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Production and Economic Analysis of Mustard Cultivation in Faridabad District of Haryana

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ABSTRACT

Rapeseed-mustard crops are one of the most important *rabi* oilseed crop cultivated in India. In 2018-19 crop season the production, area and productivity was 9.26 Million tones, 6.12 million hectare and 1511kg/ha respectively in India. Globally, India account for 19.8 % and 9.8% of the total acreage and production (USDA). In Haryana mustard cultivation is done in 0.61 million ha area and production is 1.25 million tones. In India mustard is cultivated in the states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Haryana, and West Bengal which contribute 82.41% area and 88.58% production in 2018-19 (Directorate of Economics and Statistics, DAC and FW) The present study was conducted in Faridabad district of Haryana. The data was collected with a three stage stratified random sampling technique to select the block, village and farmers. The Ballabgarh block was selected for this purpose. The selection of ultimate unit of the sample was selected purposively for collection of data. The mustard crop base farmers of the selected villages were stratified in two groups i.e., lower strata (up to one ha) and upper strata (above one ha). The per hectare cost of cultivation of mustard crop was worked out about Rs 40748.90 for lower strata and Rs 38672.28 for upper strata size of farm of mustard grower farmers. Whereas average cost of cultivation was Rs 39710.59. It was observed that, the Benefit Cost ratio of mustard cultivation was Rs1:3.69 while Cost- A, Cost- B and Cost- C level it was Rs 1:4.97, Rs 1:3.91 and Rs1:3.69 respectively. It found that the mustard cultivation was profitable in district Faridabad. For calculating the break-even point and profitability of production, it shows increasing at decreasing rate of returns from the break-even yield to the average yield.

Keywords Production, Economic analysis, Break-even point, Margin of safety.

INTRODUCTION

Haryana is small state in the Gangetic plains of India meeting Shiwalik foot hills in the north, Aravallis in the south west and arid plains in the west. Agriculture will play a vital role in the growth of Indian economy. Crop diversification in paddy-wheat crop rotation with mustard must be encouraged for rapid economic growth and employment in the country. Rapeseed-mustard is the second most important

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edible oilseed crop of India after groundnut. It has to play a major role in making India self-sufficient in oilseed production. Rapeseed-mustard crop is one of the most important *rabi* oilseed crop cultivated in India. India is major rapeseed-mustard growing country in the world, it accounted for estimated production of 9.26 Million tones with 6.12 million ha of area and 1511kg/ha productivity in 2018-19 (Directorate of Economics and Statistics, DAC and FW). The estimated area, production and yield of rapeseed-mustard in the world was 36.59 million hectares, 72.37 million tones and 1980 kg / ha, respectively, during 2018-19. Globally, India account for 19.8 % and 9.8% of the total acreage and production (USDA). Globally, India continues to be rank 2nd after Canada in acreage (19.81%) and rank 4th after Canada, European Union and China in production (10.37%) 2019-20. Out of the seven edible oilseed cultivated in India, rapeseed-mustard (*Brassica* spp.) contributes around 28.6% in the total production of oilseeds. In Haryana mustard is cultivated on 0.61 million ha. Whereas production is 1.25 million tones, which plays a major role in supplementing the income of farmers of Haryana. The productivity in Haryana (2058 kg/ha), Gujarat (1784 kg/ha), Rajasthan (1709 kg/ha), Uttar Pradesh (1483 kg/ha) and Madhya Pradesh in 2018-19. Rapeseed Mustard Scenario in India. Indian mustard (*Brassica juncea*) is predominantly cultivated in the states of Rajasthan, Uttar Pradesh, Madhya Pradesh, Haryana, and West Bengal which contribute 82.41% area and 88.58% production in 2018-19 (Directorate of Economics and Statistics, DAC and FW). Keeping in view the above mentioned facts present study entitled "Production and economic analysis of mustard cultivation in Faridabad district of Haryana" was undertaken with the objectives (1) to estimate the cost of cultivation of mustard crop (2) to study the economic analysis of mustard cultivation (3) to study the break- even analysis of mustard cultivation.

