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Estimation of cost of production and income over different cost of soybean in the agroclimatic zone Chhattisgarh plain

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Abstract

This study aimed at identification and estimation of cost components of soybean production as well as assessing its profitability under Soybean growers in Agro climatic zone of Chhattisgarh plain. The selected sampled districts namely Kabirdham, Rajnandgaon and Bemetara, The study relied mainly on primary data obtained by questionnaire and interview on a total number of 300 farmers across three district that constitute the plain zone of Chhattisgarh state. The average yield of soybean in the study area was 12.73 quintal per hectare which showed very satisfactory in respect to average yield of Chhattisgarh i.e. about 8.11 quintal per hectare. Over all, on an average the cost of cultivation per hectare of soybean was found to be ₹ 25579.22 per hectare. The overall gross return and net return was found to be Rs.36230.96 and Rs. 10651.74 respectively and the overall B-C ratio was observed 1.42. The incomes over different cost were also worked out. The average income over cost A₁, Cost A₂, cost B₁, cost B₂, Cost C₁ Cost C₂, and Cost C₃ were calculated as ₹ 20093.77 ₹20093.77 and ₹19827.83 ₹14212.76 ₹ 16830.95, ₹11215.88, ₹8714.37 respectively.

Keywords: Soybean, cost of production, cost of cultivation, per hectare, Chhattisgarh

Introduction

Soybean is one of the prominent leguminous oilseed crops in tropical and subtropical regions of India and this crop can grow in the wide range of climatic conditions. It is a short duration and the most sensitive crop and its response to yield varies with variety and temperature. Soybean has largely been responsible in uplifting farmer's economic status in many pockets of the country. It usually fetches higher income to the farmers owing to the huge export market for soybean de-oiled cake. India ranks fifth after USA, Argentina Brazil and China in production of soybean. In the recent past, soybean cultivation has increased manifold as compared to any other oilseed crop in India and stands next only to groundnut. India is the third largest edible oil economy in the world after USA and China. Soybean is a world's first rank crop as a source of vegetable oil and in India it occupies number one position among oilseed crops. In India, Soybean occupies an area of 10.1 m ha with production of 8.35 m t and productivity of 822 kg per ha. The major Soybean growing states are Madhya Pradesh (5.01 m ha), Maharashtra (3.44 m ha), Rajasthan (0.92 m ha) Karnataka (0.27 m ha), Andhra Pradesh (0.16 m ha) and Chhattisgarh (0.13 m ha). The total geographical area of Chhattisgarh is 13.8 m ha out of which 5.9 m ha is under cultivation. Soybean occupies 0.13 m ha with production of 0.86 lakh MT with average productivity of 654 kg/ ha (Anonymous 2016).

Chhattisgarh state is divided into three Agroclimatic zones viz Chhattisgarh Plains, Bastar Plateau and Northern Hills zone covering 51.0%, 28.0% and 21.0% of the geographical area, respectively. The location of the state is such that it is close to the Bay of Bengal, which is instrumental in bringing monsoon in the Northern part of the country. By keeping in view the resource management in soybean production, the present investigation has been undertaken to determine the resource use efficiency in soybean production. Soybean can be grown successfully during kharif season in Chhattisgarh. In recent past, cultivation of soybean has been gaining popularity in Chhattisgarh. The important soybean growing districts are Bemetara, Rajnandgaon, Durg, Raipur, Mungeli and Kawardha.

Methodology

The selection of sample was undertaken by multistage random sampling for this study.

Selection of area: Chhattisgarh state consists of three Agro climatic zones viz. Chhattisgarh Plains, Bastar Plateau and Northern Hills zone. Out of these three zones, Chhattisgarh Plain zone was selected purposively which contains sixteen districts. The study was conducted in

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three major soybean growing districts, Bemetara, Kabirdham and Rajnandgaon out of 27 district of Chhattisgarh. The two blocks were selected from each district; thereafter 2 villages from each block were selected purposively according to maximum area and production of soybean.

Selection of farmers: Twenty five respondents (Soybean grower) were selected randomly from each of the selected villages. Thus the total number of responded selected were 300. For the present study, both primary and secondary data were collected.

Primary data: Primary data were collected from sample soybean growers. The primary data were recorded regarding general information of the respondents, cropping pattern, farm resource structure and resource use pattern in soybean cultivation etc.

Secondary data: The required secondary data were collected from Department of Agriculture and other statistical data were collected from published record of Statistics Department. All the collected primary data were related to the agricultural year 2016-17.

Cost of production: Cost of production = Cost of cultivation/Quantity of Product

These are defined as under

(i) Gross income: It is defined as: total value of main product +by product.

(ii) Net farm income: It is defined as: gross income-cost 'C3'

(iii) Input-output ratio

$$\text{Input-output ratio} = \frac{\text{Gross income}}{\text{Cost of cultivation}}$$

Table 1: Analysis of cost of cultivation of soybean per hectare on the basis of cost concept

S. No.	Particulars	Farm size				Overall
		Marginal	Small	Medium	Large	
A.	Total variable cost	19759.62 (76.08)	19723.56 (75.74)	18890.7 (74.61)	18617.25 (73.51)	19134.07 (74.80)
B.	Total fixed cost	6211.02 (23.92)	6317.81 (24.26)	6427.22 (25.39)	6709.79 (26.49)	6445.15 (25.20)
C = A+B		25970.65 (100.00)	26041.37 (100.00)	25318.01 (100.00)	25327.04 (100.00)	25579.22 (100.00)

Table 2: Break-up of total cost, according to cost concept

Particular	farm size				Overall
	Marginal	Small	Medium	Large	
Cost A ₁	14258.92	15162.14	16486.46	17481.70	16137.19
Cost A ₂	14258.92	15162.14	16486.46	17481.70	16137.19
Cost B ₁	14509.92	15416.14	16770.46	17739.70	16403.13
Cost B ₂	20012.83	20977.75	22381.54	23467.37	22018.21
Cost C ₁	20010.62	19977.56	19174.79	18875.25	19400.01
Cost C ₂	25513.53	25539.17	24785.87	24602.92	25015.08
Cost C ₃	28064.88	28093.08	27264.46	27063.21	27516.59

Yield value of output and cost of production per quintal for Soybean crop

The yield value of output per hectare and cost of production per quintal of soybean on the sample farms have been worked out in Table 4.10.

