

## Economics of Soybean Crop in Western Vidarbha Regions of Maharashtra State

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### ABSTRACT

Soybean in Indian agriculture as a pulse and oilseed crop has attained importance due to its nutritional and industrial value. It occupies an important place as it gets more foreign exchange from as export of soya powder due to its greater demand in the international market. It is highly nutritious food item, as it contain 20 per cent oil and 40 per cent protein. In addition, it also contain 21 per cent carbohydrate, 11.5 per cent iron, and 4 per cent mineral salts like calcium phosphate and many important vitamins.

Soybean is getting prominence in the new cropping patterns because of its higher prices and less input requirement as compared to other crop in general and cotton in particular. Soybean has an ability to grow well in a verity of soil condition including light and black cotton soils.

**Key words:** Cost A, Cost B, Cost C, Gross income, Input-output ratio.

### INTRODUCTION

Soybean (*Glycine max* L. Merrill) is miracle 'Golden bean' of 20<sup>th</sup> century. It is also known as 'gold of the soil' due to its advantages such as 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.

Beside edible oil, soybean produce deoiled flour which contains high percentages of protein ranging between 55 to 60 per cent. Hence, its use in fast food and nutritious soft drink is fastly catching up. As soybean oil is 85 per cent unsaturated and cholesterol free, it is well suited to the health need of people and is considered as suitable for diabetic patients.

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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. Besides this, now a days, vegetables soybean is also released which has high potential. It is rich in protein, fat, minerals and vitamins. Soybean can also grow successfully under rainfed condition on upland and sloppy land as it withstands a temporary dry spell. Soybean crop is also helpful to improve soil condition especially its nitrogenous fertility as it is able to fix up atmospheric nitrogen at the rate of 150-200 kg/ha and is able to leave 50 kg residual per hectare which may be available to the following crops representing a reduction in fertilizer input cost of Rs.100 to 125 per hectare.

Soybean crop is originated from china. In India it is cultivated in the state of Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka, and Chattisgarh. In Maharashtra State, the area under soybean cultivation during 2004-2005 was 21,05,200 hectares with total production of 18,12,400 metric tonnes . Maharashtra is the second largest soybean growing state in the country. In Vidarbha region the area under soybean cultivation during 2004-2005 was 13,27,600 hectares with production of 10,50,100 metric tonnes, from the statistical information available , it is surprising to note that the area under cotton and other crop is decreasing and under soybean is increasing practically every year in Vidarbha region.

## MATERIAL AND METHODS

The major aspect of present study was to assess the extent of growth and instability in area, production and productivity of soybean in Akola and Amravati districts so also measuring yield gaps in the production of soybean.

### 1 Sampling Technique:

A two stage stratified multi-stage sampling technique was used to select the tehsils, villages and respondents (soybean growers)

### 1.1 Selection of Study Areas

Western Vidarbha region of the Maharashtra state will be selected purposively for the present study. It is so because western Vidarbha region is one of the water scarce region of Maharashtra and farmers are used to grow cotton earlier. Which needs high input costs. So, now a days farmers are going to shift soybean cultivation over cotton cultivation which needs lesser cost than cotton and get good yields in the lesser cost.

### 1.2 Selection of District:

There are 7 districts in western Vidarbha region. Out of these 7 districts two districts viz. Amravati and Akola are selected.

### 1.3 Selection of Tehsils, Villages & Farmer

There are 14 tehsils in Amravati district & 7 Akola district. 2 highest soybean producing tehsils from Amravati & 1 from Akola will be selected purposively. A list of all villages from the 3 tehsils will be prepared along with production data of soybean. 2 villages from each tehsils with highest production will be selected purposively .A list of all the soybean growers in the villages will be prepared & 15 farmers from each village will be selected randomly. This will lead to a sample size of 90 farmers.

### 2 Collection of data

The study was based on primary as well as secondary data collected from Akola and Amravati district. The secondary on and soybean collected from various government publications. The data pertains to the period 2000-1 to 2013-2014

### 3 Primary data

Akola and Amravati districts were selected for the study. The primary data on input used obtained from soybean were collected from Agricultural Price Scheme' Govt. of Maharashtra located in the department of agricultural economics and statistics, Dr. PDKV, Akola. The data on input used and yield obtained for demonstration plot were collected from research unit, Dr. PDKV, Amravati and also KVK .In all 90 farmers were selected for the study. The data pertained for the year 2013-14 the selected farmers were

stratified into three groups on the basis of size of holding viz., small farmers with size of holding upto 2 ha, medium farmers with 2 to 4 ha and large farmers with the holding 4 hectares and above. The details of farmers selected are given in table below.

#### 4 Economics of soybean was worked out using standard cost concepts (CACP Method)

Simple cost concept method was used for this study i.e. Cost A, Cost B and Cost C.

Cost  $A_1$  = All variable costs excluding family labour cost and including land revenue, depreciation and interest on working capital.

Cost  $A_2$  = Cost  $A_1$  + Rent paid for leased-in land.

