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Research Paper

Performance of Cost and Prices of Soybean in Vidarbha

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ABSTRACT

In Maharashtra State, the area under soybean cultivation during 2019-20 was 4124.01 (000) hectares with total production of 4825.63 (000) tonnes. Maharashtra is the second largest soybean growing state in the country. In Vidarbha region the area under soybean cultivation during 2019-20 was 4124.01 (000) hectares with production of 4825.63 (000) tonnes. Keeping in view the importance of Soybean crop in Vidarbha the present study was conducted with an defined objectives & methodology. The study revealed that, the growth rates of Area, Production & Productivity indicates stagnant growth during the study period. The coefficient of variation of Area Production & Productivity were 8.78 %, 33.19% and 35.12% respectively. The coefficient of variation in input utilization for soybean was ranges from 3.19% to 180%. However highest for female labour i.e., 180.78% whereas the growth rates for male labour and bullock labour were declined by -1.94 and -11.42 % per annum respectively. The cost of cultivation is in increasing trend. On the other hand CGR for Cost of Production was estimated 8.25% per annum and statistically found significant. However MSP increases at the rate of 9.66 % per annum and Price received by farmer at 4.54% per annum. The share of input cost to the total cost was highest in Hired Human Labour (Male & Female) i.e., 18.68%. Followed by Machine power and Seed component 13.25% and 11.16% respectively. The average yield was receive 13.24 qtl/ha. The input output ratio at Cost A is 1.41, Cost B is 1.06 and at Cost C no profit no loss was recorded. The input out put ratio at Cost A & B was more. Which means crop is profitable at variable cost, farmers were received higher producers price than MSP. But the cost of Production was more than MSP. The parity between Cost of Production and MSP was ranges from ₹ 162.58 to ₹ 1788.12 during last ten years. The study further indicates that on an average the percentage of cost of production over previous year was 1.19% on an average of last ten years. Hence farmers were getting the price as equal to MSP. However MSP changes with constant increase ranges from 100.00 to 132.00 % to present year.

HIGHLIGHTS

⦿ Soybean crop was profitable at variable cost only. Farmers were received MSP. But the cost of production was more than MSP.

Keywords: Soybean, Cost of Cultivation, Instability, Price parity & MSP

Soybean has an important place in world's oilseed cultivation scenario, due to its high productivity, profitability and vital contribution towards maintaining soil fertility. It is also known as "gold of the soil" due to its advantages like easy cultivation, high cost benefit ratio, less requirement of nitrogenous fertilizer, etc. It is highly remunerative crop with comparatively less input demand being a leguminous crop. It helps to enrich the soil fertility by fixing the atmospheric nitrogen through root nodules. As a food item, soybean has significant contribution in India, since the Indian diet is predominantly vegetarian and deficient in protein. Soybean has the potentially to make significant contribution to fill the widening gap in the availability of edible oil in the country

and has now emerged as an important oilseed crop with a potential to narrow down the oil protein gap. The milk extracted from soybean grains can be substituted for cow milk which has high biological value for human being. Soybean, is also used in manufacturing of vegetable ghee, cheese and sweet meats. Soyabean Production in India was dominated by Maharashtra and Madhya Pradesh. It contribute about 90 per cent of the country' production. India has the fifth largest vegetable oil economy in the world. In Maharashtra State, the area under soybean cultivation during 2019-20 was 4124.01(000) hectares with total production of 4825.63(000) tonnes. Maharashtra is the second largest soybean growing state in the country. In Vidarbha region the area under soybean cultivation during 2019-20 was 4124.01(000) hectares with production of 4825.63(000) tonnes, from the statistical information available. Keeping in view the importance of Soybean crop in Vidarbha the present work was conducted only for Soybean. The present study based on the secondary data on costs and returns of the crops from Vidarbha region with an objectives to study the performance of soybean in Vidarbha and access the parity between cost and prices

RESEARCH METHODOLOGY

The present study based on the secondary data on costs and returns of the soybean from Vidarbha region with an objective to estimate growth, instability, percentage share & parity between costs & prices aspect of Soybean crop in Vidarbha region.

Collection of data

The study was based on the secondary data & Time series data on cost and prices and MSP of Soybean from Vidarbha region. The data was collected from the Cost of Cultivation Scheme, Department of Agril Economics & Statistics and from government published sources. The data collected for the last 10 years i.e 2010-11 to 2019-20. The number of farmers included for the study during last ten years is presented in table 1.

