

Original Research Article

Estimation of cost and returns per hectare and input-output ratio of Mustard on different size group of farms in Jhansi district of Uttar Pradesh, India

Abstract

The present study was conducted in Jhansi District of Uttar Pradesh .. Acknowledging the limited time, money, resources and employment stability of Mustard .Totally 100 respondents were selected and interviewed. Primary data were collected through interview method, a number of different schedules were prepared for that purpose. For the collections of primary data, a number of different schedules were prepared for that purpose. The information was obtained from discussion with traders and farmers and actual spot observations. The information pertaining to production, purchases and disposal pattern of mustard was collected and secondary data were collected from government offices. Tabular and functional analyses were used to draw the conclusion, Respondents were categorized as marginal, small and medium size of farm. The cost and return have been summarized in this part of the result. On an overall average the major component of the cost were human labor (23.27 per cent), rental value of owned land 21.11 per cent), Accurate and region- specific data is important for obtaining respective and reliable estimates of the total costs of cultivation. It was observed that hired labour, machinery labour, seed, manure & fertilizer, irrigation showed constructive relationship with the increase in farm size, while family labour showed the inverse correlation (relationship) with increase the farm size. The objective is to estimate the cost and returns per ha of mustard cultivation.

Keywords: cost of cultivation, returns, gross income, net return, input- output ratio.

Introduction

“Agriculture is the backbone of rural Indian economy. A rise in the per capital income of the farm sector would create a greater aggregate demand for the goods and services produced in the other sectors of the economy. This in turn would create greater potential to absorb unemployed labour force. Oilseed crops are the most important commercial crops of India. India is the third largest producer of oilseeds in the world. The demand for the consumption of mustard comes mainly from eastern and northern areas of the country. The arrival of this crop in the markets is in its peak period during March to May. In Uttar Pradesh, a significant rise has been sighted in the last ten years of Mustard’s area, production and yield, the production has almost become doubled” [Kalia et al.2015; Patil, S.M. 1995.]. The present study has identified the measures of growth and instability (area, production and yield), of mustard in India, U.P and Jhansi district which would help policymakers and government for planning and implementing of policy related to its production and trade different oilseeds mustard is the second important oilseed crop of India, next to groundnut in respect of production. Government of India and the Uttar Pradesh Govt. share the expenditure incurred under the scheme in the ratio of 75:25 between Centre and State Government. “In the production and marketing of mustard farmers face many problems like transfer of technology, supply of quality seeds, arrangement of industrial credit, fertilizers and other inputs, market arrangements, frequent There is a need to carry out the micro levelstudies on these aspects. Production of oilseeds and oils has not fluoresced with increasing demandfor edible oils and due to this widening demand-supply gap has necessitated imports of edible oils. With competing demands onagricultural land from various crops and enterprises, the production of oilseeds can be increased only if productivity is improved significantly and farmers get remunerative prices and assured market access” [Rashid and Anwar. 2004; Gawaria et al. 2011]. Therefore, various cost associated & constraints in oilseeds production faced by the farmers which inhibit the yield potential of crops need to be addressed As such there is a need To identify the marketing channels, institutions and agencies involved and to estimate the costs and margins in the marketing of mustard. Keeping in view the above facts, the present study entitled

Methodology

Sampling design -A multi-stage sampling procedure was adopted for the for the selection of district as the first stage unit, block as the second stage unit, villages as the third stage unit and farm size as holdings as the final and ultimate stage units.

Selection of District- Keeping in view the nearness from the center of the study and limited time available the study. with the single-handed worker, Jhansi district of Uttar Pradesh was purposively selected for the study.

Selection of the block -Out of eight blocks of Jhansi district, Moth Block was selected purposely for executing the study, because majority of farmers from this block were growing mustard.

Selection of villages -A list of mustard growing villages was prepared with respect to the Jhansi(mandi) market. These villages were divided into two categories on the basis of distance of village from the market Category-1: Villages within a radius of 5 km from the selected market. Category-II: Villages beyond 5 km from the market and

having access to the selected market. One village from each category was selected randomly. A list of all the villages falling under Moth block was prepared, arranged in ascending order to the area covered under mustard crop and five villages were selected randomly from this list namely, Basowai, Looka , Ahorli, Deora, Puliya have been selected

Selection of Farmers -Intensive survey of each selected village was made in consultation with the village patwari. Then a list of all the mustard growing farmers was prepared from villages. All the mustard growing farmers were classified into three standard size groups on the basis of size of their operational land holdings.

