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Production profitability and constraints analysis of soybean production in Ujjain district of Madhya Pradesh, India: Micro perspective

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Abstract
Objectives: The main purpose of the present study to examines the costs and returns of soybean production on different size of farms and constraints analysis of soybean farming in at Ujjain district in Madhya Pradesh India.
Methods: The study was confined to sample of 120 soybean farmers selected from the four villages of two selected blocks of Ujjain districts. The primary data were collected form the respondent with the help of pre-tested schedule during the year 2019-20. Simple tabular analysis and garrets ranking technique were used to analysis the data.
Findings: The study found that an average soybean cultivating farmers in the study area spent of the total variable cost, 26.26 per cent on hired human labour, followed by 23.78 per cent on plant protection on ensure, 18 per cent on machine seed cost, 13.14 per cent on mealier cost and 13.04 per cent on fertilizer cost, realized a net return per hectare Rs. 39411.64 with B: C ratio (2.64) on overall farms. This might be due to the fact that benefit of economics of scale has reached its maximum only at the medium size farms. The unavailability of labour during crucial period with 59.78% mean garrets's score has been reported the major production constraints by the soybean growers. Therefore the study suggested that the government may take concerted initiatives in the regards to provide credit facilities in term of short-terms loan to the farms.

Keywords: Soybean, cost and revenue, constraints analysis, Madhya Pradesh, India

Introduction
Soybean has emerged as golden bean of 21th century and it is largely used as seed soybean is looked upon not merely as a means to supply food for humans and animals, but it improve the soil fertility by fix atmospheric nitrogen. Soybean contains 40 per cent proteins and 20 per cent oil. and now has been recognized all over the world as a potential supplement source of edible oil. The five major soybean producing countries in the world are, USA (108.0 million tons), Brazil (86.8 million tons), Argentina (53.4 million tons), China (12.2 million tons) and India (10.5 million tons). Out of total world soybean production countries, India's rank fifth in respect of production of Soybean of the world. The two state Maharashtra and Madhya Pradesh dominate in India accounting 89 per cent of the domestic soybean production. In Madhya Pradesh area and production under soybean crop was 5.40 million hectare and 5.91 million tones and yield estimated at 10.94 quintal per hectare (SOPA-2018). It was evident that Madhya Pradesh is a leading soybean producing states in India, despite being a crucial field of Madhya Pradesh. The soybean processing market is already dysfunctional. Most soya plant has been shut down and other are unable to pay back financial institution because of many restrictions, challenges and lack of adequate funding. The commercial farmer chiefly concern to secure a satisfactory margin between the cost and selling price of his produce. Hence the study becomes crucially important for the farmer's to know their production cost. The cost of production and returns for soybean Varies from region to region and from one category farmers to another.
In this investigation, the attempt has been made to evaluate the costs and returns and constraints analysis in soybean cultivation suggests that suitable recommendation and policy measures to improve the soybean production in Ujjain district of Madhya Pradesh.

Materials and Methods

Sampling and data collection: Ujjain district was purposively selected for study, due to largest area under Soybean cultivation in the state. The study was conducted from 120 Sample farmer in four villages of two selected blocks from one leading district viz, Ujjain of Madhya Pradesh. For the purpose of study multistage random sampling technic was adopted in designing sampling frame for the study. Post stratification was made to classify the farmers into four group viz marginal (<1ha), small (1-2ha) medium (2-4ha) and large farmers (>4ha) respectively based on the operational land size. The relevant information was collected form soybean growers through pre-tested schedule by survey methods. The primary data were collected during the year 2019-20.

Analytical tools

All input and output parameters pertaining to soybean production were based on average value of two years with a view to minimize seasonal fluctuations in the variables. The modern cost concept i.e. cost A_1, cost A_2, cost B_1, cost B_2, cost C_1, and cost C_2 was considered for the estimation of cost of soybean production mention below. The cost C_2 was taken into account in the study to calculate net income and benefit cost ratio. The Cost C_2 includes all direct expenses paid in cash and kind for crop production such as hired human labour, machine labour, seeds, fertilizers, irrigation, plant protection measures, overhead charges and imputed value of family labour. The overhead charges included land revenue paid to the state government, interest on working capital and fixed capital and charges paid for maintence and depreciation of fixed assets (central statistical organization 2008).

