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**Viraja CV**

Department of Agricultural Economics, N.M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat, India

**Thumar VM**

Planning Officer, Directorate of Research, Navsari Agricultural University, Navsari, Gujarat, India

**Tandel VB**

Research Scholar, Department of Agricultural Economics, N.M. College of Agriculture, N.A.U., Navsari, Gujarat, India

## Cost structure and profitability of turmeric cultivation in Navsari district of South Gujarat

Viraja CV, Thumar VM and Tandel VB

**Abstract**

A study was conducted to find out the cost and returns of turmeric in Navsari District of South Gujarat. Information relating to various cost of cultivation of turmeric by the Turmeric growers was enlisted in a pre-tested interview schedule. The average cost of cultivation per hectare of turmeric was ₹ 204737. It was the highest (₹ 227790) on large farms, followed by medium farms (₹ 204925) and small farms (₹ 182338). Further, study revealed that the expenditure share of operating cost in the total cost was 82.83 percent. Among the different item of expenditure, the rhizomes 34.22 percent ranked first followed by human labour 29.42 percent, Managerial charges 10.00 percent, Interest on working capital 7.19 percent, Miscellaneous cost 3.83 percent, Irrigation 2.50 percent etc. whereas the share of Cost-B in the total cost was about 86.66 percent and likewise the share of Cost C1 in the total cost was about 90.90 percent. The average yield per hectare was 247.00 quintals which was the highest on large sized farms (270.00 qtl.) and lowest on small sized farm (220.00 qtl.) The average turmeric growers received harvest price of ₹ 1155/qtl. The highest harvest price was received by large sized farms (₹ 1210/qtl) while the lowest was in case of small sizes farms (₹ 1100/qtl). The gross income per hectare was ₹ 285285 on sample farms while the average net income per hectare was ₹ 80548. It was ranged from ₹ 59662 on small farms to ₹ 98910 on large farms. The input-output ratio was 1:1.39. The farm business income and family labour income was ₹ 115704 and ₹ 107860 respectively.

**Keywords:** cost of cultivation, net income per hectare, input-output ratio

**Introduction**

India is popularly known as the "Spice Bowl of the World" as a wide variety of spices with premium quality is grown in the country since ancient times. 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 used in diversified forms as a condiment, flavoring and coloring agent and as a principal ingredient in Indian culinary as curry powder. It is one of the multi-use products which have many valuable properties and uses. It is extensively used in food, textile, medicine and cosmetic industries<sup>[1]</sup>. India is the largest producer, consumer and exporter of turmeric in the world while, other producers are Thailand, Southeast Asian countries, Central and Latin America and Taiwan. The global production of turmeric is around 11 lakh tones per annum. India dominates the world production scenario contributing (78%) followed by China (8%), Myanmar (4%) and Nigeria and Bangladesh together contributing to (6%) of the global production. India has 222.00 thousand hectares under turmeric cultivation with a total production of 1132.00 thousand tones (2016-17). The area and production of turmeric in India is growing at the rate of 2.62 and 5.67 percent per annum during the period from 2011-12 to 2016-17. Andhra Pradesh, Tamil Nadu, Karnataka and Gujarat constitute (48.03%) share in India's total production<sup>[2]</sup>. In Gujarat, during the year 2016-17 turmeric crop was cultivated in an area of about 3711 hectares and having production of 73148.53 MT with productivity of 19.71 MT/ha. In Navsari District, during the year 2016-17 turmeric crop was cultivated in an area of about 854 hectares and having production of 19300.40 MT with productivity of 22.60 MT/ha<sup>[3]</sup>.

**Materials and Methods:** The selection of turmeric growers was made by adopting a multistage simple random sampling design with tehsils (Taluka) in the selected district as the first stage unit, villages within each talukas as the second stage unit and turmeric growers within selected villages as the third stage unit of sampling. All the 6 talukas of Navsari district were listed along with their acreage under turmeric during the year-2016-17.

**Correspondence****Viraja CV**

Department of Agricultural Economics, N.M. College of Agriculture, Navsari Agricultural University, Navsari, Gujarat, India

The number of villages selected from each of the selected taluka was decided on the basis of the relative acreage of turmeric. Total 12 villages from each of selected taluka where selected at random and 120 turmeric growers are selected.

### Cost Concepts

The cost concepts and the items of costs included under each concept are given below.

#### Cost A:

1. Value of hired human labour.
2. Value of hired bullock labour.

3. Value of owned bullock labour.
4. Value use of owned machinery.
5. Hired machinery charges.
6. Value of Rhizomes.
7. Value of manure (owned and purchased).
8. Value of fertilizer.
9. Value of insecticides and pesticides.
10. Irrigation charges.
11. Depreciation on farm buildings and implements.
12. Interest on working capital.
13. Other paid out expenses, if any.

