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# Study of Cost and Profit Strategies for the Mustard Crop in Madhya Pradesh

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***Authors' contributions***

*This work was carried out in collaboration between both authors. Author PS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors PS and JKG managed the analyses of the study. Author JKG managed the literature searches. Both authors read and approved the final manuscript.*

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## ABSTRACT

"India occupies fourth position in the World which share the 5.06 million hectares area, and the production is 5.83 million tones and 1,152kg per hectare productivity. The mustard oil seed produce in the states of India are Gujarat, Andhra Pradesh, M.P., Maharashtra, Karnataka, U.P., and Rajasthan. Around 85% of the oilseed crop is from the seven states of India. In India Madhya Pradesh contributes 40 percent production, in the national economy and its occupies 6$^{th}$ position, and also contributes 0.31million hectare area, 0.21 million tonnes production. Mustard is the most remunerative and dominant oilseed crop and more than 20% percent of this crop area lies in the Neemuch district of M.P. The most popular district of the state for the mustard is Neemuch. In this study, the profit is found from the cultivation of the mustard. This crop contains the area per hector, which is higher for the existing yield level with the level of the sample farms.

*Keywords: Mustard crop; profit; cost; hector area.*

## 1. INTRODUCTION

Mustard seeds have been highly prized culinary oil-seeds being in use since earlier times. The seeds are fruit pods obtained from the mustard plant, in the Brassica family [1-3]. Some of the close members of mustards in this family include cabbage, broccoli, brussels-sprouts, etc.

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Scientific name: *Brassica juncea.* Mustards are native to Asia Minor, but these days cultivated as one of the main commercial crop in Canada, India, China, and temperate climates of the European region [4-6]. Mustards are winter crops. The plant reaches about 4-5 feet in height and bears golden yellow flowers. They are tiny, round seeds measuring about one mm in diameter found encased inside a fruit pod." Mustard is nearby to mellow territories of Europe and has its eminent base there. Regardless, its supplies from western Europe were vexed during World War II, and began to be made as a phenomenal yield in North America [7-9]. It is a yearly, cool-season monetary cash crop that has a short creating season and is routinely evolved thus with little grains. Yellow mustard arrangements for the most part create in 80 to 85 days, while gritty shaded and oriental varieties usually anticipate that 90 should 95 days to create. Mustard is best changed in accordance with create in ready, all around drained, loamy soils. Creators are asked to create mustard under consent to guarantee a market and a selling cost [10-13]. The 3 sorts of mustard are: yellow, earthy colored and oriental. Agarwal et, al (2004) found an away from in the case of quantum of appearances of the rapeseed and mustard. At the point when everything is said in done, mustard seed is essentially used in the food or fixing organizations as either seeds or oil. Borah et. al (2006) uncovered the value variety of rapeseed and mustard in Assam. M. P contributes around 40 percent creation on national economy and includes 6th circumstance in mustard creation and besides contributes about 0.3million hectare area, 0.21 million tones creation and 66kg/hectare proficiency (Agricultural bits of knowledge at first 2008-2009). The close by economy of Neemuch is on a very basic level established on the agribusiness produces exhibit [14-17]. In Neemuch district of M.P 19,335hectare locale is made sure about under rapeseed – mustard improvement [18-20]. Indian mustard (*Brassica juncea*) is overwhelmingly evolved in the states of Rajasthan, Uttar Pradesh, Haryana, M. P, and Gujarat which contribute 81.5% region and 87.5% creation (2001-02 to 2005-06). During 2006-07, more than 84 % of the all-out rapeseed-mustard real estate and creation in the nation is represented by these states, out of which over 47.0% is contributed by Rajasthan state alone. The harvest takes 135-150 days to develop. The significance of this harvest is in the state economy the current examination discuss the mustard developing at Neemuch region of M.P. with the target, where the expense and return for mustard development is considered by Dhekale et. al (2017), Vishawajith et al. [21] and Mishra et.al [10].

## 1.1 Research Gap

The study of mustard crop was done in different countries around the world. In India, number of state has done the studied of this crop. This study is conducting in the Neemuch district of Madhya Pradesh. District Neemuch is selected purposively due to economic importance of mustard cultivation. The district Neemuch is also selected due to convenience as well as being well acquaintance of researcher.

## 2. MATERIALS AND METHODS

This section helps for providing the idea of the research process in the systematic way.

