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


## Abstract

The present study was conducted in Jhansi District of Uttar Pradesh . Study on cost and return estimation of Mustard was carried out during agriculture year 2021. Keeping in view the limited time, money, resources and employment stability of Mustard .The study was based on 100 respondents of different categories. 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 Govt. offices. Tabular and functional analyses were used to draw the inferences, Respondents were categorised 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. At last mustard cultivation was found commercial successful and showed the advance increase in profit per unit of time and area if the constraints of production and marketing is solved.


**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. Jhansi district which is a disadvantaged region also known forits dryland and rain fed conditions. Area wise, mustard is the third important crop of rabi season in this region(mostly taken as intercrop with wheat). With the limited sub-optimal resources, in the last ten years there has been a significant change in the area, production and productivity of mustard. 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. It belongs to family Cruciferae and genus Brassica. 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 level studies on these aspects. Production of oilseeds and oils has not fluoresced with increasing demand for edible oils and due to this widening demand-supply gap has necessitated imports of edible oils. With competing demands on agricultural 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. 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

## Research 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. Thena 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

Suitable statistical tools were used for analysis of data. Tabular analysis was used to compare the different parameters among marginal, small and medium size groups of the farmers. To examine the profitability, the cost of cultivation and returns were worked out on per ha basis. In this computation weighted average were used. Cost of cultivation and returns were estimated using standardized CACP cost concept.

**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).**

**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 = Qm * Pm

Where,
GI=Gross Income
Qm= Quantity of main product
Pm= Price of main product

**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

The results to costs and returns, of mustard cultivation have been worked out and are discussed as under

**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 (Rs32042.96) 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 21.11per 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. CostA1 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 $A_1/A_2$ | 12232.02 | 15437.02 | 16475.73 | 14715.03 |
| 2 | Cost $B_1$ | 12708.19 | 15850.48 | 17039.25 | 15199.35 |
| 3 | Cost $B_2$ | 19073.19 | 22215.48 | 23404.25 | 21564.35 |
| 4 | Cost $C_1$ | 20886.84 | 21994.66 | 22046.04 | 21642.71 |
| 5 | Cost $C_2$ | 27251.84 | 28359.66 | 27053.19 | 28086.07 |
| 6 | Cost $C_3$ | 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)**

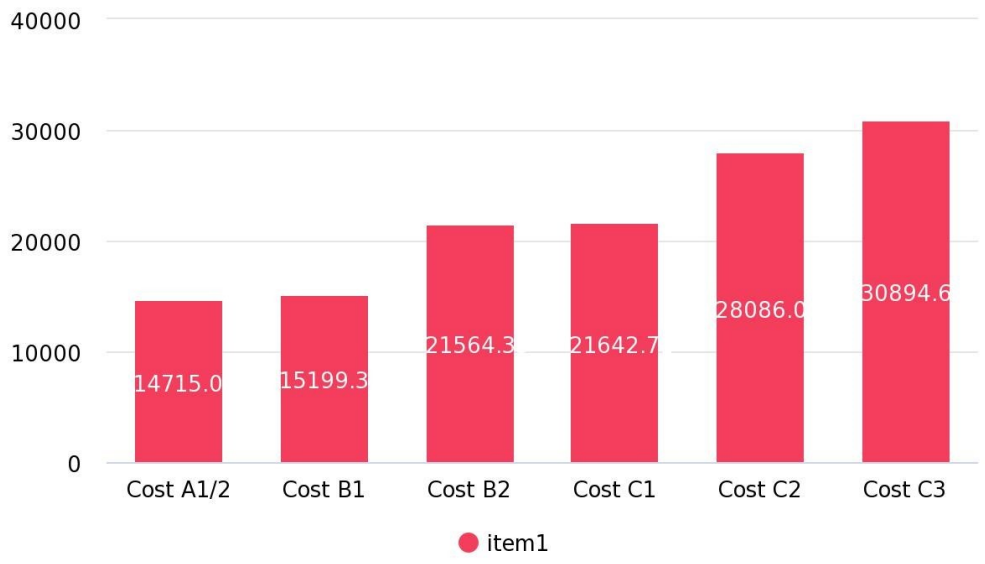


Table 3. Reveals that cost and returns in Mustard production in different size of farms group. Among different size of farms groups, the total cost of production incurred by the small farms were high (Rs.32136.52/ha) as compared to medium (Rs.32042.96/ha) and marginal farms (Rs.31989.74 /ha). Sample 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. 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.

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