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An economic analysis of turmeric cultivation in the Bemetara district of Chhattisgarh

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Abstract
An Economic Analysis of Turmeric Cultivation in the Bemetara District of Chhattisgarh was conducted to work out the cost and return of turmeric production. The study is based on data collected from 60 farmers from berla and saza blocks of Bemetara District. The average total cost per hectare was estimated Rs. 207460 per hectare and gross return was Rs 299715 per hectare. Yield of turmeric in study area was 4.99 tonnes per hectare. The calculated family labour income and farm business income were Rs 92694.9 per hectare and Rs 110716 per hectare respectively. Highest B.C. ratio 1:1.48 was calculated for large size farmers while it was observed lowest 1:1.38 for marginal farmers.

Keywords: cost and return, B.C. ratio of turmeric, family labour income, farm business income economic analysis

Introduction
Turmeric is an important spice and medicinal plant that belongs to the family Zingiberaceae genus Curcuma. It is also known as Indian saffron. Due to its condimental and medicinal properties, turmeric plays an important role in our daily diet. India is the largest producer, consumer and exporter of turmeric in the world. In India, the production of turmeric was 11 lakh tonnes during 2019-20 and area was 2.54 lakh ha which is about 6 percent of the total area under spices in India. Turmeric can be regarded as a good cash crop for farmers of Bemetara district as its cultivation requires low technology, less capital investment, and it can be grown with comparatively less use of chemicals. Turmeric can also be grown in those lands where other horticulture crops and grains do not grow properly which is beneficial for farmers in terms of earning extra income from the sales of the crop. In spite of the spectacular expansion of turmeric farming during the last decades, still the average yield is low compared to other Asian countries. The main reasons behind such low yield are lack of improved varieties and inadequate capital availability, and lack of technical knowledge of turmeric cultivation. Keeping mind this study aims to estimate the cost and returns of turmeric production, to work out the family labour income, farm business income and benefit cost ratio.

Methods And Materials
Among 4 blocks of Bemetara district, 2 blocks (Berla and Saja) were selected on the basis of maximum area under turmeric crop in previous years. Kusmi, Sakra, Borsi, Chandi, Amlidih, and Rakhi villages were selected for collection of data. Total 60 farmers were selected for study.

Analytical framework
Cost Concept
For estimation of cost and returns the nfollowing cost concepts given by the Commission of Agricultural costs and prices (CACP) was used, which is given as:
Cost A_1= All actual expenses in cash and kind incurred in production.
Value of hired human labour
Value of bullock labour (owned & hired)
Value of machine labour (owned & hired)
Value of seed (produced & purchased)
Value of manure, fertilizer and pesticide.
Irrigation charges and land revenue.
Interest on working capital.

Cost A_2= Cost A_1 + rent paid for leased in land.
Cost B_2= A_1 + interest on value of owned capital (excluding land).
Cost B_2 = B_1 + Rental value of owned land & rent paid for leased land.
Cost C_1= B_1 + imputed value of family labour.
Cost C_2 =B_2 + imputed value of family labour (human labour at market rate or statutory minimum wage rate whichever is higher).
Cost C_3 = C_2 + managerial cost of 10% of cost C_2.

- **Total cost:** Total Variable Costs + total fixed cost.
- **Gross returns:** Output (kg) * price per kg of output (Rs).
- **Net returns:** Gross returns – total cost
- **Benefit cost ratio:** Gross return/Total cost
- **Farm business income:** Gross return – cost A.
- **Farm labour income:** Gross return – cost B.

Results and Discussion

Net income, family labour income and farm business income per hectare for different groups of farmers were calculated and represented in tabular and graphical farm in table no 1.