## 2.1 Nature and Collection of Data

The study contains both primary and secondary data. The primary data on different aspect were collected through pre-tested interview schedule. Every one chose the mustard producers was approach for recording applicable information. The secondary data was collected from published record of district head quarter.

## 2.2 Analysis Procedures

### 2.2.1 Estimation of costs and profit in the cultivation of Mustard"

The estimation expenses and productivity of Mustard development depended on various expenses and benefit gauges as suggested by "Special expert committee on cost estimates. GOI new Delhi" was used in this study.

**Table 1. The respondents have three categories defined as**

| S. No. | Size of holding | Mustard growers |
|---|---|---|
| 1. | Small | 35 |
| 2. | Medium | 30 |
| 3. | Large | 15 |
| 4. | Total | 80 |

#### 2.2.2 Concepts of Cost

The cost of cultivation classified as recommended by, "Special Expert Committee on Cost Estimates, GOI, New Delhi", was used in this study. The cost concepts are given below:

**Cost = A1:** It incorporates: Value of recruited human work, Value of employed and claimed bullock work, Value of possessed and bought seed, Value of composts, excrements and synthetic concoctions, Value of recruited and claimed apparatus charges, Land income and duties, Expenditure on water system, Interest paid on crop advances (whenever taken), Depreciation on ranch resources, Interest on working capital, and, Assorted costs.

**Cost A2:** It incorporates, Cost A1 + lease paid for rented in land

**Cost B1:** It incorporates, Cost A2 + enthusiasm on estimation of claimed fixed capital resources. (Barring land)

**Cost B2:** It incorporates, Cost B1 + rental estimation of claimed land.

**Cost C1:** It incorporates, Cost B1 + credited estimation of family work

**Cost C2:** It incorporate, Cost B2+imputed estimation of family work

**Cost C3:** It incorporates, Cost C2 + 10 percent of cost C1 to represent administrative contribution of the rancher.

#### 2.2.3 Profitability concepts

For the estimation of gainfulness from Mustard, the accompanying proficiency measures were utilized in this examination: Gross pay, Farm business salary, Farm venture pay, Net ranch pay, Family work pay, Input-yield proportion.

## 3. RESULTS AND DISCUSSION

### 3.1 Sample Respondents Characteristics

The study contain Maximum numbers of sample respondents were found fewer than 3 types of age group than the other selected size groups. Regarding, types of family, maximum 40.91 per cent of sample respondents belonged to individual under the small farmers and joint family about 39.13 per cent belonged to the medium farmers, 22.91per cent belonged to large farmers respectively.

The information under the different size groups of the sample respondent is characterized in the table below.

### 3.2 Land Utilization Pattern

The given table below show the land utilization pattern of the respondents.

### 3.3 Cropping Pattern of Sample Respondent

The trimming example of test holding reflects towards harvests and succession developed is introduced in Table 4.

### 3.4 Assessment of Farm Assets

The estimation of the fixed homestead resources in the cultivating by and large decide the outright ranch productivity, which is contributed during the previous years. The information on present normal estimation of speculation of fixed ranch resources is introduced in Table 5.

### 3.5 Cost and Profitability

The expense and benefit of Mustard development on test ranches were inspected and information on the equivalent is introduced in this segment.

#### 3.5.1 Cost of cultivation of mustard crop

The information on cost of development (cost per hectare) on various size gatherings of property introduced in Table 6.1.

The information introduced in the Table 6.2 shows that the general normal expense of development of mustard crop was 19390.82per hectare.

### 3.6 Aggregate Profitability

Net salary from mustard yield of test rancher is introduced in Table 7(a).

Table 7. (b) Shows that the profit of mustard crop of sample respondent. The net income was Rs.28, 879.32 for small farmers, Rs.32, 658.32 for medium farmers, Rs.30,545.56 for large farmers and average net income was Rs. 30,694.4.

### 3.7 Cost of Production of Mustard

Cost of creation (cost/quintal) shows direct connection between cost per hectare and efficiency of Mustard on test property. The information on the equivalent is introduced in the Table 8.