- Marginal farmer (below 1 ha)
- Small farmer (1-2 ha),
- Medium farmer (2-10ha)

From this list 100 respondents were selected randomly through proportionate allocation to the population.

2.1 Analysis of Data

The data was analyzed using appropriate statistical tools. Comparing the various parameters among the farmers in the small, medium, and marginal size groups was done using tabular analysis. The cost of production and returns were calculated per ha in order to assess profitability. Weighted averages were employed in this computation. Using the conventional CACP cost approach, the cost of cultivation and returns were calculated.

Total cost: Total cost = Total variable cost + Total fixed cost

Cost A1: It includes

1. Value of hired human labour
2. Value of hired and owned bullock labour
3. Value of hired and owned machine labour
4. Value of seed (both farm seed and purchased)
5. Value of manures (owned and purchased) and fertilizers
6. Depreciation
7. Irrigation charges
8. Land revenue
9. Interest on working capital
10. Miscellaneous expanses

Cost A2: Cost A1 + rent paid for leased in land.

Cost B1: Cost A2 + interest on value of owned fixed capital assets (Excluding land).

Cost B2: Cost B1 + rental value of owned land. **Cost C1:**

Cost B1 + imputed value of family labour. Cost C2:

Cost B2 + imputed value of family labour.

Cost C3: Cost C2 + 10% of C2 (managerial cost).

$$\text{Cost of production (Rs/ q)} = \frac{\text{cost of cultivation / ha}}{\text{Quantity of main product/ ha}}$$

Income measures : Following income measures were calculated

1. **Gross income:** $GI = Q_m * P_m$
2. **Farm business income** = Gross income - Cost A1
3. **Family labour income** = Gross income - Cost B2
4. **Net income** = Gross income – Cost C2
5. **Return to management** . = Gross Income - Cost C3
6. **Return per rupee of investment** = $\frac{\text{Gross Income (G.I)/ ha}}{\text{cost C2/ha}}$
7. **Family labour income** = Gross Income - cost B2

Result and Discussion

Per hectare costs of cultivation of mustard:

Per hectare costs incurred on the various input factor in the production of mustard was worked out and given in table 1. This Table 1 indicates that, costs of cultivation was highest on small farms (Rs.32136.52), followed by medium farms (Rs.32042.96) and marginal farms (Rs.31989.74). The overall average of costs of cultivation was observed (Rs. 32056.41) on sample farms, which shows the positive relationship with the size of farms. On an overall average the major component of the cost were human labor (23.27 per cent), rental value of owned land 21.11 per cent, irrigation charge (14.64 per cent), manure & fertilizer (7.81 per cent), machine labor (10.76 per cent), and interest on fixed capital (1.64 per cent), respectively of the total costs of cultivation. It was observed that hired labour, machinery labour, seed, manure & fertilizer, irrigation showed constructive relationship with the increase in farm size, while family labour showed the inverse correlation with increase the farm size.

Interest on working capital is paid at 5% which is obviously low as working cost is low in marginal farm group at 972.03/ha followed by small and medium farm group with Rs. 1027.68/ha and Rs. 1022.96 /ha respectively.

Table:1 hectare costs of different inputs used in Mustard production(Rs.)

