



Research Article

COMPARATIVE ECONOMICS OF ORGANIC AND INORGANIC TURMERIC FARMERS IN MIDDLE GUJARAT

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Abstract: Organic farming provided higher net return as compared to inorganic farming. Gross return was 325163.00 and 245053.00 ₹/ha, respectively in organic and inorganic turmeric in middle Gujarat. The cost C₂ was 165178.67 and 168608.69 ₹/ha, respectively in organic and inorganic turmeric cultivation. Overall, it was observed that that BCR was significantly higher in organic which were 1:97 as compared to inorganic 1:1.45. So, it indicated that organic farming was more profitable than inorganic farming.

Keywords: Organic, Inorganic, Turmeric, Cost and return

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Introduction

Turmeric is *Curcuma longa*, a rhizomatous herbaceous perennial plant belonging to the ginger family Zingiberaceae, which was native to tropical South Asia. As many as 133 species of *Curcuma* had been identified worldwide. Most of them have common local names and are used for various medicinal formulations. Today, turmeric is widely cultivated in the tropics and goes by different names in different cultures and countries. In north India, turmeric is commonly called "haldi" a word derived from the Sanskrit word haridra, and in the south it is called "manjal" a word that is frequently used in ancient Tamil literature [1]. India produces nearly the world's entire turmeric crop and consumes 80 per cent of it, with its inherent qualities and high content of the important bioactive compound curcumin, Indian turmeric is considered to be the best in the world. Erode, a city in the South Indian state of Tamil Nadu, is the world's largest producer of and the most important trading centre for turmeric. It is also known as "Yellow City" "Turmeric City" or "Textile City". Sangli, a city of Maharashtra, is second only to Erode in size and importance as a production and trading site for turmeric. In Middle Gujarat, major turmeric producing districts were Dahod (18260 MT), Panchmahal (6627 MT), Mahisagar (6703 MT), Anand (2992 MT), Vadodara (3736 MT) [2].

Popularity of organic farming is increasing day by day among the farmer hence they started cultivation of crops and animal husbandry organically. But organic farmers are more or less in unorganized and scattered manner so proper data of organic farming is not available, so to find the proper compression between organic and inorganic turmeric farming this study was conducted with bellow mentioned objectives is to study the comparative economics of organic Vs inorganic farming of turmeric.

Materials and Methods

The study was confined to Middle Gujarat district only. In middle Gujarat Anand, Vadodara, Dahod, Panchmahals districts were selected. Purposive sampling technique was used to collected primary data from organic and inorganic turmeric farmers related to agricultural year 2020-21. The sample size was 80 from that 40 organic farmers were there and 40 inorganic farmers were there [3-9].

Comparative Economics / Tabular Analysis

The data collected was analysed and presented in tabular form to facilitate easy comparisons.

This technique of tabular analysis was employed for estimating the cost and return and profitability in cultivation of crops under organic as well as inorganic farming systems. The Cost Concept (CACP approach) used widely in farm management studies such as cost A, cost B, cost C₁ and cost C₂ was adopted for computing cost of cultivation and cost of production. Conventional statistical analysis such as mean, percentages, ratio etc. was used for making a comparison of general characteristics of sample farms to derive meaningful findings.

Computation of cost of cultivation

Cost A =	Value of hired human Labour + Value of bullock Labour (owned / hired) + Value of seeds (owned / purchased) + Value of manure (owned / purchased) + Value of fertilizer + Value of pesticides and insecticides + Irrigation charges + Charges for machineries (owned / hired) + Other paid out expenses if any + Depreciation on farm building and implements + Interest on working capital
Cost B =	Cost A + Rental value of owned land + Interest on fixed capital assets (excluding land)
Cost C ₁ =	Cost B + Imputed value of family labour
Cost C ₂ =	Cost C ₁ + 10 per cent of the Cost C ₁ as a managerial charges

Gross Returns

The gross returns include both incomes from main product as well as income from by product. The formula to calculate gross income is as under:

Gross Returns = Income from Main Product + Income from By-product
= (Quantity of M.P. x Price) + (Quantity of By-P x Price)

Net Returns (Profit)

Net return is also called profit. It refers to gross returns minus cost.