Garret ranking technique

In the present study, garret ranking technique as developed by IRRI, (Manila), Phillipines, was used to constraints analysis. The opinion survey of farmers sample about the various constraints in soybean production was collected and analyzed using Garret's ranking technique. The rank gives by each respondent were converted into present position by using formula.

$$\text{Percent position}=\frac{100\times(Rij-0.5)}{Ni}$$

Where,

$$\text{Rij}=\frac{100\times(Rij-0.5)}{Ni}$$

Where,
Rij= J^{th} respondent given the rank for i^{th} variable
Nj= Number of Variable ranked by J^{th} respondents.

The percentage location of each rank was translated to score using Garrett's table. The score of individuals respondents was added together for each constraint and divided by the total number of respondent. Therefore, after arranging it is descending order the ranking was done on the basis of the mean score.

Results and Discussion

The recent experience of the developing countries confirms that increase in agricultural production is continuously possible by increasing the productivity of land. The productivity of land depends on the optimum allocation of resources, which have definite impact on the cost and revenues structure of the crops farms. Therefor for farmer, examination of the various items of costs involved in crop production and revenue expended form the same are very necessary for policy planning at micro level and rational cropping decision at micro level.

Cost and Returns structure of soybean production

The quantity of various inputs directly affects the cost of cultivation and therefore, the use of different inputs like human labour, seeds fertilizers, plant protection chemical etc. in quantitative and monetary terms have been studied in details. The information on utilization of different resources for soybean crop is presented in the table-1. The study revealed that an average soybean cultivating farmers spent highest on 26.26 present of total variable cost on hired human labour, followed by 23.78 per cent on plant protection measures 18.12 per cent on seed cost, 13.14 per cent on machine power and 13.04 per cent on fertilizer costs. The table also observed that the total cost of cultivation per hectare of soybean in Ujjain district was estimated, RS. 43597.20 on overall farm. The average cost of cultivation observed highest on marginal farm (Rs. 47203.20), followed by large farms (Rs. 44223.40) and lowest on small farm (Rs. 41358.86).

Per hectare variable cost was observed highest in marginal farmer due to increase in the expenditure towards, human labour, seed cost, machine power and fertilizer costs respectively. Among different item of cost rental value of land was the major items of cost which accounted Rs. 14,893.75 per hectare.

An attempt has been made to compare the per hectare gross income, profit at different costs with net returns and benefit cost ratio in different size groups of soybean growers are presented in table-2. The gross return realized per hectare was Rs. 61898.45 at the overall level. From the point of view net return, this intended to increase with farm size. The net retune per hectare on variable cost amounted to Rs.36482.13, Rs. 38797.58, Rs. 47618.04, and Rs. 39659.26 on marginal, small, medium and large farm respectively. The Benefits cost ratio of soybean farming was highest on medium farms (3.20) and lowest on marginal farms (2.39) on the basis of total variable cost. The highest net return on medium farm due to higher yield and higher the price level by these farm as compare to other farm sizes. It is seen that on medium size group of soybean growers got more profit (3.20), followed by large, small and marginal size group in the study area.

Constraints

The result of the study (Table-3) indicated that out of production constraints, lack of labour facilities during peak period ranked-I (59.78%) which might be due to reason that high wage in one hand and another most of the laboures work under MNREGA scheme. The second most significant constraints was pest and disease hazards ranked -II (59.57%), which might be due to improve pest-management practices and high cost of pesticide ranked-III (57.18%), poor weather ranked (57.18)%. The other least severe constraints were non-availability of fertilizers on time (31.88%) respectively.

Again, out of financial constraints, high wage rate of labour ranked –I (61.67%), high rate of interest of borrowing ranked-II, (41.88%), unavailability of labour properly ranked-III, (38.43%), expensive improved technology ranked-IV

(29.23%). As regards the marketing constraints lack of storage facilities ranked-I,(37.28%), followed by lack of proper marketing channel (34.67%), high marketing and transportation costs (30.90%), and lack of proper marketing facilities (23.65%) ranked, II, III and IV respectively.

Conclusions and action Implication

The present investigation was intended to depict the picture of soybean growing enterprise in ujjain district. The foregoing discussion on various aspects of study led to draw the following conclusions. The result shown that the utilization of labour cost among the various size group of soybean cultivation on a comparative advantage has been witnessed for the medium size group in the study area. Plant protection measures cost, being a basis input recorded to an average of about 23.78 per cent for soybean crop. The cost of plant protection chemical was found on the rise for medium farmers, which higher proportion of seed cost and fertilizer cost for witnessed on marginal farms. The net return and B: C ratio on variable cost was found highest Rs. 47618.04 and 3.20 for medium farms respectively. It is very much evident from the study that there existed a wide gap between development of technologies and their transfer to actual farming situations. Hence, these constraints perceived by the farmers could be overcome by the following strategies like demonstration on importance of soybean cultivation and their production technology among the farmers of the districts improved high yielding varieties and processing industries should be made available to the farmers. The government intervention is sought in a manner that there is unbiased provide credit support for farms at all categories without discrimination is terms of short term loan to the farmers.