Cost B:	Cost A plus rental value of owned land and interest on value of owned fixed capital assets (excluding land revenue).
Cost C <sub>1</sub> :	Cost B plus imputed value of family labour.
Cost C <sub>2</sub> :	Cost C <sub>1</sub> plus 10 percent of cost C <sub>1</sub> as managerial charges.

### Result and Discussion

Table 1 revealed that on an average, total cost per hectare for turmeric crop was (₹ 204737). On reviewing the size wise total cost per hectare, it can be seen that it was the highest (₹ 227790) on large farms, followed by medium farms (₹ 204925) and small farms (₹ 182338).

On an average, it was observed that rhizome accounted for 34.22 percent (₹70066.00), followed by, human labour 29.42 percent (₹ 60239.00), Managerial charges 10.00 percent (₹

18612.00), Interest on working capital 7.19 percent (₹ 14720.00), Miscellaneous cost 3.83 percent (₹ 7836.00), manures & fertilizers which accounted for 3.28 percent (₹ 6700.00), Irrigation 2.50 percent (₹ 5126.00), Tractor charges and machinery 1.92 percent (3933.00), Insect/pest.0.39 percent, depreciation percent 0.08 percent and Interest on own fixed capital 0.04 percent [3].

Factor wise distribution of total cost per hectare is exhibited in the Table 1.

**Table 1:** Input wise distribution of total cost per hectare on different size of turmeric farm

Sr. No	Items	Categories of farm											
		Small			Medium			Large			Average		
		Unit	₹	%	Unit	₹	%	Unit	₹	%	Unit	₹	%
1.	Human labour:												
	A. Family (days)	48.00	8640	4.74	55.00	9900	4.83	42.00	7560	3.32	48.33	8699	4.25
	B. Hired (days)	301.00	54180	29.71	330.00	59400	28.99	373.00	67140	29.47	334.66	60239	29.42
2	Tractor charges and machinery	11.25	4500	2.47	9.75	3900	1.90	8.50	3400	1.49	9.83	3933	1.92
3	Rhizomes (Kg.)	3000	60000	32.90	3200	70400	34.35	3500	80500	35.34	3233.33	70066	34.22
4.	Manures (carts)	2.00	2500	1.37	2.20	2750	1.34	3.00	3750	1.65	2.40	3000	1.47
5	Chemical fertilizer												
	N. (kg./ha.)	58.25			60.75			62.25			60.25		
	P. (kg./ha.)	28.75	3368	1.85	30.50	3742	1.83	30.75	3990	1.75	30.00	3700	1.81
	K. (kg./ha.)	30.00			32.25			32.00			31.42		
6	Irrigation	-	4464	2.45	-	5208	2.54	-	5704	2.50	-	5126	2.50
7	Insect/pest.	-	375	0.20	-	690	0.34	-	1350	0.59	-	805	0.39
8	Miscellaneous cost	-	6975	3.82	-	7553	3.69	-	8980	3.94	-	7836	3.83
9	Depreciation	-	132	0.07	-	147	0.07	-	185	0.08	-	155	0.08
10	IWC	-	13062	7.20	-	14732	7.19	-	16430	7.21	-	14720	7.19
11	RVOL	-	7500	4.03	-	7800	3.81	-	8000	3.51	-	7767	3.79
12	IOFC	-	66	0.04	-	74	0.04	-	92.5	0.04	-	77	0.04
13	Managerial charges	-	16576	10.00	-	18630	10.00	-	20708	10.00	-	18612	10.00
14	Cost-A	-	149556	82.02	-	168522	82.24	-	191429	84.04	-	169581	82.83
15	Cost-B	-	157122	86.20	-	176396	86.08	-	199522	87.59	-	177425	86.66
16	Cost-C <sub>1</sub>	-	165762	90.90	-	186296	90.90	-	207082	90.90	-	186124	90.90
17	Cost-C <sub>2</sub>	-	182338	100.00	-	204925	100.00	-	227790	100.00	-	204737	100.00

The various cost of cultivation, Cost-A, Cost-B Cost-C<sub>1</sub> and Cost-C<sub>2</sub> on different sized farms of turmeric are given in Table 2.