MATERIALS AND METHODS

The present study was conducted in Faridabad district of Haryana. The data was collected with a three stage stratified random sampling technique to select the block, village and farmers. The Ballabgarh block was selected for this purpose. The selection of ultimate unit of the sample was selected purposively for collection of data. The mustard cultivation base farmers of the selected villages were stratified in two groups i.e., lower strata (up to 1 ha) and upper strata (above 1 ha). From the villages, sixty households were selected through simple random sampling without replacement each category. The primary data on various aspects of mustard cultivation was collected from selected respondents. Analysis was conducted in reference to Gangwar and Singh (2015).

Tools: The weighted average of the variable X has been calculated by using following formula.

$$\text{Weighted average} = \frac{\sum \text{WiXi}}{\sum \text{Wi}}$$

Where, Wi = Weight assigned
Xi = Value of the variable

For calculating the break-even point and profitability of mustard cultivation, the following formula was used:

$$\text{Break even point (BEP)} = \frac{\text{Total cost of production}}{\text{Price per unit of yield}}$$

The percentage share of the break-even point of the average mustard yield was calculated

$$\text{Percentage share of the break-even point} = \frac{\text{Break even point (BEP)}}{\text{Price per unit of yield}} \times 100$$

RESULTS AND DISCUSSION

Production analysis

The production per hectare of mustard on different categories of farmers, were worked out and presented in Table 1. It indicates that the average yield per hectare of rapeseed-mustard came to 26.12 q/ha. Yield per hectare was observed different in different strata. Higher yield was found at lower strata (26.75 q/ha) and the lowest was observed at the upper strata (25.50 q/ha) Table 2. Production analysis was found in reference to Kumar P. *et al.*(2017) and Sharma *et al.* (2018).

Table 1. Per hectare cost of different inputs in mustard cultivation. Values are given in rupees.

Sl. No.	Items	Size groups of sample farms Lower strata (Up to one ha)	Upper strata (Above one ha)	Overall
1	Family labor	2800.00 (6.87)	1750.00 (4.52)	2275.00 (5.73)
2	Hired labor	10500.00 (25.77)	9800.00 (25.34)	10150.00 (25.56)
3	Tractor and Machinery charges	8871.05 (21.77)	8570.45 (22.16)	8720.75 (21.96)
4	Seed charges	520.52 (1.28)	543.63 (1.41)	532.08 (1.34)
5	Manures and Fertilizers	3655.26 (8.97)	3434.09 (8.88)	3544.68 (8.93)
6	Irrigation charges	5173.68 (12.70)	5513.63 (14.26)	5343.65 (13.46)
7	Plant protection	898.68 (2.21)	977.27 (2.53)	937.97 (2.36)
8	Miscellaneous	221.47 (0.53)	168.63 (0.44)	195.05 (0.49)
9	Interest on working capital	1377.98 (3.38)	1307.76 (3.38)	1342.87 (3.38)
10	Rental value of land	6730.26 (16.52)	6606.82 (17.08)	6668.54 (16.79)
	Total cost	40748.90 (100.00)	38672.28 (100.00)	39710.59 (100.00)

Figure in parentheses indicate percentage to the total cost)

Cost of mustard cultivation

The cost incurred on the various input factors and the cost of production of mustard per hectare was worked out (Table 1). The cost of cultivation of mustard was found Rs 39710.59 per hectare, and cost of cultivation was higher on lower strata Rs 40748.90 than the upper strata (Rs 38672.28) were using more manure

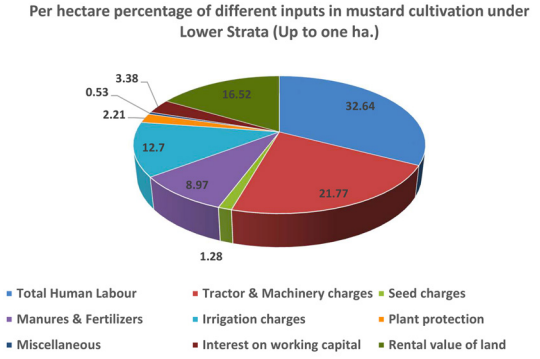

Fig. 1 a. Cost of cultivation of mustard crop under lower strata.

