

Research Paper

Cost and Profitability Analysis of Selected Oilseed Crops: An Estimation from Karnataka

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ABSTRACT

The present study has examined the profitability of groundnut and sunflower cultivation in Karnataka during 2001-02 to 2019-20. The results indicated that the area and production of groundnut and sunflower have shown a negative growth, whereas productivity of both crops has shown positive growth for the overall study period. The cost of producing groundnut in Karnataka was found 1.7 times the production cost in Uttar Pradesh and sunflower was found 1.5 times the production cost in Andhra Pradesh. The profitability of both crops has shown negative returns during the study period (2001-02 to 2019-20). The return per rupee of investment for both crops was also less than unity. Hence, there is a need for incentive programs and Government should increase the procurement price to cover its cost of production in order to help farmers.

HIGHLIGHTS

- The groundnut and sunflower areas and production have shown negative growth during the study periods.
- Human labour constitutes a major share in both crop cultivations.
- The net returns realized from both the crops were found to be negative, indicating the non-profitability of cultivating the crops.

Keywords: Cultivation, Growth, Production, Profitability, Sunflower

Indian agriculture has achieved tremendous growth in the production and productivity of crops after independence (Narayanamoorthy, 2013). Oilseeds are among the major crops that are grown in India apart cereals and pulses and the oilseeds sector occupies an important position in the agricultural economy of the country (Jyotirmayee and Basavaraja, 2017). In India, the majority of the oilseeds are cultivated in the rainfed ecosystem. Karnataka, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, etc., are the country's major oilseed producing states. Groundnut and sunflower are the important oilseeds that are cultivated in India. Karnataka is one of the major oilseeds producing state in India. The groundnut and sunflower occupy an area of 7.32 mha and 1.21 mha with an annual

production of 7.20 mt and 1.08 mt during 2020-21, respectively.

Returns from crop cultivation are essential for the survival of farmers and they also facilitate reinvestment in agriculture. The detailed analysis of the profitability of different crops in relation to cost of cultivation over a period of time helps in assessing the profitability of crops. The National Commission on Farmers (NCF) has also recognised that inadequate return from crop cultivation is the main reason for the present agrarian crisis in India. The cost of production of oilseeds has

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increased substantially over the past few years. There is enough evidence to show that acreage allocation decisions in respect of oilseed crops have been governed by their relative profitability (Singh and Sarbjit, 1993). The area under oilseeds has experienced a deceleration in general and this is due to their relatively lower profitability against competing crops under the prevailing crop growing and marketing situations (Vinod and Abhishek, 2020). Hence, the present study attempts to find out the trends in the profitability of groundnut and sunflower crops over a period utilizing the data from the cost of cultivation survey.

METHODOLOGY

To examine the trends in the area, production, and productivity of groundnut and sunflower, the required secondary data was obtained from the Directorate of Economics and Statistics, Government of Karnataka, Bangalore for the time period from 2001-02 to 2020-21. This study also utilized the data on the cost of cultivation survey compiled from the various reports of the Directorate of Economics and Statistics, Government of Karnataka, Bangalore. The cost of cultivation data was obtained for the period from 2001-02 to 2019-20 to examine the trends in the profitability of the crops.

Compound Growth Rate Analysis

The exponential model was employed to estimate the rate of growth in the area, production, and productivity of crops.

$$Y_t = ab^t e^u \quad \dots(1)$$

Where,

Y_t : dependent variable (area/production/productivity)

a : intercept

b : regression coefficient

t : time in years, 1, 2, ..., n

u : error term

The compound growth rate (g) is computed using the relation, $g = (\text{Antilog of } \ln b - 1) * 100$, and the growth rates are expressed in terms of percent.

Profitability Analysis

The cost C2 and cost C3 were considered for computing profitability in the present study. Cost C2 covers actual expenses in cash and kind incurred in production by the producer, rent paid for leased-in land, the imputed value of family labour, and the interest on the value of owned capital assets (excluding land). Cost C3 includes all the components of cost C2 and adds 10% of cost C2 on account of managerial functions performed by the farmer. The profit of the crop is estimated by deducting the value of crop output from the cost of cultivation under two scenarios, namely (a) relating the value of output with cost C2, and (b) with cost C3 from the value of the product. The use of cost C2 and cost C3 is the correct method for calculating profitability (Narayanamoorthy, 2013). Therefore only cost C2 and C3 were used for the analysis. The profitability was calculated by using the following formulas.