Table 1: Estimated cost of soybean cultivation in a Ujjain districts (Madhya Pradesh)

(Rs./ha)

Particulars	Farm size				
	Marginal (<1ha)	**Small (1-2ha)**	**Medium (2-4 ha)**	**Large (>4ha)**	**Overall**
Cost of hired human labour	6727.71 (25.58)	6314.29 (28.81)	4701.32 (20.81)	7501.39 (31.51)	6311.18 (26.26)
Cost of Machine power	4559.04 (17.33)	3360.00 (15.33)	2457.89 (10.88)	2255.50 (9.47)	3158.12 (13.14)
Cost of Seed	5075.66 (19.30)	3655.43 (16.68)	4083.42 (18.07)	4606.94 (19.35)	4355.36 (18.12)
Cost of Fertilizers	4202.41 (15.98)	3289.29 (15.01)	2678.95 (11.86)	2514.58 (10.56)	3135.27 (13.04)
Plant protection Measure	4250.60 (16.16)	4057.14 (18.51)	7394.74 (32.73)	5583.33 (23.54)	5716.66 (23.78)
Sub-Total	24815.38	20676.15	21315.26	22460.41	22676.20
Interest on Variable Cost (6%)	1489.00 (5.66)	1240.56 (5.66)	1279.00 (5.66)	1347.60 (5.66)	1360.56 (5.66)
Total Variable Cost (TVC)	26304.38 (100.00)	21916.71 (100.00)	22594.26 (100.00)	23807.41 (100.00)	24036.56 (100.00)
Cost A_1(TVC+ including land revenue)	26314.38	21926.71	21452.26	23817.40	24046.56
Cost A_2	26314.38	21926.71	21452.26	23817.40	24046.56
Cost B_1(Cost A_1+ Interest on Capital Asset)	26634.00	22276.72	21822.26	24227.40	23740.11
Cost B_2 (Cost B_1+ Rental value of land)	40859.00	36501.72	37197.26	39977.40	38633.86
Cost C_1(Cost B_1+ family labour)	28687.10	23373.56	22448.58	24453.79	24740.83
Cost C_2(Cost B_2+ family labour)	42912.20	37598.86	37823.58	40203.40	39634.58
Cost C3(Cost C2+10% of C2)	47203.20	41358.86	41605.58	44223.40	43597.20

Source: Survey data (figures in parentheses indicates percentage)

Table 2: Return from soybean production in Ujjain district:

(Rs/ha)

Yield and Income	Marginal	Small	Medium	Large	Overall
Cost of cultivation (Variable cost)	26304.38	21916.71	21442.26	23807.41	24036.56
Cost of cultivation (Total cost)	47203.20	41358.86	41605.58	44223.40	43597.20
Yield (Q/ha)	17.85	15.57	16.40	15.75	15.89
Price(Rs/Q)	3519.23	3899.09	4211.70	4153.37	3495.90
Total Return (Rs.)	62818.52	60707.43	69060.40	65418.72	63448.20
Net Return (on Variable cost)	36514.14	38790.72	47618.04	41611.72	39411.64
Cost of production (Rs/Q)	1473.64	1407.62	1489.05	1511.58	1512.65
B-C ratio(Variable cost)	2.39	2.49	3.20	2.75	2.64
B-C ratio(total cost)	1.33	1.47	1.66	1.48	1.46

Table 3: Constraints of soybean cultivation in Ujjain districts

(N=60)

SI. No	Constraints	Garrets mean score	Garret Ranking
A	**Production constraints**		
1	Lack of labour facility during peak period	59.78	I
2	Pest and disease hazards	**59.57**	**II**
3	Poor weather	57.18	IV
4	High cost of pesticides	57.98	III
5	Non-availability of fertilizer on time	31.88	V
B	**Financial constraints**		
1	High wage rate of labour	61.67	I
2	High rate of interest of borrowing	41.88	II
3	Unavailability of loan properly	38.43	III
4	Expensive improved technology	29.23	IV
5	Old technology	20.15	V
C	**Marketing Constraints**		
1	Lack of storage facilities	32.28	II
2	Lack of proper marketing channels	34.67	I
3	High marketing and transportation cost	3090	III
4	Lack of proper marketing facilities	23.65	IV

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