Table 1: Cost and returns of turmeric for different group of farms

S. No.	Particulars	Farm Size				
		Marginal	Small	Medium	Large	Overall
1	Gross cost (Rs/ha)	194004.3651	202622.9	212431.2986	220779.94	207460
2	Yield (t/ha)	4.46	4.9	5.18	5.43	4.99
3	Price (Rs/q)	6000	6000	6000	6000	6000
4	Gross return (Rs/ha)	267600	294000	312020	326040	299715
5	Net income (Rs/ha)	73595.6349	91377.0997	98788.70144	105260.06	92255.4
6	Family lab our income	73812.63	91694.0997	99280.70144	105992.06	92694.9
7	Farm business income	98443.7649	99477.0997	116180.2443	117757.53	110716
9	B.C. Ratio	1:1.38	1:1.45	1:1.47	1:1.48	1:1.44

Cost and returns over the cost concepts

The cost and returns on the basis of cost concept in the production of turmeric farms of different size groups were presented in table no 2. Cost A1, Cost A2, Cost A2+family lab, Cost B1, Cost B2, Cost C1, Cost C2 and Cost 3 were worked out at Rs.188999.14, Rs.188999.14, Rs. 196349.14, Rs.197020.12, Rs. 207020.12, Rs. 204370.12, Rs.214370.12 and Rs.235807.13 per hectare and respectively. The average income over different costs, i.e., income over costs A1, A2, A2+family lab, B1, B2, C1, C2 and C3 were Rs. 107964.65, Rs.107964.65, Rs.100614.65, Rs.102694.87, Rs. 92694.87, Rs. 95344.87, Rs. 85344.87, and Rs. 63907.86 per hectare.

Table 2: Cost concept wise income over different cost in turmeric

Particulars	Farm size				
	Marginal	Small	Medium	Large	Overall
Break-up of cost					
Cost A1	169156.2351	194522.9003	195039.7557	208282.471	188999.1405
Cost A2	169156.2351	194522.9003	195039.7557	208282.471	188999.1405
Cost A2+family labour	183106.2351	202622.9003	201339.7557	209332.471	196349.1405
Cost B1	183787.3684	192305.9003	201939.2986	210047.937	197020.1262
Cost B2	193787.3684	202305.9003	211939.2986	220047.937	207020.1262
Cost C1	197737.3684	200405.9003	208239.2986	211097.937	204370.1262
Cost C2	207737.3684	210405.9003	218239.2986	221097.937	214370.1262
Cost C3	228511.1052	231446.4903	240063.2284	243207.731	235807.1388
Income over different cost					
Income over cost A1	98443.7649	99477.09974	116180.2443	117757.529	107964.6595
Income over cost A2	98443.7649	99477.09974	116180.2443	117757.529	107964.6595
Income over A2+FL	84493.7649	91377.09974	109880.2443	116707.529	100614.6595
Income over Cost B1	83812.6316	101694.0997	109280.7014	115992.063	102694.8738
Income over Cost B2	73812.6316	91694.09975	99280.70144	105992.063	92694.87382
Income over Cost C1	69862.6316	93594.09975	102980.7014	114942.063	95344.87382
Income over Cost C2	59862.6316	83594.09975	92980.70144	104942.063	85344.87382
Income over cost C3	39088.89476	62553.50972	71156.77158	82832.2688	63907.8612