$$Profit_a = \text{Value of product} - C2 \quad \dots(2)$$

$$Profit_b = \text{Value of product} - C3 \quad \dots(3)$$

$$Profitability Ratio_a = \frac{\text{Value of product}}{C2} \quad \dots(4)$$

$$Profitability Ratio_b = \frac{\text{Value of product}}{C3} \quad \dots(5)$$

RESULTS AND DISCUSSION

Growth in area, production and productivity of groundnut and sunflower

Growth rates in the area, production, and productivity of groundnut and sunflower in Karnataka for the period 2001-02 to 2020-21 are presented in Table 1. The results indicated that the area under groundnut has shown negative growth during all the study periods. Though there was a negative growth in groundnut production during the period I, the trend turned out to be positive during period II. Whereas, the sunflower area and production have shown a high negative growth during period II compared to that of the period I. The sunflower area and production have shown

a negative growth of 11.60 per cent and 8.64 per cent per annum for the overall period. The interesting fact is that positive growth in the productivity of groundnut and sunflower was observed during the overall study period. The decline in the area of oilseeds was mainly responsible for the negative growth performance of the oilseeds in the state (Saraswati *et al.*, 2012).

Table 1: Percent growth in area, production and productivity of groundnut and sunflower in Karnataka

Particulars (%)	Period I (2001 to 2010)	Period II (2011 to 2020)	Overall (2001 to 2020)
Groundnut			
Area	-0.37	-0.89	-2.72*
Production	-1.16	3.70	-0.26
Productivity	1.99	4.34*	6.39
Sunflower			
Area	-3.17	-15.31*	-11.60*
Production	-2.71	-7.83*	-8.64*
Productivity	0.47	8.57*	3.28*

Note: * denotes significant at 5 per cent.

Cost of production of groundnut and sunflower crops across the major producing states

The cost of production of groundnut and sunflower crops across the major producing states was presented in Table 2. The cost of producing groundnut per quintal varied from ₹ 3260 in Uttar Pradesh to ₹ 7270 in Maharashtra in 2019-20. Similarly, the cost of producing sunflower varied from ₹ 2719/q in Andhra Pradesh to ₹ 7977/q in Odisha in 2019-20. The cost of producing groundnut in Karnataka was 1.7 times the production cost in Uttar Pradesh and 0.8 times less than the production cost in Maharashtra. Whereas, the cost of producing sunflower in Karnataka was 1.5 times the production cost in Andhra Pradesh and 0.5 & 0.6 times less than the production cost of Odisha & Telangana, respectively. The use of production technologies and access to irrigation across the states is the region for variation in the production cost of crops. Similarly, Srivastava *et al.* (2017) reported that the large variation in the production cost of a crop across the states arises due to differences in production technology, access to irrigation, and the

level of productivity.

Table 2: Cost of production of sunflower and groundnut crops across the major producing states during 2019-20 (₹/q)

State	Groundnut	Sunflower
Andhra Pradesh	5822	2719
Gujarat	3959	—
Karnataka	5536	4211
Madhya Pradesh	5805	—
Maharashtra	7270	—
Odisha	6572	7977
Rajasthan	3628	—
Tamil Nadu	5525	—
Telangana	5765	6558
Uttar Pradesh	3260	—

Source: DES, Ministry of Agriculture, 2019-20.

Source of changes in cost of cultivation

The contribution of different inputs to the cost of cultivation from the year 2001-02 to 2019-20 has been sub-categorized into four periods and presented in Table 3. Human labour constitutes a major share in groundnut cultivation during all periods. Whereas, the share of human labour has increased from 19.56 per cent in 2001-2005 to 29.68 per cent in 2016-2019 in sunflower production. It was noticed that the share of bullock labour was decreasing and the machine labour was increasing over the years in both groundnut and sunflower production indicating the shift from animal labour towards machine use. The share of seed, fertilizer & manures, and insecticides was 17.63 percent, 6.50 percent, and 0.28 percent in groundnut production and it was 8.19 percent, 8.31 percent, and 0.70 percent in sunflower production, respectively during the period 2016-2019. The data revealed that the labour cost is the predominant source of cost of cultivation of groundnut and sunflower cultivation in Karnataka.

Share of operational and fixed costs in cost of cultivation of groundnut and sunflower

The share of operational and fixed costs in the cost of cultivation of groundnut and sunflower is given in Table 3. The operational cost constitutes around 71-76 per cent of the total cost of cultivation in groundnut while it constitutes around 70-73 per cent

Table 3: Source of changes in the cost of cultivation of groundnut and sunflower in Karnataka

Year	Share in cost of cultivation (%)									Total
	Human Labour	Bullock Labour	Machine Labour	Seed	Fertilizer & Manures	Insecticides	Others	Operational cost	Fixed cost	
Groundnut										
2001-2005	21.07	12.97	4.37	21.07	10.34	0.44	29.73	73.79	26.21	100
2006-2010	28.41	9.25	4.15	20.70	7.03	0.23	30.23	72.64	27.36	100
2011-2015	30.87	7.19	5.55	18.19	9.54	0.72	27.94	75.69	24.31	100
2016-2019	27.51	8.75	7.66	17.63	6.50	0.28	31.66	71.94	28.06	100
Sunflower										
2001-2005	19.56	18.06	6.59	10.34	11.46	0.20	33.77	71.68	28.32	100
2006-2010	26.73	14.50	7.66	10.61	9.47	0.41	30.61	72.10	27.90	100
2011-2015	28.26	9.32	13.04	8.94	9.84	0.80	29.81	72.68	27.32	100
2016-2019	29.68	7.86	12.70	8.19	8.31	0.70	32.56	70.37	29.63	100