Net Returns over Cost A= Gross Returns-Cost A

Table-1 Comparative cost of cultivation (₹/ha)

SN	Item of cost	Unit	Organic farming		Inorganic farming	
			Physical quantity	Amount (₹)	Physical quantity	Amount (₹)
1	Human labour					
	Hired	man-days	94.72	18943.90	104.03	19737.00
	Family labour	man-days	21.32	4263.43	30.05	5625.63
	Total	man-days	116.04	23207.30	134.08	25362.60
2	Tractor	Hours	5.05	2621.83	5.45	2894.98
3	Planting Material	Kg	2393.03	71790.70	2811.85	70296.20
4	Organic Manures	Tonne	82.38	10810.30	9.56	223.27
5	Chemical Fertilizers	Kg	-	-	439.20	7905.66
6	Irrigation	No of irrigation	8.37	4158.36	6.50	3155.32
7	Plant protection			3993.75		7525.00
8	Miscellaneous			126.03		420.04
9	Herbicide					1082.40
10	Depreciation			828.00		897.00
11	Interest on WC			9255.17		9386.95
12	Interest on FC			731.03		780.08
13	Rental value of owned land			19275.00		18375.00
14	Harvesting cost			3244.83		3200.00
15	Cost A			125893.00		128500.29
16	Cost B			145899.00		147655.00
17	Cost C ₁			150162.43		153280.63
18	Cost C ₂			165178.67		168608.69

Table-2 Production and gross income of organic and inorganic farmers of turmeric

SN	Particulars	Organic farms			Inorganic farms		
		Production (q/ha)	Price (₹/q)	Gross Income (₹/ha)	Production (q/ha)	Price (₹/q)	Gross Income (₹/ha)
1	Main product	173.42	1875.00	325163.00	146.30	1675.00	245053.00

Net Returns over Cost B= Gross Returns-Cost B

Net Returns over Cost C₁= Gross Returns-Cost C₁

Net Returns over Cost C₂= Gross Returns-Cost C₂

Input – Output Ratio

Input – Output Ratio is a ratio of gross return over cost. It indicates how much gross income is obtained over one rupee of cost incurred by the farmer.

Input-Output Ratio over cost A=(Gross Return)/(Cost A)

Input-Output Ratio over cost B=(Gross Return)/(Cost B)

Input-Output Ratio over cost C₁=(Gross Return)/(Cost C₁)

Input-Output Ratio over cost C₂=(Gross Return)/(Cost C₂)

Results

From the [Table-1] item-wise cost mentioned above, were further classified into four group viz., cost A, cost B, cost C₁ and cost C₂. In case of organic farming cost A, cost B, cost C₁ and cost C₂ were 125893.00, 145899.00, 150162.43, 165178.67, respectively. While in case of inorganic farming cost A, cost B, cost C₁ and cost C₂ were 128500.29, 147655.00, 153280.63, 168608.69, respectively. It can be observed that cost C₂ was lesser in organic farming. This was mainly due to exclusion of chemicals usage and comparatively less requirement of labours.

Production and Gross Income on Organic and Inorganic Farms of Turmeric

Comparative outline of average production, price and gross income received in organic and inorganic farming [Table-2]. Results showed that average yield was 173.42 q/ha in organic farming while, in case of inorganic farming it was 146.30 q/ha. The average price received by organic farmers and inorganic farmers was 1875.00 and 1675.00 ₹/q, respectively. The average gross income received by organic farmers was 325163.00 ₹/ha while the same for inorganic farming was 245053.00 ₹/ha. Organic farming received higher gross returns as compared to inorganic farming. Obviously, the main driving factor was comparatively higher yield in organic farming and now a day people are ready to pay premium price for organic product also which is same as which is same as Shivanaiakar *et al.*, (2012) [10] studied comparative economics of organic and inorganic sugarcane in Bagalkot district of Karnataka, per acre cost of cultivation in organic farming was ₹ 45,974.50 and in inorganic farming was ₹ 54,331.82, which indicated that higher cost of cultivation in inorganic farming of sugarcane and they got net return in organic sugarcane which was ₹ 82,328 and in inorganic sugarcane was ₹ 81,360 which indicated that higher net return in organic sugarcane.