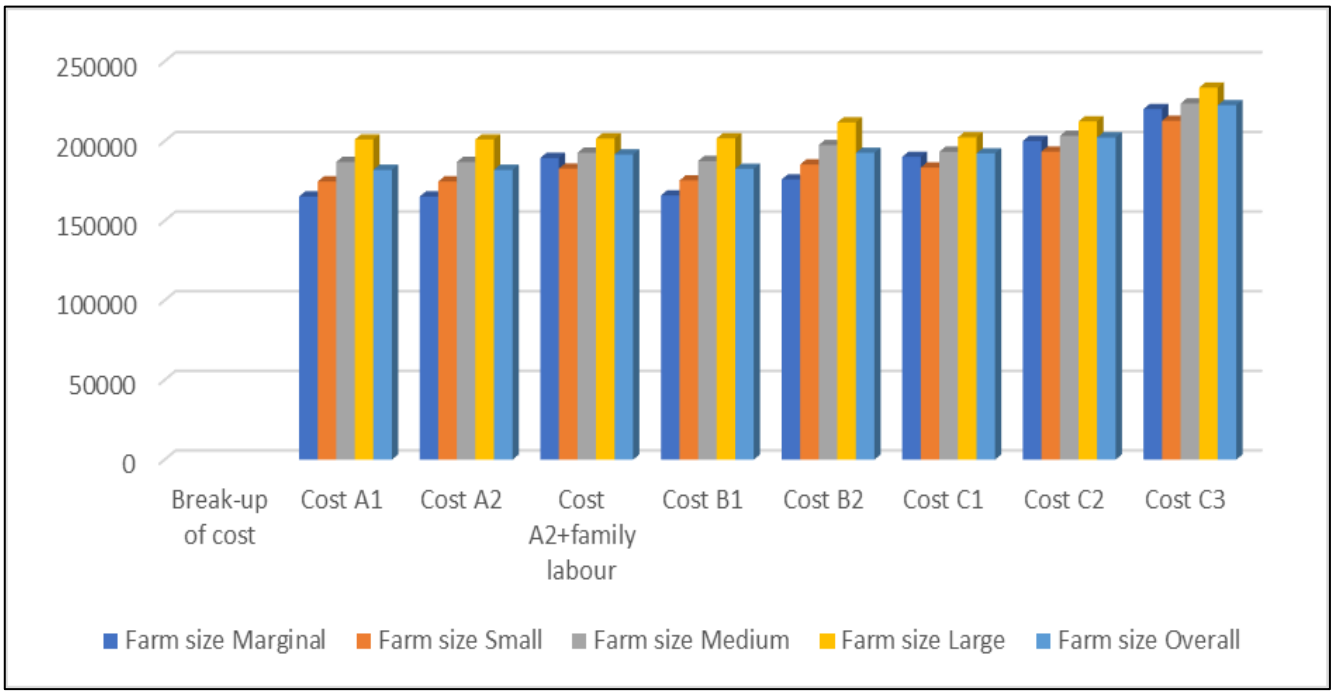

Fig 1: Cost of Different Farm Size

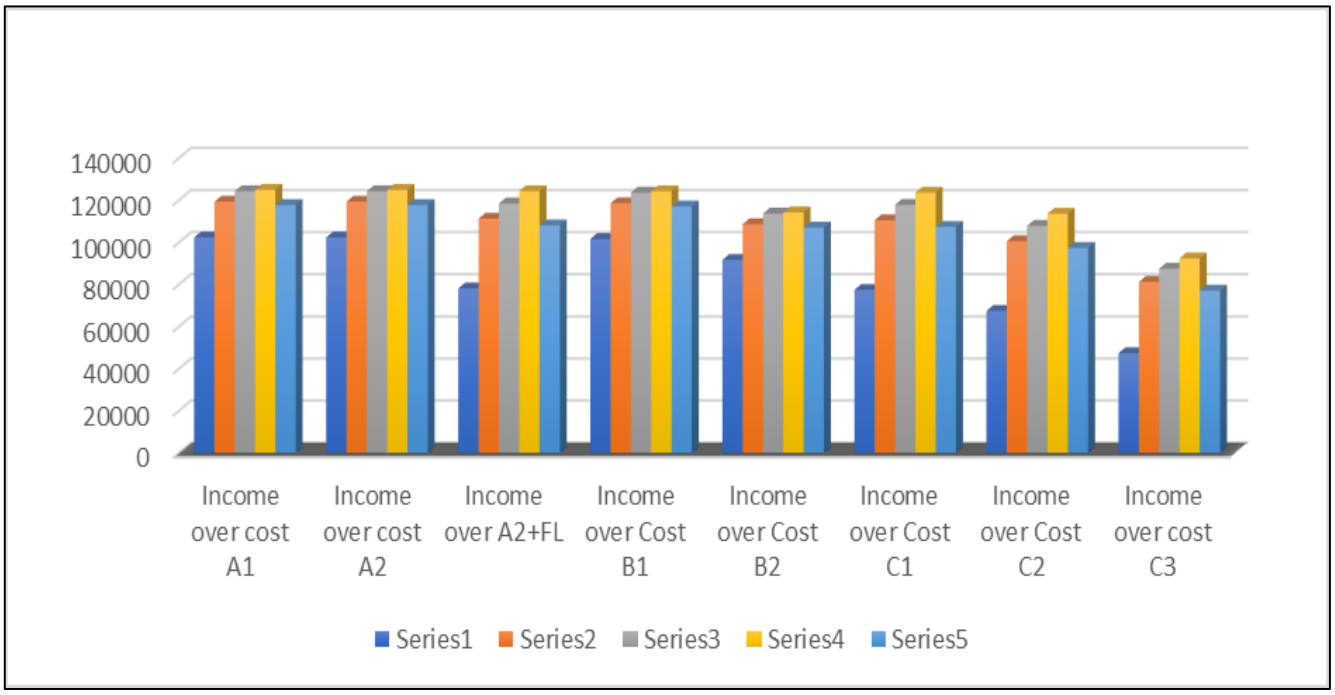

Fig 2: Different Income Over Cost

Cost and returns in turmeric cultivation

The varying cost and return of turmeric cultivation in Bemetara District were measured and depicted in table no.3.

Table 3: Cost structural of turmeric production on different size groups of farms (Rs/ha)