Economics of soybean production

A study on economics of soybean cultivation, as cash crop, is important to find out their profitability in order to choose best alternative resources, cultivation practices and scale of production etc. Secondly, it gives an estimate of the amount that the farmers will require for cultivating as per size of crop area with different level of technological adoption. It is well known fact that profitability of crop production depends upon the cost of production, yield and their related market price. The economics of soybean crop is presented in Table 01. It clearly shows that the cost of cultivation per hectare of soybean was higher on large farms as compared to marginal farms. Over all, on an average the cost of cultivation per hectare of soybean was found to be ₹ 25579.22 per hectare. The cost of cultivation in case of small farm was higher (₹ 26041.37/ha.) followed by marginal farms (₹ 25970.65/ha.), large farms (₹ 25327.04/ha.) and medium (₹ 25318.01/ha.). It seems similar cost of cultivation in all the farm sizes, due to the fact that the all farmers approach similar kind of practises applied on their farms input like quality seed, fertilizer, plant protection material, hired labour etc. The cost on the basis of cost concept in the production of soybean has been presented in Table 2. The cost on the basis of cost concept in the production soybean on the sample farm of different size groups have been overall Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁ Cost C₂, and Cost C₃ were worked out to ₹16137.19, ₹16137.19, ₹16403.13, ₹22018.21, ₹19400.01, ₹25015.08 and ₹27516.59 hectare respectively on the sample farms.

Note: figure in parenthesis is percentage.

Income over different cost

The yield value of output per hectare and cost of production per quintal of soybean on the sample farms have been worked out in Table 03. The income over different cost were also worked out. The average income over cost A₁, Cost A₂, cost B₁, cost B₂, Cost C₁ Cost C₂, and Cost C₃ were calculated as ₹ 20093.77 ₹20093.77 and ₹19827.83 ₹14212.76 ₹ 16830.95, ₹11215.88, ₹8714.37 respectively.

This table indicates that the average yield per hectare of soybean came to 12.73 quintal of main product and 16.92 quintal of by-product on sample farms. The price per quintal received by the different farmers was found to have variation. It was due to size of marketing cost and time of selling the produce which made differences on total gross return, respectively. The average price per quintal of soybean comes to ₹ 2800 per quintal of main product and ₹ 110 per quintal of by-product on sample farms as per the price of product total value of production comes to ₹ 34369.54 of main product and 1861.42 of by-product respectively. The overall gross return and net return was found to be ₹36230.96 and ₹10651.74 respectively. The overall B-C ratio was observed as 1:1.42 and on marginal farms 1:1.28, on small farms 1:1.33, on medium farms 1:1.48 and on large farms 1:1.49 respectively.

Table 3: Income over different cost

Particulars	farm size				Overall
	Marginal	Small	Medium	Large	
Income overA ₁	18906.46	19345.43	20942.98	20137.80	20093.77
Income overA ₂	18906.46	19345.43	20942.98	20137.80	20093.77
Income overB ₁	18655.46	19091.43	20658.98	19879.80	19827.83
Income overB ₂	13152.56	13529.82	15047.90	14152.13	14212.76
Income overC ₁	13154.76	14530.01	18254.65	18744.25	16830.95
Income overC ₂	7651.86	8968.40	12643.57	13016.58	11215.88
Income overC ₃	5100.51	6414.49	10164.98	10556.29	8714.37

Table 4: Per ha yield value of output and cost of production per quintal for Soybean crop

Particular	Marginal	Small	Medium	Large	Overall	
Gross Cost (₹/ha.)	25970.7	26041.4	25318	25327	25579.2	
Yield (q/ha.)	a) Main Product	11.65	12.12	13.15	13.22	12.73
	b) By-product	15.49	16.11	17.48	17.58	16.92
Price(₹/q)	a) Main Product	2700	2700	2700	2700	2700
	b) By-product	110	110	110	110	110
Value of Production (₹/ha.)	a) Main Product	31461.5	32735.5	35506.6	35685.7	34369.5
	b) By-product	1703.9	1772.1	1922.8	1933.8	1861.42
Gross return(₹)	33165.4	34507.6	37429.4	37619.5	36231	
Net return(₹)	7194.74	8466.2	12111.4	12292.5	10651.7	
Cost of production(₹/quintal)	2228.78	2147.87	1925.23	1916.26	2009.45	
B:C Ratio	01:01.3	01:01.3	01:01.5	01:01.5	01:01.4	

Conclusion

The result obtained from the above study shows that the overall gross return and net return was found to be ₹36230.96 and ₹10651.74 respectively and the overall B-C ratio was observed as 1:1.42, there is a potential for soybean crop production under oilseed crops in the sample area Chhattisgarh Plain, there is a need for extensive improvement and expansion in the present production and productivity in view of future oilseed demand.

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