**Table 2:** Estimation of different cost per hectare

Categories of farms	Cost-A	Cost-B	Cost-C <sub>1</sub>	Cost-C <sub>2</sub>
Small	149556 (75.41)	157122 (86.26)	165762 (90.90)	182338 (100.00)
Medium	168522 (82.24)	176396 (86.08)	186296 (90.90)	204925 (100.00)
Large	191429 (84.04)	199522 (87.59)	207082 (90.90)	227790 (100.00)
Average	169581 (82.83)	177425 (86.66)	186124 (90.90)	204737 (100.00)

It was observed that Cost-A accounted about 82.83 percent of the total cost whereas the share of Cost-B in the total cost was about 86.66 percent and total cost whereas the share of Cost-C<sub>1</sub> in the total cost was about 90.90 percent. Almost similar

trend was observed on different farm size. A total investment of ₹ 204737 per hectare was required in turmeric cultivation. The table shows that, on an average yield of turmeric on selected farms was 247.00 quintals per hectare. Among the

different groups of farms, it was the highest (₹ 270 quintals) on large sized farms and lowest (₹ 220 quintals) on small farms. This may be due to timely supply of inputs and better managerial capacity of large sized farmers than medium and small sized farmers further, it was observed that on an average, turmeric growers received ₹ 1155 per quintal, which ranged from ₹ 1100 on small sized farms to ₹ 1210 on large sized farms. Farm harvest price of turmeric depends upon the quantity and quality of rhizomes size and colour as well as bargaining power of the farmers.

**Table 3:** Yield level, gross income and net income per hectare over different cost

Categories of farms	Yield (qt.)	Harvest price (₹/qtl)	Gross income (₹/ha)	Net gain over (₹/ha)			
				Cost A	Cost B	Cost-C	Cost-C <sub>2</sub>
Small	220	1100	242000	92444	84878	76238	59662
Medium	250	1155	288750	120228	112354	102454	83825
Large	270	1210	326700	135271	127178	119618	98910
All farms	247	1155	285285	115704	107860	99161	80548

On studying the data regarding net gains over different cost per hectare viz., Cost-A, Cost-B, Cost-C<sub>1</sub> Cost-C<sub>2</sub>, it was found that average net gains over paid out cost (i.e. Cost-A) was ₹ 115704 per hectare. Net gains over cost-A was the highest (₹ 135271) on large sized farms, followed by medium sized farms (₹ 120228) and small sized farms (₹ 92444). Further, net gain over Cost- C<sub>2</sub> was ₹ 80548 for all farms. It was ₹ 59662, ₹ 83825 and ₹ 98910 per hectare on small, medium and large sized farms, respectively. This leads to conclude that turmeric cultivation was found profitable proposition to the farmers in the study area. The table highlights that on an average the input-output ratio on Cost-C<sub>2</sub> was 1:1.39 and it was the highest (1:1.43) on large farms, followed by medium (1:1.41) and small farms (1:1.33). This implies that, on an average, turmeric growers realized ₹ 1.39 as against one rupee invested on turmeric production. The lower input-output ratio on small farms may be due to lack use of some input in cultivation of turmeric crop. Further, input-output ratio on cost-A, cost-B, and Cost-C<sub>1</sub> was ₹ 1.68, ₹ 1.61, ₹ 1.53 on sample farms. Both the ratio (on the basis of Cost-A, Cost-B and Cost-C<sub>1</sub>) were higher (1.71, 1.64 and 1.58) on large sized farms and lowest (1.62, 1.54 and 1.46) on small farms [5].

The input-output ratios were worked out on the basis of different cost concept and the same are presented in Table 4.

**Table 4:** Returns per rupees of investment in turmeric cultivation

Categories of farms	Input output ratio			
	Cost-A	Cost-B	Cost-C <sub>1</sub>	Cost-C <sub>2</sub>
Small	1:1.62	1:1.54	1:1.46	1:1.33
Medium	1:1.71	1:1.64	1:1.55	1:1.41
Large	1:1.71	1:1.64	1:1.58	1:1.43
All farms	1:1.68	1:1.61	1:1.53	1:1.39

**Conclusion:** The average cost of cultivation per hectare of turmeric was ₹ 204737. It was the highest (₹ 227790) on large farms, followed by medium farms (₹ 204925) and small farms (₹ 182338). The average yield per hectare was ₹ 247.00 quintals which was the highest on large farms ₹ 270.00 quintals and the lowest 220.00 quintals on small farms. The average farm harvest price was ₹ 1150/qtl. Which range from ₹ 1100/qtl. On small sized farms to ₹ 1210/qtl. On large sized farms. The gross income per hectare was ₹ 285285.00 on sample farms while the average the net income per hectare was ₹ 80548.00. It was ranged from ₹ 59662.00 on small farms to ₹ 98910.00 on large farms. The input-output ratio was

Average gross income realized from one hectare of turmeric was ₹ 285285 on all farms. Among the different groups of farms, it was the lowest (₹ 242000) on small farms, large size farmers realized highest gross income (₹ 326700) and medium size farms realized ₹ 288750 per hectare of turmeric farms [4].

Details regarding yield, harvest price, gross income and net gain realized per hectare over different cost are presented in Table 3.

1:1.39. The farm business income and family labour income was ₹ 115704.00 and ₹ 107860.00, respectively.

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