Table 2. Economic analysis of mustard cultivation. Rs.

Sl. No.	Items	Size groups of sample farms Lower strata (Up to one ha.)	Upper strata (Above one ha.)	Overall
1	Cost- A1/A2	29840.66	29007.80	29424.23
2	Cost- B	37948.90	36922.28	37435.59
3	Cost- C	40748.90	38672.28	39710.59
4	Gross income	144237.50	148575.00	16406.25
5	Net income	103488.60	109902.72	106695.66
6	Farm business income	114396.84	119567.20	116982.02
7	Family labour income	106288.60	111652.72	108970.66
8	Farm investment income	110218.86	116509.54	113364.20
9	Cost production (per quintal)	1523.32	1516.56	1519.94
10	Yield (qt /ha)	26.75	25.50	26.12
11	Cost benefit ratio	3.54	3.84	3.69
a	On the basis of cost- C	3.54	3.84	3.69
b	On the basis of cost - B	3.80	4.02	3.91
c	On the basis of cost - A	4.83	5.12	4.97

and fertilizer, total human labor, seed cost, machinery charges, irrigation charges, plant protection as compared to upper strata, resulting the higher cost of cultivation. Average human labor is 32.64% (Fig 1 a) (25.77% hired labor and 6.87 % family labor) under lower strata while average human labor is 29.87% (Fig. 1b) (25.34% hired labor and 4.52% family labor) under upper strata. On an average the human labor is 31.29% (25.56% hired labor and 5.73% family labor) Table 1. Second major item was tractor and machinery charges 21.96% followed by rental value of land 16.79%, irrigation charges 13.46%, manure and fertilizer 8.93%, interest on working capital 3.38%, plant protection 2.36 and seed charges 1.34%, respectively. Cost analysis was found in reference to Kumar *et al.* (2016), Sahu *et al.* (2018) and Shukla and Gupta (2020).

Economic analysis of mustard cultivation

The return per hectare from production of mustard on different categories of farmers, were worked out and presented in Table 2.

On an average Cost A1/A2 basis came to Rs 29424.23 which was Rs 29840.66 and Rs 29007.80 on lower strata and upper strata respectively, whereas on an average Cost-B basis came to Rs 37435.59

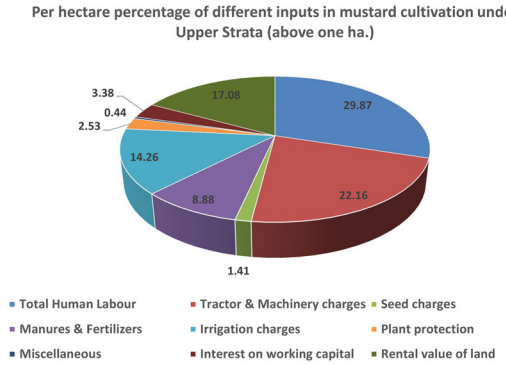

Fig. 1 b. Cost of cultivation of mustard crop under upper strata.

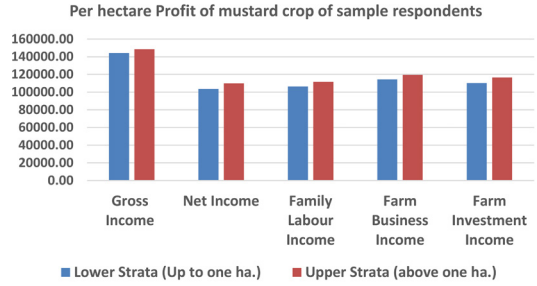

Fig. 2. Profit of mustard crop of sample respondents.