Table 1: Year wise Total number of selected farmers in the study during last ten years

Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Total
N =	261	262	260	289	283	196	175	160	119	110	2115

Analytical techniques

(A) Growth Rate Analysis

The Compound Growth Rates of the parameters input items of cost of cultivation for soybean crop were estimated for entire Vidarbha region. The parameters / input cost item wise (Area, Production, Yield, Cost A, B & C) compound growth rates was estimated to study the growth. It was estimated on the basis of following exponential model.

$$Y = a.b^t$$
$$Log\ Y = log\ a + t\ log\ b$$
$$CGR = [Antilog\ (log\ b - 1)\ ] \times 100$$

Where,

CGR = Compound Growth Rate

t = time period in a year

Y = Area, Production, Yield and Cost Items

$A\ \&\ b$ = regression parameters

(B) Instability Analysis

To measure the instability in input cost items / parameters, an index of instability was used as a measure of variability. The Coefficient of Variations (CV) was calculated by the following formula:

$$CV(\%) = \frac{Standard\ Deviation}{Mean} \times 100$$

(C) Cost of Cultivation

The data on cost of cultivation of soybean was collected from the Agricultural Prices & Costs Scheme/ Cost of Cultivation Scheme, Department of Agril Economics & Statistics and from government published sources. The data collected for the last 10 years i.e., 2010-11 to 2019-20.

RESULTS AND DISCUSSION

Keeping in view the objective of the study, the data was analyzed using suitable statistical techniques. The results obtained from this study has presented and discusses thoroughly.

The rate of changes in Area, Production & Productivity components was expressed in terms of Compound Growth Rates estimated through exponential function determined for the last

ten years and which was presented in table 2. The coefficient of variation was worked out for examining the instability in area, production and productivity of soybean in Vidarbha region for last 10 years. The coefficient of variation of Area Production & Productivity were 8.78 per cent, 33.19 per cent and 35.12 per cent respectively. The growth rates of Area, Production & Productivity indicates stagnant growth during study period.

**Table 2:** Area, Production & Productivity Mean & CV% and CGR for Soybean

Year	Unit	Mean	CV%	CGR
Area	00 ha	18358.37	8.78	0.78
Production	00 tonnes	18735.22	33.19	-0.674
Productivity	Kg/ha	2029.07	35.12	0.214

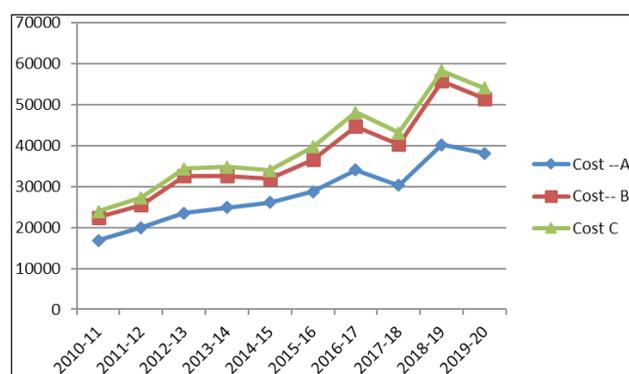**Table 3:** Input item-wise (Qty) Mean & CV% and CGR for Soybean

Particulars/ Input	Unit	Total	Mean	CV%	CGR
Hired Human Labour	Male Days	157.22	15.72	12.41	-1.94*
	Female Days	270.72	60.07	180.78	0.47
Bullock Labour	Pair Days	52.45	5.25	38.14	-11.42*
Machine use	Hrs	343.32	34.33	53.28	1.81
Seed	Kg	809.23	80.92	3.19	-0.02
Manures	Qtl	74.33	7.43	100.59	24.6*
Fertilizer Kg	N	234.26	23.43	15.97	0.88
	P	354.80	35.48	9.51	2.06**
	K	45.37	4.54	38.82	6.2*
Family Human Labour	Male Days	99.31	9.93	13.52	0.24
	Female Days	40.22	4.02	29.00	1.42

*5%, **10% significance level.*

The rate of utilization of Input items in terms of quantity was presented in table 3. From the table it is revealed that the coefficient of variation in input utilization for soybean was ranges from 3.19 per cent to 180 per cent. The lowest variations observed for seed. However highest for female labour i.e., 180.78 per cent whereas the growth rates for male labour and bullock labour were declined by -1.94 and -11.42 per cent per annum respectively and found statistically significant. On the other hand the highest growth rates was observed for manure used in soybean cultivation i.e., 24.6 per cent per annum.
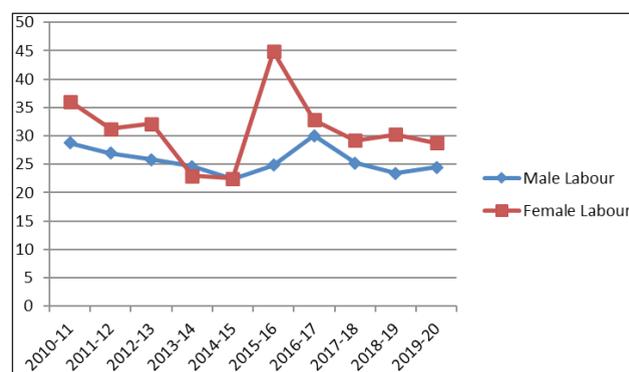
Fig. 1: Graph showing Male & Female Labour Days