Cost  $B_1$  = Cost  $A_1$  + Interest on the value of owned fixed capital assets (excluding land).

Cost  $B_2$  = Cost  $B_1$  + Rental value of owned land (Net of land revenue).

Cost  $C_1$  = Cost  $B_1$  + Imputed value of family labour.

Cost  $C_2$  = Cost  $B_2$  + Imputed value of family labour.

Cost  $C_2^*$  = Cost  $C_2$  estimated by taking into account statutory minimum or actual wage rate, whichever is higher.

Cost  $C_3$  = Cost  $C_2^*$  + 10 per cent of cost  $C_2^*$  on account of managerial function performed by farmers.

## RESULTS AND DISCUSSION

### Size of family of selected farmers:

The study of size of family would help us to get an idea about labour forces available for farm operation from the family. The details of averages size of family of the selected farmers was presented in table 1.

Information presented in Table 1 reveals that, the average size of family for small, medium and large farmer were 4, 5 and 6 member, respectively.

### 2 Economics of production of soybean

#### 2.1 Input use for cultivation of soybean:

Table 2 present's information on farm size cropping intensity of selected farmers. It could be seen from Table 4.3 that the average size of holding was 1.01, 2.67, and 5.15 hectares for small, medium and large farmers, respectively.

The production of area available for cultivation for small, medium and large farmers worked out to 87.38, 73.59 and 67.19 per cent to total size of holding. The cropping intensity being the measure of land use efficiency was higher on large farmers (148.81) followed by medium farmers (135.87) and small farmers (119.35)

In Table 3 present's information on farm product is the result of different input factors utilized in the process of production. A study of input utilization helps to determine the profitability of crop enterprise. Realizing the important of cost studies, an attempt was made to study the inputs utilized and cost associated with them for soybean in the study area. Result obtained are presented in Table 3.

### Economics of production of soybean

#### 1) Input use for cultivation of soybean

Farm product is the result of different input factors utilized in the process of production. A study of input utilization helps to determine the profitability of crop enterprise. Realizing the important of cost studies, an attempt was made to study the inputs utilized and cost associated with them for soybean in the study area. Result obtained are presented in Table 4.

Table 4 depicts information on the use of inputs in soybean production per hectare use of was 52.70 man days while total bullock labour was 5.90 days per hectare.

At overall, fertilizer use was observed to be 225.00 kg NPK against level of 100 kg NPK per hectare. Thus, actual use of fertilizer was low to recommend. The small size farmers used average level of 67.84 kg of NPK which was far below the recommended does. It could be revealed from the table that expenditure on plant protection for soybean for overall size groups was Rs.2725.20 per hectare which was just near to the requirement.

Intergroup comparison revealed that with increase in size of holding there was decrease in per hectare use of fertilizer. Result presented in Table 4 revealed the level of seed and human labour increase with the increase in size of holding. The level of use of seed and human labour by small farmers was less than

medium and large farmers. However, the use of fertilizer was observed more on small farmers followed by medium and large farmers. Comparison of input use between different size groups indicated that per hectare use of human labour, bullock labour, and seed was highest in large size group. Yield of soybean was highest i.e.15.06 quintals per hectare in medium size group of holding and lowest in large size group (11.84qtl/ha).

## 2 Cost of cultivation of soybean

The per hectare cost of cultivation of soybean was worked out using cost concepts explained

in methodology. The estimation of cost helps us to know the profitability of a particular crop enterprise. For the purpose of crop planning, more emphasis is given on cost “A” i.e. direct cost per hectare item wise cost for soybean production worked out was presented in Table 5. It could be seen from Table 5 that per hectare total cost of cultivation of soybean for the sample as whole was Rs.46572.52. It could be seen from Table 5 that per hectare total cost of cultivation of soybean for the sample as whole was Rs.46572.517.

**Table 1: Average size of the family of selected soybean grower**

Sr No	Size of holding	Number of persons			
		Male	Female	Children	Total
1	Small farmer	2	1	1	4
2	Medium farmers	2	2	1	5
3	Large farmers	3	2	1	6

**Table 2: Average farm size and cropping intensity of selected Soybean grower**

Sr. No.	Particulars	Farm size			
		Small (0-2 ha)	Medium (2-4)	Large (4-above)	Overall
1)	Number of Farmer	48	30	12	90
2)	Area under soybean	0.83	2.27	4.38	2.49
3)	Average size of farm	1.01	2.67	5.15	2.94
4)	Fallow land	0.04	0.05	0.07	0.053
5)	Net cultivation area	0.97 (87.38)	2.62 (73.59)	5.08 (67.19)	2.87
6)	Area sown more than once	0.18	0.94	2.48	1.2
7)	Gross cropped area	1.11	3.56	7.56	4.07
8)	Cropping intensity	119.35	135.87	148.81	134.68

(Figures in parenthesis indicated per cent to total size of farm)