Table 4: Cost of cultivation, value of product and profitability in groundnut crop

Year	Cost of cultivation (₹/ha)		VOP (₹/ha)	Profit (₹/ha)		Ratio	
	Cost C2	Cost C3		VOP-C2	VOP-C3	VOP/C2	VOP/C3
2001-2005	12778.48	14056.33	10545.25	-2233.24	-3511.08	0.82	0.74
2006-2010	17842.38	19626.61	16889.61	-952.77	-2737.01	0.95	0.86
2011-2015	43642.18	48006.40	39217.70	-4424.48	-8788.70	0.91	0.83
2016-2018	58639.08	64502.99	47353.67	-11285.41	-17149.32	0.81	0.74

Source: Computed from DES; Note: VOP- Value of Product.

of the total cost of cultivation in case of sunflower production. Human labour and rental value of the land were the major items of operational cost and fixed cost in both the cultivation of the crops, respectively.

Profitability in groundnut crop

Groundnut is one of the major oilseeds cultivated in Karnataka. The area under groundnut decreased from 8.55 mha in 2001-02 to 7.32 mha in 2020-21 while the production increased from 5.86 mt in 2001-02 to 7.20 mt in 2020-21. The profitability results indicate that the farmers incurred losses in all time periods (Table 4). Using cost C2 the loss varies from ₹ 952.77 to ₹ 11285.41 per ha during the time periods. Whereas, using cost C3 the loss varies from ₹ 2737.01 to ₹ 17149.32 per ha. The results of the profitability ratio showed less than unity which indicates that the farmer incurred a loss per every rupee of investment in all time periods. This result is in line with Sunandini and Devi (2020), who has indicated that the net returns of groundnut over the C2 cost of cultivation are negative. Govind et

al. (2016) in his study revealed that the return from seed production of groundnut was higher than grain production. Hence suggested to popularise seed production among the farming community to increase the profitability of groundnut cultivation.

Profitability in sunflower crop

Sunflower is an important oilseed crop that is cultivated traditionally in Karnataka. The area under sunflower decreased from 5.84 mha in 2001-02 to 1.21 mha in 2020-21 and the production from 2.62 mt to 1.08 mt. The profitability of sunflower varies substantially across different years over cost C2 (Table 5). The farmers incurred losses in all time periods. Using cost C3 for profit calculation, the losses varied from ₹ 1554.99 to ₹ 6988.63 ha⁻¹ during the time periods. The farmers incurred losses due to less remunerative of the crop. The ratio of the value of product to cost C2 and cost C3 was less than the unity during the time periods indicating the unprofitability of sunflower cultivation in Karnataka. Similarly, Sunandini and Devi (2020) reported that the sunflower cultivation was not

Table 5: Cost of cultivation, value of product and profitability in sunflower crop

Year	Cost of cultivation (₹/ha)		VOP (₹/ha)	Profit (₹/ha)		Ratio	
	Cost C2	Cost C3		VOP-C2	VOP-C3	VOP/C2	VOP/C3
2001-2005	9011.33	9912.47	8357.48	-653.85	-1554.99	0.93	0.85
2006-2010	11441.92	12586.11	10993.66	-448.26	-1592.45	0.97	0.88
2011-2015	22591.55	24850.71	19737.85	-2853.70	-5112.86	0.90	0.81
2016-2019	34179.95	37597.95	30609.32	-3570.64	-6988.63	0.90	0.82

Source: Computed from DES; *Note:* VOP- Value of Product.

profitable in Andhra Pradesh due to increased cost of cultivation, low and fluctuating yields and fluctuating farm harvest prices.

CONCLUSION

The study has revealed that the area and production of groundnut and sunflower have declined over the years. Though there was deceleration in area and production there was positive growth in productivity during overall period. The larger variation was observed in the production costs of both crops being cultivated across the state. Human labour is the predominant source of the cost of cultivation of groundnut and sunflower cultivation in Karnataka. To reduce the dependence on human labour, there is a need to develop and promote the farm mechanization technologies. The profitability analysis indicated that the farmers incurred losses in all time periods of groundnut and sunflower production. The results also indicated the unprofitability of both crop cultivations by the use of cost C2 and cost C3. Hence, there is a need for incentive programs and Government should increase the procurement price to cover its cost of production in order to help farmers.

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