S. No.	Particulars		Marginal			Small			Medium			Large			Average	
	Variable cost	Unit	Quantity	Rate	Cost	Quantity	Rate	Cost	Quantity	Rate	Cost	Quantity	Rate	Cost	Quantity	Rate
A	Family labour	Man Days														
a	Land Preparation	Man Days	5.00	150.00	750.00	7.00	150.00	1050.00	5.00	150.00	750.00	1.00	150.00	150.00	4.50	150.00
b	Bed preparation	Man Days	10.00	150.00	1500.00	8.00	150.00	1200.00	5.00	150.00	750.00	1.00	150.00	150.00	6.00	150.00
c	Planting	Man Days	20.00	150.00	3000.00	8.00	150.00	1200.00	7.00	150.00	1050.00	1.00	150.00	150.00	9.00	150.00
d	Manures and fertilizers	Man Days	6.00	150.00	900.00	5.00	150.00	750.00	4.00	150.00	600.00	1.00	150.00	150.00	4.00	150.00
e	Plant protection chemicals	Man Days	11.00	150.00	1650.00	8.00	150.00	1200.00	6.00	150.00	900.00	1.00	150.00	150.00	6.50	150.00
f	Intercultural	Man Days	17.00	150.00	2550.00	5.00	150.00	750.00	6.00	150.00	900.00	1.00	150.00	150.00	7.25	150.00
g	Irrigation	Man Days	6.00	150.00	900.00	5.00	150.00	750.00	4.00	150.00	600.00	0.00	150.00	0.00	3.75	150.00
h	Harvesting	Man Days	18.00	150.00	2700.00	8.00	150.00	1200.00	5.00	150.00	750.00	1.00	150.00	150.00	8.00	150.00
	Total Family labour	Man Days	93.00	13950.00		54.00	8100.00		42.00	6300.00		6.00	1050.00		48.75	7350.00
B	Hired labour	Man Days														
a	Land Preparation	Man Days	4.00	150.00	600.00	14.00	150.00	2100.00	15.00	150.00	2250.00	18.00	150.00	2700.00	12.75	150.00
b	Bed preparation	Man Days	6.00	150.00	900.00	14.00	150.00	2100.00	15.00	150.00	2250.00	18.00	150.00	2700.00	13.25	150.00
c	Planting	Man Days	13.00	150.00	1950.00	28.00	150.00	4200.00	30.00	150.00	4500.00	37.00	150.00	5550.00	27.00	150.00
d	Manures and fertilizers	Man Days	6.00	150.00	900.00	6.00	150.00	900.00	8.00	150.00	1200.00	14.00	150.00	2100.00	8.50	150.00
e	Plant protection chemicals	Man Days	6.00	150.00	900.00	7.00	150.00	1050.00	10.00	150.00	1500.00	13.00	150.00	1950.00	9.00	150.00
f	Intercultural	Man Days	10.00	150.00	1500.00	17.00	150.00	2550.00	20.00	150.00	3000.00	26.00	150.00	3900.00	18.25	150.00
g	Irrigation	Man Days	5.00	150.00	750.00	5.00	150.00	750.00	7.00	150.00	1050.00	12.00	150.00	1800.00	7.25	150.00
h	Harvesting	Man Days	16.00	150.00	2400.00	21.00	150.00	3150.00	26.00	150.00	3900.00	30.00	150.00	4500.00	23.25	150.00
	Total Hired labour	Man Days	66.00	9900.00		112.00	16800.00		131.00	19650.00		168.00	25200.00		119.25	17887.50
1	Total labour charge		159.00	23850.00 (13.03)		166.00	24900.00 (12.99)		173.00	25950.00 (12.89)		174.00	26250.00 (12.54)		168.00	25237.50 (12.85)