Fig. 2: Graph showing Cost A, B & C in ₹

Table 4: Input item-wise (Value) Mean & CV per cent and CGR for Soybean

Cost Items	Mean	CV%	CGR
Hired Male Labour (days)	3633.9	31.43	9.83*
Hired Female Labour (days)	3362.7	22.73	7.02*
Total	6996.6	26.74	8.42*
Bullock power (pair days)	2161.1	24.46	-0.36
Machine power (Hrs.)	5097.7	44.42	15.23*
Seed (Kgs.)	4181.7	27.52	6.8*
Manures (Qtls.)	737.37	45.15	12.86*
Fertilizer	2007.0	32.46	10.85
Bio-fertilizers/Micronutrient	64.31	86.83	50.22*
Plant protection charges	1066.1	43.14	12.36*
Incidental charges	1112.9	68.52	21.57*
Repairs on farm implements	368.92	47.71	14.01*
Growth Regulator	106.02	104.1	67.31*
Weedicide	692.64	42.19	5.34
Working Capital	24636	30.09	9.77*
Cost --A	27012	30.92	10.07*
Cost-- B	35684	32.75	10.39*
Family Male Labour (days)	1807.6	29.61	8.85*
Family Female Labour (days)	453.41	39.25	8.77*
Total	2261	31.09	8.86*

Cost C	37945	32.20	10.32*
Per Quintal cost	2924.6	32.76	8.25*
Minimum Support Price	2188.5	40.23	9.66*
Price Received by Farmers	2808.8	19.75	4.54*

*5% significance level.

In the present study the growth of input cost value in soybean cultivation were estimated using growth rates as indicated in methodology. In the analysis the growth performance of input costs were examined by fitting exponential growth function. By working out Instability we can judge the performance is stable or unstable. For better understanding of change in input levels of soybean for different years instability were studied and worked out. Table 4 revealed that the input used for cultivation of soybean in terms of value shows the CV range from 22.73 per cent for hired human labour to 104.1 per cent for expenditure under growth regulator. The CGR for input used in soybean cultivation was positive for almost all items in value term. The CGR for Cost A,B,C were about 10 per cent per annum. Indicates the cost of cultivation was in increasing trend. On the other hand CGR for Cost of Production was estimated 8.25 per cent per annum and statistically found significant. However MSP increases at the rate of 9.66 per cent per annum and Price received by farmer at 4.54 per cent per annum.

Table 5: Variations in Cost of Cultivation Structure & Share of Input Cost to Total Cost in average (Year 2010-11 to 2019-20)

Sl. No.	Cost Items	Average (Yr. 2010-11 to 2019-20)
1	Hired Male Labour days)	9.73
2	Hired Female Labour (days)	8.95
	Total	18.68
3	Bullock power (pair days)	6.02
4	Machine power (Hrs.)	13.25
5	Seed (Kgs.)	11.16
6	Manures (Qtls.)	1.87
7	Fertilizer	5.32
8	Irrigation charges	0.08
9	Bio-ferti/Micronutrient	0.16
9	Plant protection charges	2.68
10	Incidental charges	2.74
11	Repairs	0.94
12	Growth Regulator	0.25
13	Weedicide	2.01
14	Working Capital	65.20
15	Cost --A	71.34
16	Cost-- B	93.93
17	Family Male Labour (days)	4.85
18	Family Female Labour day	1.22
	Total	6.07
19	Cost C	100.00

In Vidarbha Soybean crop was greatly influenced by the level of Cost of cultivation structure . In order to see the average percentage share of inputs to total cost simple tabular analysis was done to record the share of input to total cost. The average share of various cost input to total cost of soybean in Vidarbha region is presented in **table 5**. Table revealed that the highest share is recorded with Hired Human Labour (Male & Female) i.e., 18.68 per cent. Followed by Machine power and Seed component 13.25 per cent and 11.16 per cent respectively. The share of working capital was seems to be 65.20 per cent.