**Table 2. Characteristics of sample respondents**

| Size of groups | Family members | | | | Age groups | | | | Caste | | | | | Literacy level | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Children | Total | I 25-35 | II 35 -45 | III >45 | Total | ST | SC | OBC | GEN | total | Illiterate | Primary | Middle | HS | HSS C | Graduate | Total |
| I Small Farmers (35) | 45 | 38 | 65 | 148 | 9 | 14 | 12 | 35 | 4 | 8 | 16 | 7 | 35 | 6 | 5 | 9 | 8 | 5 | 2 | 35 |
| II Medium Farmers (30) | 39 | 29 | 48 | 116 | 6 | 13 | 11 | 30 | 5 | 7 | 10 | 8 | 30 | 4 | 7 | 5 | 8 | 5 | 1 | 30 |
| III larg e Farmers (15) | 50 | 42 | 60 | 152 | 3 | 2 | 10 | 15 | 2 | 4 | 6 | 3 | 15 | 2 | 6 | 3 | 2 | 1 | 1 | 15 |
| Overall (80) | 134 | 109 | 173 | 416 | 18 | 29 | 33 | 80 | 11 | 19 | 32 | 18 | 80 | 12 | 18 | 17 | 18 | 11 | 4 | 80 |

**Table 3. Land Utilization Pattern**

| S.N. | Particulars | Size | | | |
|---|---|---|---|---|---|
| | | Small | Medium | Large | Overall |
| 1. | No. of sample respondents | 35 | 30 | 15 | 80 |
| 2. | Total area (ha.) | 28.9 | 59.4 | 135.4 | 223.3 |
| 3. | Average size of land holding (ha.) | 1.46 | 3.29 | 6.03 | 3.59 |
| 4. | Net sown area (ha.) | 38.6 | 55.92 | 110.87 | 205.39 |
| 5. | Irrigated area (ha.) | 35.43 | 50.47 | 104.86 | 190.76 |
| 6. | Area sown more than once (ha.) | 18.9 | 24.45 | 34.76 | 78.11 |
| 7. | Total cropped area (ha.) | 44.86 | 74.36 | 165.67 | 284.89 |
| 8. | Cropping intensity | 179.8 | 164.39 | 168.40 | 170.86 |

**Table 4. Cropping pattern of sample respondents (Unit: hectare)**

| S.N. | Particulars | Size groups | | | |
|---|---|---|---|---|---|
| | | Small | Medium | Large | Overall |
| **Kharif season** | | | | | |
| **1.** | Soybean | 7.8 | 9.6 | 18.5 | 35.9 |
| **2.** | Maize | 3.56 | 4.86 | 9.34 | 17.76 |
| **3.** | Cotton | 2.5 | 5.5 | 8.6 | 16.6 |
| **Sub total** | | 13.86 | 19.96 | 36.44 | 70.26 |
| | **Rabi season** | | | | |
| 1. | Mustard | 14.5 | 36.3 | 87.4 | 138.2 |
| 2. | Wheat | 7.8 | 9.7 | 22.6 | 40.1 |
| 3. | Gram | 2.1 | 4.4 | 9.6 | 16.1 |
| **Sub total** | | 24.4 | 50.4 | 119.6 | 194.4 |
| | **Zaid Season** | | | | |
| 1. | Mung | 0.5 | 0.4 | 1.8 | 2.6 |
| 2. | Others | 0.3 | 0.8 | 1.1 | 2.2 |
| | **Sub total** | 0.7 | 1.2 | 2.9 | 1.8 |
| **Total cropped area** | | 44.86 | 74.36 | 165.67 | 284.89 |

