478.99	195800.23
	Cost "C2"	272569.03	282599.60	291440.85	281077.55
	Cost "C3"	299825.93	310859.56	320584.94	309185.31
<b>5 Return at</b>					
	Cost "A1"	334703.85	360606.41	382943.31	361094.46
	Cost "A2"	334703.85	360606.41	382943.31	361094.46
	Cost "B1"	331521.63	357133.91	379323.98	357687.08
	Cost "B2"	249298.57	269597.05	287362.12	272409.76
	Cost "C1"	304007.75	330236.83	353381.21	330451.77
	Cost "C2"	221784.69	243652.40	261419.35	245174.45
	Cost "C3"	194527.79	215392.44	232275.26	217066.69
<b>6 Output input ratio at</b>					
	Cost "A1"	3.10	3.18	3.25	3.19
	Cost "A2"	3.10	3.18	3.25	3.19
	Cost "B1"	3.04	3.11	3.19	3.12
	Cost "B2"	2.02	2.05	2.08	2.07
	Cost "C1"	2.60	2.68	2.77	2.69
	Cost "C2"	1.81	1.86	1.90	1.87
	Cost "C3"	1.65	1.69	1.72	1.70

The Table 6 indicates that the per hectare production of turmeric for small medium and large farmer was 70.12, 74.12 and 77.54 quintal respectively. At overall level it was 74.12 q/ha. The average per hectare net return received by the small, medium and large cultivator was Rs. 194527.79/- Rs. /-

215392.44and Rs. 232275.26/-. At an overall the net returns were Rs. 217066.69/-. The input-output ratio at cost C<sub>3</sub> was 1.65, 1.69 and 1.72 for small, medium and large farmer respectively. The overall input-output ratio was 1.70. It indicates that the turmeric cultivation was profitable.



**Fig 1:** Per hectare cost and returns from turmeric

### Conclusions

1. The per hectare total cost of cultivation of Turmeric i.e., cost 'C<sub>3</sub>' was highest in the large size group i.e., 320584.94 per hectare followed by medium size group (310859.56) and small size group (299825.93) respectively. The average yield and gross returns per hectare increased with the increase in size of farms.
2. The benefit cost ratio of Turmeric at cost 'C<sub>3</sub>' was 1.65 in small group, 1.69 in medium group and 1.72 in large group. This indicates that, Cultivation of Turmeric crop was economically profitable.

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