Particulars		Size group			
		Marginal	Small	Medium	Overall
1. Operational cost					
A. Labour cost					
i. Human labour	Family	8178.65 (26.68)	6144.18 (19.27)	5007.15 (23.86)	6443.36 (23.27)
	Hired	367.25 (1.68)	2170.04 (7.21)	3673.44 (2.39)	2070.24 (3.76)
ii. Machine Labour	Owned+ Hired	2154.06 (7.68)	3455.28 (12.36)	2600.00 (12.21)	2736.44 (10.76)
iii. Bullock labour		1121.47 (3.65)	0.0 (0.0)	937.00 (1.02)	686.16 (1.57)
Sub Total		11821.97 (39.69)	11769.05 (38.84)	12217.59 (39.48)	11936.23 (39.34)
B. Material cost					
i. Seed		748.08 (2.15)	892.40 (2.73)	726.63 (2.51)	789.27 (2.46)
ii. Fertilizer & manure		2204.02 (7.17)	2828.83 (8.36)	2367.35 (7.36)	2466.74 (7.81)
iii. Plant protection		134.24 (0.54)	326.70 (1.40)	544.72 (0.26)	335.22 (0.74)
iv. Irrigation charge		4531.05 (14.35)	4736.27 (14.16)	4603.63 (15.41)	4623.66 (14.64)
Total Working cost		19440.71 (63.09)	20553.07 (65.49)	20459.92 (65.62)	20151.24 (64.74)
Interest on working Capital		972.03 (3.43)	1027.68 (3.21)	1022.96 (3.34)	1007.57 (3.33)
A. Rental value of land		6365.00 (21.03)	6365.00 (21.52)	6365.00 (20.79)	6365.00 (21.11)
B. Depreciation		1827.43 (3.47)	856.17 (2.87)	719.28 (4.78)	1134.30 (3.70)
C. Interest on fixed capital		476.17 (1.83)	413.28 (1.43)	563.52 (1.64)	484.32 (1.64)
Total fixed cost		8668.6 (26.32)	7634.45 (25.82)	7647.08 (27.21)	7983.37 (26.45)
Total cost (Operational cost + Fixed cost)		29081.34 (93.69)	29215.02 (93.09)	29129.96 (92.83)	29142.11 (93.21)

Managerial Cost@10% of sub-total cost	2908.13 (6.42)	2921.51 (6.69)	2912.99 (7.17)	2914.21 (6.94)
Grand Total	31989.74 (100)	32136.52 (100)	32042.96 (100)	32056.41 (100)

Cost and Return of cultivation and different cost concept basis in different size of farms group(Rs/ ha)

Cost concepts in Mustard production per hectare in different size of farms group (Rs./ha)

Table 2 reveals that cost concepts on different size of farms group per hectare. Cost A1 was highest in medium size farms Rs. 16475.73/ha followed by small size farms Rs. 15437.02/ha and marginal size farms Rs.12232.02/ha respectively. Cost B1 was highest in medium size farms Rs. 17039.25/ha and lowest in marginal size farms Rs. 12708.19/ha as compared to small size farms Rs 15850.48/ha respectively. The average Cost B2 was Rs.21564.65/ha respectively. Among different land size categories, Cost C1 was highest on medium farms Rs 22046.04/ha and lowest on marginal size farms Rs 20886.84/ha with an average of Rs 21994/ha of small size farms. Cost C3, which includes managerial cost, was worked out to be Rs 30894.67/ha per hectare on an overall basis. An increasing trend was observed in different costs with increase in the farm size.

Table 2: Cost concepts in Mustard production per hectare in different size of farms group (Rs./ha)

S. No.	Cost	Size group			
		Marginal	Small	Medium	Overall
1	Cost A□/A□	12232.02	15437.02	16475.73	14715.03
2	Cost B□	12708.19	15850.48	17039.25	15199.35
3	Cost B□	19073.19	22215.48	23404.25	21564.35
4	Cost C□	20886.84	21994.66	22046.04	21642.71
5	Cost C□	27251.84	28359.66	27053.19	28086.07
6	Cost C□	29977.02	31195.62	29758.51	30894.67

Graph 1:- Overall Result Cost concepts in Mustard production per hectare in different size of farms group (Rs./ha)