2	Machine charge			5500.00 (3)			5500.00 (2.87)			5800.00 (2.88)			5800.00 (2.77)			5650.00 (2.88)
3	Planting material	qt.	2000.00	140000.00 (76.46)		2100.00	147000.00 (76.72)		2200.00	154000.00 (76.49)		2300.00	161000.00 (76.91)		2150.00	150500.00 (76.65)
4	Manures and fertilizer	Kg./ha		2500.00 (1.37)			2500.00 (1.30)			2900.00 (1.44)			2900.00 (1.39)			2700.00 (1.38)
5	Plant protection	Rs./ha		1400.00 (0.76)			1500.00 (0.78)			1700.00 (0.84)			1850.00 (0.88)			1612.50 (0.82)
6	Irrigation	Rs./ha		3500.00 (1.91)			3500.00 (1.83)			3800.00 (1.89)			3800.00 (1.82)			3650.00 (1.86)
7	Interest on working capital			6356.24 (3.47)			6718.10 (3.51)			7189.76 (3.57)			7732.47 (3.69)			6999.14 (3.56)
	Total variable cost Fixed cost			183106.24 (100)			191618.10 (100)			201339.76 (100)			209332.47 (100)			196349.14 (100)
9	Rent value of own land	Rs./ha	4 month	10000.00 (91.76)			10000.00 (90.87)			10000.00 (90.16)			10000.00 (87.36)			10000.00 (90.01)
10	Depreciation			205.00 (1.88)			305.00 (2.77)			480.00 (4.33)			720.00 (6.29)			427.50 (3.85)
11	Land revenue			12.00 (0.11)			12.00 (0.11)			12.00 (0.11)			12.00 (0.10)			12.00 (0.11)
12	Interest on fixed capital			681.13 (6.25)			687.80 (6.25)			599.54 (5.41)			715.47 (6.25)			670.99 (6.04)
	Total fixed cost			10898.13 (100)			11004.80 (100)			11091.54 (100)			11447.47 (100)			11110.48 (100)
	Total cost			194004.37			202622.90			212431.30			220779.94			207459.63

Conclusion

The average total cost of turmeric production was estimated Rs. 207459.63 per ha consisting of Rs.196349.14 variable cost and Rs. 11110.48 fixed cost. Cost of turmeric production by different groups of farmers were calculated Rs. 194004.36 per ha for marginal farmers, Rs. 202622.9 per ha for small farmers, Rs. 212431.29 per ha for medium farmers and Rs. 220779.94 per ha for Large farmers. Resourcewise the average cost of turmeric cultivation are; 7350.00 Rs per ha family labour and hired labour, 17887.50 Rs per ha, 5650 Rs per ha Machin charge, 150500 Rs per ha planting material, 2700 Rs per ha manures and fertilizer, 1612.50 Rs per ha plant protection and 3650 Rs per ha irrigation.

Yield of turmeric in study area was 4.99 tonnes per hectare. The calculated family labour income and farm business income were Rs 92694.9 per hectare and Rs 110716 per hectare respectively. Highest B.C. ratio 1:1.48 was calculated for large size farmers while it was observed lowest 1:1.38 for marginal farmers.

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