Net returns Over Different Costs of Organic and Inorganic Farmers

Result manifested from [Table-3] that net return received over cost A was 199270.00 and 116552.71 ₹/ha, over cost B was 179264.00 and 97398.00 ₹/ha, over cost C₁ was 175001.00 and 91772.37 ₹/ha and over cost C₂ it was 159984.33 and 76444.31 ₹/ha in organic and inorganic farming respectively. Explicitly, organic farming provided higher net return as compared to inorganic farming. Since, higher production and relatively lower cost of cultivation in organic turmeric farming eventually led to higher net return.

Table-3 Net returns over different costs of organic and inorganic farmers of turmeric

SN	Net Returns over	Organic farm	Inorganic farm
1	Cost A	199270.00	116553.00
2	Cost B	179264.00	97398.00
3	Cost C ₁	175001.00	91772.40
4	Cost C ₂	159984.00	76444.30

Cost of Production over Different Costs on Organic and Inorganic Farms

The average cost of production per quintal of turmeric incurred by organic and inorganic farmers are depicted in [Table-4]. It can be observed that cost of production over cost A was lower in organic farming (725.94 ₹/q) as compared to inorganic farming (878.33 ₹/q). This was mainly due to no use of chemical fertilizers, pesticides and labourers in case of organic farming.

Table-4 Cost of production over different costs on organic and inorganic farms of turmeric (₹/q)

SN	Cost of Production over	Organic farm	Inorganic farm
1	Cost A	725.94	878.33
2	Cost B	841.30	1009.26
3	Cost C ₁	865.89	1007.71
4	Cost C ₂	952.48	1152.49

Similarly, cost of production over cost B was 841.30 and 1009.26 ₹/q, over cost C₁ was 865.89 and 1007.71 ₹/q and over cost C₂ was 952.48 and 1152.49 ₹/q for organic and inorganic farming respectively. In total, it was observed that cost of production was lower in organic farming compared to inorganic farming. This was mainly due to lower cost of cultivation and higher gross income received by organic farmers.

Table-5 Benefit Cost Ratio (BCR) over different costs on organic and inorganic farms of turmeric

SN	BCR over	Organic Farms	Inorganic Farms
1	Cost A	1:2.58	1:1.91
2	Cost B	1:2.23	1:1.66
3	Cost C ₁	1:2.17	1:1.60
4	Cost C ₂	1:2.19	1:1.45

Table-6 Comparative economics of organic and inorganic farmers of turmeric

SN	Economic character		Mean value		Difference in OF over IOF		
	Item	Unit	OF	IOF	Actual	%	t-Test
Cost of cultivation							
1	Hired labour	₹/ha	18943.85	19736.99	-793.09	-4.02	-0.3358
2	Family labour	₹/ha	4263.43	5625.63	-1362.20	-24.21	-4.0761**
3	Total labour	₹/ha	23207.28	25362.62	-2155.34	-8.50	-2.8229**
4	Tractor hours	₹/ha	2621.83	2894.98	-273.15	-9.44	-3.1987**
5	Manures	₹/ha	10810.32	223.27	10587.05	4741.84	55.6525**
6	Planting Material	₹/ha	71790.72	70296.20	1494.52	2.13	2.6370**
7	Fertilizers	₹/ha	0	7905.66	-7905.66	-100	-15.31**
8	Irrigation	₹/ha	4158.36	3155.32	1003.04	31.79	8.9466**
9	Plant protection	₹/ha	3993.75	7525.00	-3531.25	-46.93	-73.5018**
10	Herbicides	₹/ha	0	1082.40	-1082.40	-100	-18.0450**
11	Harvesting	₹/ha	3244.83	3200.00	44.83	1.40	5.4904**
12	Cost C ₂	₹/ha	165178.67	168608.69	-3430.00	-2.03	-1.7570*
Cost of Production							
13	Production	q/ha	173.42	146.30	27.12	18.54	17.9577**
14	Price	₹/q	1875.00	1675.00	200.00	11.94	5.9665**
15	Gross income	₹/ha	325163.00	245053.00	80110.00	32.69	28.9528**
16	Return over C ₂	₹/ha	159984.33	76444.31	83540.02	109.28	28.3094**
16	Cost of production	₹/q	952.48	1152.49	-200.01	-16.64	-16.7505**
17	BCR	-	1.97	1.45	-	-	-