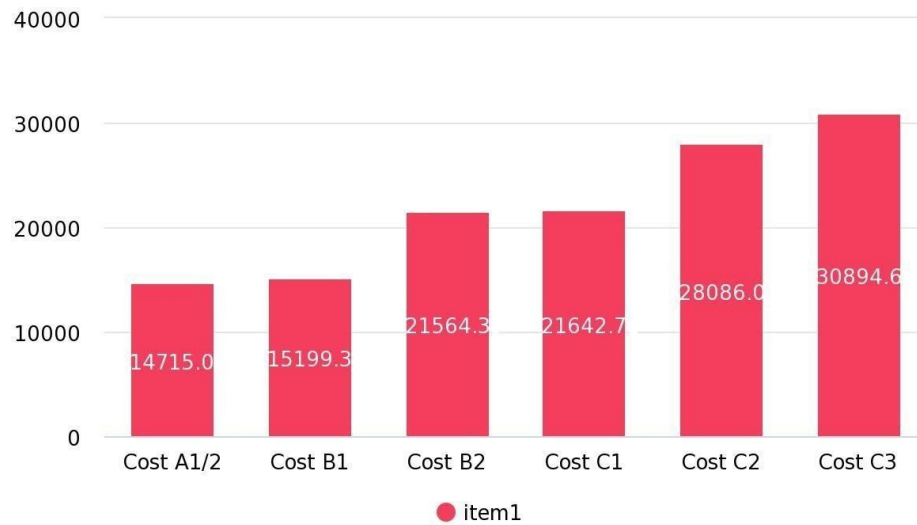


Table 3. Reveals that cost and returns in Mustard production in different size of farms group. Among different size of farms groups, the total cost of production incurred by the small farms were high (Rs.32136.52/ha) as compared to medium (Rs.32042.96/ha) and marginal farms (Rs.31989.74 /ha). Sample average for total cost of production was Rs.32056.41/ha in different size of farms group. Yield of product is less in marginal size farms is 13.48 qtls/ha, as compared to small size farms 13.74 qtls/ha and medium size farms group is 14.13 qtls/ha. Average yield h in all three categories is 13.78 qtls/ha. The gross returns obtained per hectare by medium size farms were high (Rs.44688.09/ha) as compared to small and marginal size farms (Rs.43446.88/ha and Rs.42624.75/ha) respectively. The net returns per hectare obtained by medium size farms were (Rs.17637.9/ha) as compared to marginal and small size farms (Rs.12647.73/ha and Rs 12251.26/ha) respectively.

Table 3 : Measures of Farm profitability in Mustard production per hectare in different Size of Farm Groups (Rs./ha)

S. No.	Economic parameter	Size group			
		Marginal	Small	Medium	Overall
1	Total cost	31989.74	32136.52	32042.96	32056.41
2	Yield(qtls/ha)	13.48	13.74	14.13	13.78
3	Cost of production Rs/qtls	2373.12	2,338.91	2,267.72	2,326.29
4	Gross income (Rs/ha)	42624.75	43446.88	44688.09	43,586.57
5	Net income	15,372.91	15,087.22	17,634.9	15,500.5
6	Return to management	12,647.73	12,251.26	14,929.58	12,691.9
7	Farm business income	30,392.73	28,009.86	28,212.36	28,871.54
8	Farm investment income	22217.08	21,865.5	24,563.42	22,349.82
9	Family labour income	23,551.56	21,231.4	21,283.84	22,022.22
10	Return per rupee (RPR)	1.56	1.53	1.65	1.55
Input-Output ratio					
a.	On the basis of cost A1	1:3:48	1:2:81	1:2:71	1:2.96
b.	On the basis of cost B1	1:3:35	1:2:74	1:2:62	1:2.86
c.	On the basis of cost B2	1:2:23	1:1:95	1:1:90	1:2.02
d.	On the basis of cost C1	1:2:04	1:1:97	1:2:02	1:2.01
e.	On the basis of cost C2	1:1:56	1:1:53	1:1:65	1:1.55
f.	On the basis of cost C3	1:1:42	1:1:39	1:1:50	1:1.41

On overall average family labour income, farm investment income and farm business income were observed to Rs. 22022.22/ ha, Rs. 22349.82/ ha and Rs. 28871.54/ ha, respectively. Family labour income was highest on marginal farms followed by medium and small farms and farm investment income was highest on medium farms followed by marginal and small farms and farm business income was highest on marginal farms followed by medium and small farms. On an average, cost of production per quintal was estimated to Rs. 2326.29/ ha which was maximum on Marginal farms i.e. Rs 2373.12/ ha followed by small and medium size of farms i.e. Rs. 2339.91/ha and Rs. 2267.72/ha, respectively. On an average input output ratio the basis costs A1/A2, B1, C1, C2 and C3 were recorded 1:2.96., 1:2.86, 1:2.02, 1:2.01, 1:1.55 and 1:1.41 respectively. On the basis of cost C2, the output: input ratio was highest on medium farms i.e. 1:1.65 followed by marginal and small size group of farms i.e. 1:1.56 and 1:1.53 , respectively. It may be concluded from above discussion that medium farmers were more conscious about economic cultivation of mustard, than the small and marginal farmers. Which results in positive ration of cost of cultivation and inverse correlation of income measures with size of holding on sample farms.