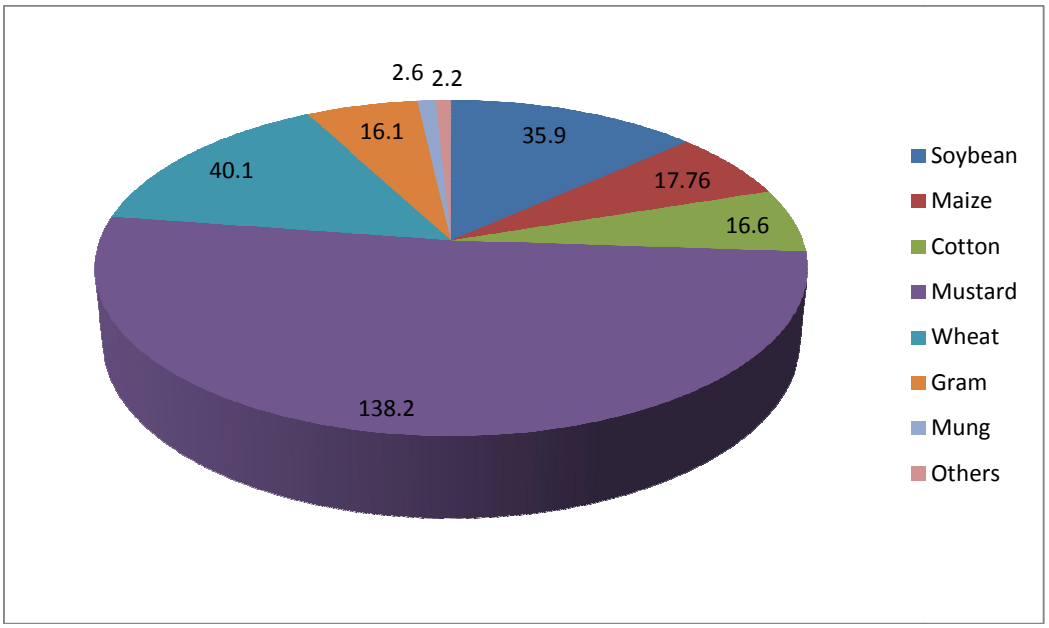


**Fig. 1. Cropping Pattern of Sample Respodent**

**Table 5. Value of farm assets of sample mustard growing farmers**

| S.N. | Assets | Size of holding | | | |
|---|---|---|---|---|---|
| | | Small | Medium | Large | Overall |
| 1 | Land | 2,56,792 | 2,43,353 | 2,47,701 | 2,49,283. 6 |
| 2 | House & store | 22,146.12 | 14,453.44 | 14,991.69 | 17,197.08 |
| 3 Irrigation structure | | | | | |
| I | Tube well& pump house | 1,598.17 | 4,858.54 | 9,011.63 | 5,162.78 |
| Ii | Diesel/electrometer & pipeline | 821.92 | 2368.44 | 3,064.78 | 2,085.04 |
| 4 Bullock drawn implements | | | | | |
| I | Bhakhar / pata | 264.84 | 68.82 | 137.04 | 156.9 |
| Ii | Bullock card | 511.42 | 172.06 | - | 227.83 |
| 5. Tractor drawn implements | | | | | |
| I | Tractor | - | 14,676.11 | 26,453.48 | 13,709.86 |
| Ii | Cultivator | - | 319.84 | 585.55 | 301.79 |
| Iii | Seed drill | - | 364.37 | 714.28 | 359.55 |
| Iv | Thresher | - | 931.17 | 1299.83 | 743.66 |
| V | Sprayer | - | 108.29 | 132.06 | 80.12 |
| A | Total value of assets & excluding land | 25,342.47 | 38,341.06 | 56,390.34 | 40,024.61 |
| B | Total value of assets | 2,42,134.4 | 2,81,699.06 | 3,04,091.34 | 2,89,308.27 |

**Table 6.1. Cost of cultivation of Mustard crop under different scales of acreages.Unit Rs./ha**

| S No. | Cost of items | Small | Medium | Large | Average |
|---|---|---|---|---|---|
| 1. | Value of hired labour | 595.21 | 703.65 | 860.60 | 719.82 |
| 2. | Value of owned bullock labour | 775.64 | 179.23 | - | 318.29 |
| 3. | Value of owned machine labour | - | 1623.23 | 5885.58 | 2502.93 |
| 4. | Value of hired machine labour | 3914.29 | 2830.30 | - | 2248.19 |
| 5. | Plant protection | 1781 | 1948 | 2077 | 1935.33 |
| 6. | Value of seed | 165.10 | 193.24 | 205.59 | 187.97 |
| 7. | Value of fertilizer and manure | 1703.28 | 1773.52 | 2524.63 | 2000.47 |
| 8. | Irrigation charges | 938.23 | 979.41 | 994.14 | 970.59 |
| 9. | Depreciation of implements and farm buildings | 89.09 | 990.56 | 1,812.98 | 964.21 |
| 10. | Enthusiasm on working capital 12% | 255.12 | 265.22 | 314.32 | 278.22 |
| | Cost $A_1$ | 10216.9 | 11486.36 | 12404.84 | 12126.02 |
| 11. | Enthusiasm on fixed capital 12% | 603.26 | 665.95 | 666.65 | 645.28 |
| | Cost – $B_1$ | 10820.16 | 12152.31 | 13071.49 | 12771.3 |
| 12. | Rental estimation of possessed land | 5,193.91 | 5,716.25 | 5,721.38 | 5,543.85 |
| | Cost- $B_2$ | 16014.07 | 17868.56 | 18792.87 | 18315.15 |
| 13. | Attributed estimation of family work | 1766.41 | 895.41 | 565.05 | 1075.62 |
| | Cost-C1(Cost-B1+ Imputed estimation of family work) | 12586.57 | 13047.72 | 13636.54 | 13846.92 |
| | Cost - C2 (Cost-B2 + Imputed estimation of family work) | 17780.48 | 18763.97 | 19357.92 | 19390.77 |
| | Cost-$C_3$(Cost $C_2$ + 10% of Cost $C_2$) | 17780.536 | 18764.023 | 19357.971 | 19390.821 |