which was Rs 37948.90 and Rs 36922.28 on lower strata and upper strata respectively. Further on an average Cost-C basis came to Rs 39710.59 which was Rs 40748.90 and Rs 38672.28 on lower strata and upper strata respectively. Cost A1/A2, Cost B and Cost C in lower strata was higher than the upper strata. Average net income of Rs 106695.66. Per hectare was worked out whereas net income was higher on upper strata (Rs 109902.72) as compared to lower strata (Rs 103488.60). On an average farm business income was worked out Rs 116982.02, it was higher on upper strata (Rs 119567.20) as compared to lower strata (Rs 114396.84). On an average family labor income was worked out Rs 108970.66, it was higher on upper strata (Rs 111652.72) as compared to lower strata (Rs 106288.60). Average farm investment income was worked out Rs 113364.20, it was higher on upper strata (Rs 116509.54) as compared to lower strata (Rs 110218.86). From present study it was observed that mustard cultivation is more profitable in Faridabad district *rabi* season crops. Economic analysis was found in line with finding of Kumar *et al.* (2018) and Verma and Rathore (2018).

Analysis revealed that family labor income, net income, farm investment income and farm business income increases with increase in size groups of farms. Average cost of production per quintal of mustard was worked out as Rs1519.94, it was higher on lower strata (Rs 1523.32) as compared to upper strata (Rs1516.56). The input – output relationship was worked and it was 3.69, 3.91 and 4.97 on the Cost-C, Cost-B and Cost –A basis, respectively. The input-output ratio was higher in upper strata on Cost – C, Cost–B and Cost –A as compared to upper strata. The comparison of lower and upper strata of gross income, net income, family labor income, farm business income and farm investment income has been depicted in Fig. 2 shows that upper strata show better income than lower strata in all parameters.

Break-even point analysis of mustard cultivation

The break-even analysis was done to estimate the minimum quantity of mustard cultivation to be produce to cover the total cost on all the farmers size (Table 3). Cost of production was Rs 46162.54 and Rs 43993.01 per hectare for lower and upper strata respectively. The selling price of mustard was Rs 5250 and Rs 5650 per qt for lower and upper strata respectively. The total mustard production was 26.75 and 25.50 quintal per hectare on lower and upper strata respectively. The break-even output came out to be 8.79

Table 3. Break-even point analysis in mustard cultivation.

Sl. No.	Items	Size groups of sample farms		
		Lower strata (Up to one ha)	Upper strata (Above one ha)	Overall
1	Cost of cultivation (in Rs)	40748.9	38672.28	39710.59
2	Management charges (in Rs)	4074.89	3867.23	3971.06
3	Cost of marketing (in Rs)	1338.75	1453.50	1396.12
4	Cost of production (in Rs)	46162.54	43993.01	45077.77
5	Price per quintal (in Rs)	5250.00	5650.00	5450.00
6	Out-put per hectare (in qt)	26.75	25.50	26.12
7	Break even out-put (in qt)	8.79	7.77	8.28
8	Percentage of breakeven point to total out-put	0.17	0.14	0.16
9	Marginal safety (in qt)	17.96	17.73	17.84

qt and 7.77 qt on lower and upper strata. The study reveals that the mustard production per hectare was higher than its break-even output to cover the total cost of production of all the farm size. The percentage break-even point was worked out to 0.17 and 0.14% of the total mustard production on lower and upper strata, respectively. On an average, the break-even point was worked out to be 8.28 qt and 0.16% of the total mustard production. The overall marginal safety was worked out as 17.84 qt per hectare. Thus, it can be concluded that the breakeven output was achieved earlier on upper size farmer than lower size farmers. Economic analysis was found in line with finding of Shukla and Gupta (2020).

CONCLUSION

It is concluded from the present study that cultivation of mustard is profitable in district Faridabad as compare to other crops grown in *rabi* season. The per hectare profit at Cost- C in lower strata and upper strata was Rs 103488.60 and 109902.72, respectively. On an average net income, farm business income, family labor income and farm investment income was calculated as Rs 106695.66, Rs 116982.02, Rs 108970.66 and Rs 113364.20 respectively. The benefit cost ratio at lower strata and upper strata were 1: 3.54 and 1: 3.84, respectively. Whereas average benefit cost ratio was 1: 3.69 for mustard cultivation. The mustard is a profitable crop in the study area as reflected by the considerable difference between the average yield per hectare and the break -even point. Based on economics of mustard crop in future the area under this crop will certainly increase and government is also purchasing crop at higher price.

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