Benefit Cost Ratio (BCR) over Different Costs on Organic and Inorganic Farms of Turmeric

The average BCR over cost A, B, C₁ and C₂ was 1:2.58, 1:2.23, 1:2.17, and 1:1.97, respectively in organic farming. Whereas it was 1:1.91, 1:1.66, 1:1.60 and 1:1.45, respectively in case of inorganic farming. From results, it can be observed that higher benefit was received in organic farming compared to inorganic farming indicating organic farming proved to be more profitable than inorganic farming which is same as Tomar *et al.*, (2018) [11] studied BCR for organic ragi and maize found to be 1.08 and 1.37 which is higher than the inorganic farming 0.78 and 1.12.

Comparative Economics of Organic and Inorganic Farms of Turmeric

The actual difference between the mean of important economic characters of organic over inorganic farming was worked out and "t" test was applied to analyse whether the difference between mean is statistically significant or not. The results are depicted in [Table-6]. Overall, results revealed that the total cost of cultivation (cost C₂) incurred on in organic farming was lowered by 2.03 per cent which cost is 3430.00 ₹/ha. In case of inorganic farming, higher cost for fertilizers, herbicides etc., and therefore in inorganic farming cost C₂ is higher. It was observed that gross income received by organic farmers was significantly higher as compared to inorganic farmers. The actual difference was observed to be 80110.00 ₹/ha, which was 32.69 per cent higher. Similarly, the net return received over cost C₂ in organic farming was significantly higher as compared to inorganic farmers. The actual difference was observed that 83540.02 ₹/ha, which was 109.28 per cent higher. The cost of production incurred by organic farming was significantly lowered as compared to inorganic farming. The actual difference was 200.01 ₹/ha, which was significantly lowered by 16.64 per cent in organic farming. Overall, it was observed that that BCR was significantly higher in organic which were 1:97 as compared to inorganic 1:1.45. So, it indicated that organic farming was more profitable than inorganic farming which is same as Charyulu and Dwivedi (2010) [12] studied and their Result revealed that yield of sugarcane in conventional farming was 24333 kg/acre while in organic farming it was 27364 kg/acre. Net return received by organic farming (21256.70 ₹/acre) was comparable higher than conventional farming (15643.29 ₹/acre) and same as Sudhir (2011) [13] studied the economics of organic versus chemical farming for three crops viz., paddy, red gram, and groundnut at Andhra Pradesh. It was found that organic farmers are earning a gross income of 5, 10 and 7 per cent more compared to the inorganic farmers of paddy, red gram, and groundnut, respectively.

Conclusion

The cost incurred in hired labour, family labour, total labour and tractor cost were 4.02, 24.21, 8.50, and 9.44 per cent less in organic turmeric cultivation as compared to inorganic turmeric cultivation.

The average cost incurred in manures and planting material were 4741.84 and 2.13 per cent higher in organic turmeric cultivation as compared to inorganic turmeric cultivation. In case of fertilizers and herbicides, 100.00 per cent difference was there, as 100.00 per cent cost was higher in inorganic turmeric cultivation. Overall cost of cultivation was 2.03 per cent less in organic turmeric cultivation as compared to inorganic turmeric cultivation. In case of production, price and gross income, in organic turmeric cultivation they were 18.54, 11.94 and 32.69, respectively higher in organic turmeric cultivation. Overall, it was observed that that BCR was significantly higher in organic which were 1:97 as compared to inorganic 1:1.45, so it can be concluded that organic turmeric cultivation was more profitable as compare to inorganic turmeric cultivation after the conversion period.

Application of research: Research shows organic turmeric cultivation was more profitable as compare to inorganic turmeric cultivation after the conversion period.

Research Category: Agriculture Economics

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Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Anand, Vadodara, Dahod, Panchmahals districts

Cultivar / Variety / Breed name: Turmeric

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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