**Table 6.2. Cost of cultivation of Mustard crop on sample respondents (Rs. / ha.)**

| Cost concept | Size groups | | | |
|---|---|---|---|---|
| | Small | Medium | Large | Average |
| Cost A1/A2 | 10216.9 | 11486.36 | 12404.84 | 12126.02 |
| Cost B1 | 10820.16 | 12152.31 | 13071.49 | 12771.3 |
| Cost B2 | 16014.07 | 17868.56 | 18792.87 | 18315.15 |
| Cost C1 | 12586.57 | 13047.72 | 13636.54 | 13846.92 |
| Cost C2 | 17780.48 | 18763.97 | 19357.92 | 19390.77 |
| Cost C3 | 17780.53 | 18764.02 | 19357.97 | 19390.82 |

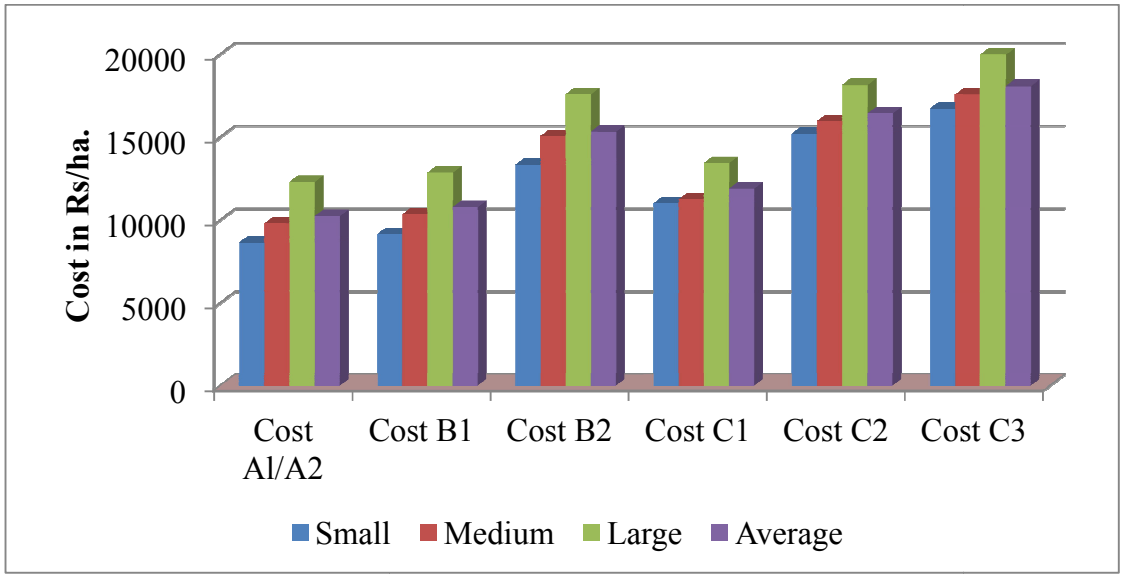


**Fig. 2. Cost of cultivation of Mustard crop of sample respondents**

**Table 7(a). Gross Income from Mustard crop of sample respondents**

| S.N. | Particulars | Size of groups | | | |
|---|---|---|---|---|---|
| | | Small | Medium | Large | Average all size |
| 1. | Main product(qt.) | 410.00 (14.65) | 1230.00 (16.98) | 1485.00 (17.53) | 1041.66 (16.39) |
| 2. | Value of Main product(Rs.) | 8,80,70 | 27,13,30 | 38,61,00 | 248500 |
| 3. | By product (qt.) | 540 | 1590 | 2085 | 1405 |
| 4. | Value of by product(Rs.) | 82,250 | 2,10,125 | 2,08,500 | 166958.33 |
| | Gross income (Rs.) | 9,63,900 | 29,26,245 | 40,69,500 | 2654404.23 |