Conclusion

We can conclude following from the above study , Table 1 indicates that, costs of cultivation was highest on small farms (Rs.32136.52), followed by medium farms (Rs32042.96) and marginal farms (Rs.31989.74).Sample average for total cost was Rs. 32056.41 /ha in different size of farms group. Table 2 reveals that cost and returns in mustard production in different size of farms group. An increasing trend was observed in different costs with increase in the farm size. The overall cost,of A1, B1, B2, C1, C2, C3 were Rs 14715.03/ ha, Rs 15199.35/ha, Rs 21564.35/ha, Rs21642.71/ha, Rs28086.07/ha, and Rs 308794.67/ha. Table 3 Reveals that cost and returns in Mustard production in different size of farms group. Yield of product is less in marginal size farms is 13.48 qtls/ha, as compared to small size farms 13.74 qtls/ha and medium size farms group is 14.13 qtls/ha. Overall gross income was Rs4356.57/ha and net income was Rs15500.5/ha.

The overall rate of return was estimated as 1.55 with medium size farm hold highest

i.e 1.65 followed by marginal and small farm size 1.56 and 1.53. On the basis of cost C2, the output: input ratio was highest on medium farms i.e. 1:1.65 followed by marginal and small size group of farms i.e. 1:1.56 and 1:1.53 , respectively. The discussion above suggests that medium farmers were more concerned with the economics of growing mustard than were small and marginal farmers. Which leads to a positive association between cultivation costs and holding size on sample farms and an inverse correlation between income measurements and holding size.

Reference

Patil, S.M. (1995). Yield Gaps and Constraints in Groundnut production in Karnataka. An Economic Analysis. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad. i Povrtarstvo; 47(1):179-185.

Tripathi, R.S. (1995) Rapeseed (*Brassica campestris* L.) cultivation in rainfed hill farming: case study. *Journal of Agricultural Research*.**29** (1/2):10-14. 3

Rashid, M. A.; Anwar, M. M.(2004) Profitability and resource use efficiency of mustard crop selected areas of Bangladesh. *Economic Affairs (Calcutta)*,**49**(2):87-93. 7.

Gawaria, K. M. Gajja, B. L. Sharma, S. B. (2011). “Economic efficiency of mustard production in arid region of Rajasthan: an econometric analysis.” Banaras Hindu University - CAB Abstracts Current Agriculture; 2011. 35(1/2):27-32.

Dubey, L.R., Pal, H.R., Singh, S.P. (2014). A study of costs and returns for rapeseed-mustard on the sample farms of Bharatpur district of Rajasthan. *Agric. Sci. Digest.*, 34(4): 257 – 262.

Kalia, A., Sen, C., Singh, S.K., Singh, U.P., Tripathi, A.K., and Mishra, S. (2015). Comparative analysis of resource endowments in different regions of Eastern Uttar Pradesh. *Ecology Env. and Conserv.*, 21(Suppl): 259-256.

Verma, Ajit; Gupta, Savita; Singh, I. J; Singh, S. P; Kumar, Avinash (2015). Study the cost of cultivation and net income of mustard in different farm size groups on the fields. *Plant Archives*, **15** (2):841-842.

Yadav, M.K. and Sharma, A.(2019). Assessment of resource use efficiency of rapeseed and mustard to farm size in to block of Jaipur district, Rajsthan. *J. Env. Sci. Pharmacology and Life Sci.*, 8(5): 78 - 84.

Jammu Division of J& K state, Indian Journal of Agricultural Sciences, 88(3), 463-468

DRMR. 2020. Directorate of Rapeseed-Mustard Research. Retrieved September 12, 2020, from www.drmr.res.in:www.drmr.res.in/about_rmcrop.php

Gayathri, H. and Chakrabarty, Y.S. (2021). Economics of Rapeseed-Mustard in Imphal West District of Manipur. *Indian Res. J. Ext. Edu.*, 21(1).