Table 6: Cost of Cultivation, Value of Output & income of soybean in average. (Year 2010-11 to 2019-20) (₹ /ha)

Sl No.	Particulars	Average (Yr. 2010-11 to 2019-20)
1	Yield (qtl) Main Produce	13.24
	By Produce	6.73
2	Value Main Produce	37619.4
	By Produce	1290.932
	Total	38910.33
3	Total Cost A	28288.74
	Cost B	37401.23
	Cost C	39774.98
4	Net Return over Cost A	10621.6
	Cost B	1509.102
	Cost C	-864.64
5	Input-Output Ratio at	
	Cost A	1.38
	Cost B	1.04
	Cost C	0.98

The value of Main Produce, Cost A,B,C with input output ratio was worked out to observe the profitability analysis of soybean cultivation and which was depicted in table 5. Table 6 indicates that the average yield was receive 13.24 qtl/ha. The output ratio was observed that the soybean cultivation was profitable and recorded the input

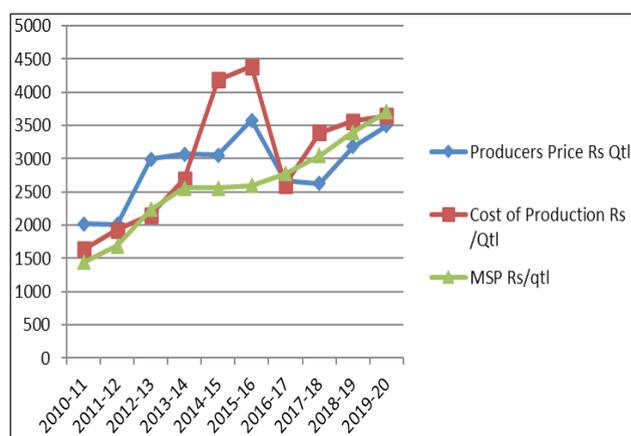**Table 7:** Comparison between producers price, cost of production and MSP

Sl. No.	Particulars	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	Average
1	Producers Price ₹ Qtl	2018.00	2011.06	2997.21	3071.04	3058.08	3583.67	2667.36	2627.82	3179.27	3496.95	2871.05
2	Cost of Production ₹ /Qtl	1635.20	1927.96	2156.17	2695.82	4189.4	4388.11	2601.46	3390.12	3561.58	3645.83	3019.17
3	MSP ₹/qtl	1440.00	1690.00	2240.00	2560.00	2560.00	2600.00	2775.00	3050.00	3399.00	3710.00	2602.40
4	Pairity between cost and MSP	195.21	237.96	-83.83	135.82	1629.40	1788.12	-173.54	340.13	162.58	-64.17	416.77
5	% OF Producers Price over MSP	140.14	119.00	133.80	119.96	119.46	137.83	96.12	86.16	93.54	94.26	114.03
6	% change over previous year		117.90	111.84	125.03	155.40	104.74	59.28	130.32	105.06	102.37	101.19
7	% change over previous year MSP		117.36	132.54	114.29	100.00	101.56	106.73	109.91	111.44	109.15	100.30

output ratio at Cost A,B & C were 1.38,1.04 and 0.98 respectively. The input output ratio at Cost A & B was more. Which means soybean was profitable at variable cost.

Comparative analysis between producers price, cost of cultivation and MSP was shown in table 7. From the table it was observed that farmers were received higher producers price than MSP. But the cost of Production was more than MSP. The parity between Cost of Production and MSP was ranges from 162.58 to 1788.12 Rs. The study further indicates that on an average the percentage of cost of production over previous year was increased by 1.19% on an average of last ten years. However, the MSP was increased only by 0.30%. The input output ratio at cost A & B was more than one and at cost C it was 0.98 which indicates that the crop is profitable at variable cost and at Cost C it was not profitable.

Fig. 3: Graph showing Cost of Production, MSP & Price received by farmer

CONCLUSION

The study revealed that, the growth rates of Area, Production & Productivity indicates stagnant growth during the study period. The coefficient of variation of Area Production & Productivity were 8.78 %, 33.19% and 35.12% respectively. The coefficient of variation in input utilization for soybean was ranges from 3.19% to 180%. The cost of cultivation is in increasing trend. However MSP increases at the rate of 9.66% per annum and Price received by farmer at 4.54% per annum. The input output ratio at Cost A is 1.38, Cost B is 1.04 and at Cost C it was 0.98. The input out put ratio at Cost A & B was more. Which means crop is profitable at variable cost, farmers were received higher producers price than MSP. But the cost of Production was more than MSP. The parity between Cost of Production and MSP was ranges from ₹ 162.58 to ₹ 1788.12. During last ten years. The study further indicates that on an average the percentage of cost of production over previous year was 1.19% on an average of last ten years. Hence farmers were getting the price as equal to MSP. However, MSP changes with constant increase ranges from 100.00 to 132.00 % to present year. The input output ratio at cost A & B was more than one and at cost C it was 0.98 which indicates that the crop is profitable at variable cost and at Cost C it was not profitable.

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