**Table 3: Per hectare input utilization of soybean**

Sr. No.	Crop	Units	Physical quantity			
			Small	Medium	Large	Overall
1	<b>Hired human labour</b>	Days	21.42	19.54	17.67	19.54
	a) Male	Days	31.85	33.15	34.48	33.16
	b) Female					
	Total		53.27	52.69	52.15	52.70
2	<b>Total bullock labour</b>	Days	4.2	1.67	0.36	2.07
		Days	2.66	5.24	3.59	3.83

	1) Hired 2) Owned					
3	Machine labour	Hours	27.85	17.9	15.88	20.54
4	Seed	Kg	80.6	80.09	86.24	82.31
5	Manure	Qtl.	4.79	15.04	25.5	15.11
6	<b>Fertilizer</b>					
	N	Kg	31.96	69.91	155.28	85.71
	P	Kg	33.36	96.03	268.15	132.51
	K	Kg	2.52	3.43	14.38	6.77
	Total		67.84	169.37	437.81	225.0
7	<b>Family labour</b>	Days	13.4	9.62	6.63	9.88
	a)Male	Days	6.4	3.06	1.46	3.64
	b)Female					
8	Yield a)Main produce	Qtl.	15.66	15.06	13.78	14.84
9	Price					
	Main produce	Rs/per qtl	3040.46	3037.51	3016.66	3031.54
	By-produce		191.91	198.33	196.04	195.42

Table 4: Per hectare input utilization of soybean

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	Total		53.27	52.69	52.15	52.70
2	Total bullock labour	Days	4.2	1.67	0.36	2.07
	1) Hired	Days	2.66	5.24	3.59	3.83
	2) Owned					
3	Machine labour	Hours	27.85	17.9	15.88	20.54
4	Seed	Kg	80.6	80.09	86.24	82.31
5	Manure	Qtl.	4.79	15.04	25.5	15.11
6	Fertilizer					
	N	Kg	31.96	69.91	155.28	85.71
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Table 5: per hectare Cost of cultivation of soybean

Sr.no	Particular	Group			
		Small	Medium	Large	Overall
	<b>Variable cost</b>				
1	Hired Human Labour	3871.59	3678.3	3753.23	3767.70
	a) Male	3226.74	3535.57	3266.02	3342.77
	b) Female				
2	Family human labour	2062	1538.3	1190.84	1597.25
	a)male	560.09	305.3	102.19	322.52
	b)female				
3	Bullock Labour	1296.06	570.015	268.066	711.38
	a)Hired	1050.55	2273.05	1323.45	1549.01
	b)Owned				
4	Machine Labour	4194.44	4061.02	3968.28	4074.58
	a)Hired	0.00	0.00	0.00	0.00
	b)Owned				
	<b>Total Labour cost</b>	<b>16262.1</b>	<b>15961.55</b>	<b>13872.07</b>	<b>15365.24</b>
5	Seed	3792.46	3780.9	3776.35	3783.23
6	Manure	421.44	563.23	495.14	493.27
7	Fertilizer	674.71	587.258	728.235	663.401
	N	1384.53	1341.53	1588.42	1438.16
	P	42.34	26.73	43.95	37.67
	K				
8	Irrigation charges	0.00	0.00	0.00	0.00
9	Plant protection	889.75	1023.85	883.91	932.50
10	Incidental charges	733.23	445.81	344.53	507.85
11	Repairing charges	431.75	240.7	172.47	281.64
	<b>Total material cost</b>	<b>8370.21</b>	<b>8010.013</b>	<b>8033.020</b>	<b>8137.747</b>
	<b>Total operating cost</b>	<b>24632.31</b>	<b>23971.56</b>	<b>21905.09</b>	<b>23502.99</b>
12	Interest on working capital (10%)	2463.2	2397.15	2190.51	2350.28
	<b>Fixed cost</b>				
13	Depreciation in implements and farm building	452.78	393.04	393.35	413.06
14	Rental value of land	829.25	791.40	662.75	761.13
	Land revenue cess and taxes	26.35	34.98	22.23	27.85
15	Interest on Fixed capital (10%)	130.83	121.94	107.82	120.19
	<b>Total fixed Cost</b>	<b>1439.21</b>	<b>1341.38</b>	<b>1186.17</b>	<b>1322.25</b>
	<b>Total Cost (Cost C2)</b>	<b>28534.72</b>	<b>27710.1</b>	<b>25281.77</b>	<b>27175.53</b>
16	Managerial cost (10 % of Total cost )	2853.47	2771.01	2528.18	2717.55
	<b>Cost C3</b>	<b>31388.19</b>	<b>30481.11</b>	<b>27809.95</b>	<b>29893.08</b>
	<b>Production</b>				
	Main produce	47628.86	45773.114	41588.9	44996.958
	By produce	1771.446	1614.99	1340.241	1517.559
	<b>Gross income</b>	<b>49400.306</b>	<b>47388.10</b>	<b>42929.141</b>	<b>46572.52</b>
	<b>Price</b>				
	Main produce	<b>3040.46</b>	<b>3037.51</b>	<b>3016.66</b>	<b>3031.54</b>
	By-produce	<b>191.91</b>	<b>198.33</b>	<b>196.04</b>	<b>195.42</b>

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