*During this period Rs. 2680.76 is the average quintal price of the mustard crop*

**Table 7(b). Profit of mustard crop of sample respondents (unit:- Rs.)**

| S.N. | Size group | Gross income | Farm business income | Farm investment income | Family labour income | Net farm income |
|---|---|---|---|---|---|---|
| 1. | Small | 45,564.25 | 35,145.32 | 33,586.54 | 32,548.89 | 28,879.32 |
| 2. | Medium | 47,256.45 | 38,245.36 | 36,547.58 | 33,654.92 | 32,658.32 |
| 3. | Large | 44,125.58 | 32,546.47 | 31,789.14 | 31,546.65 | 30,545.56 |
| Average | | 45,648.76 | 35,312.38 | 33,974.42 | 32,583.48 | 30,694.4 |

**Table 8. Cost of production of Mustard (Rs. /qt.)**

| Cost concept | Size groups | | | |
|---|---|---|---|---|
| | Small | Medium | Large | Average |
| Cost A1 | 848.18 | 866.21 | 625.94 | 780.11 |
| Cost B1 | 869.65 | 896.15 | 655.21 | 807.00 |
| Cost B2 | 1112.54 | 1175.84 | 987.32 | 1091.9 |
| Cost C1 | 969.64 | 946.28 | 647.81 | 854.57 |
| Cost C2 | 1240.26 | 1284.96 | 914.21 | 1146.47 |
| Cost C3 | 1345.66 | 1354.87 | 1084.77 | 1261.76 |

The expense per quintal at variable cost diminishes with increment in size of holding. The overall cost A1, B1, C1, B2, C2, and C3 per quintal was Rs. 780.11, 807.00, 854.57, 1091.9, 1146.47 and 1261.76 respectively.

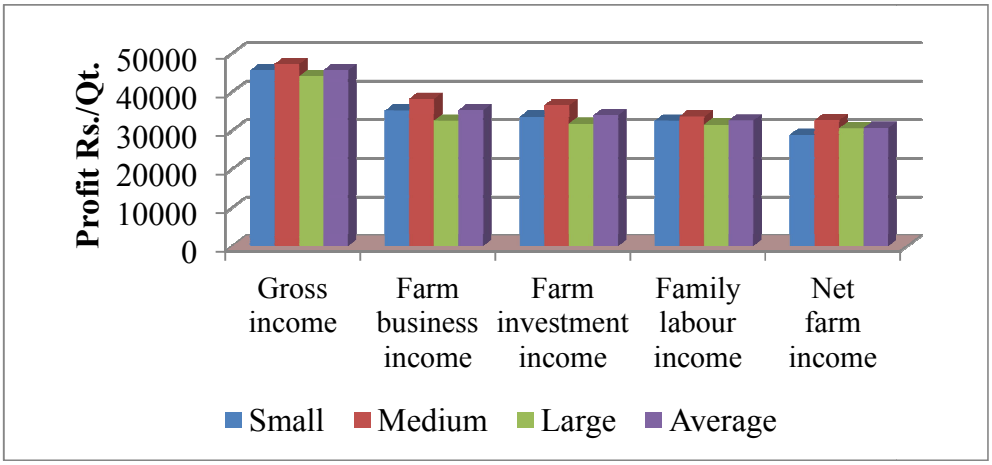


**Fig. 3. Profit of mustard crop of sample respondents**

**Table 9. Profit per quintal in the production of Mustard (Rs./qt)**

| S.N. | Size group | Gross income | Farm business income | Farm investment income | Family labour income | Net farm income |
|---|---|---|---|---|---|---|
| 1. | Small | 4,900.00 | 4,324.65 | 4152.61 | 4012.87 | 3638.24 |
| 2. | Medium | 5,200.00 | 4732.14 | 4625.32 | 4436.63 | 3938.24 |
| 3. | Large | 2,500.00 | 1864.78 | 1754.88 | 1547.55 | 1238.24 |
| 4. | Average | 4200.00 | 3640.52 | 3510.93 | 3332.35 | 2938.24 |

### 3.8 Profit per quintal

The information on gainfulness of mustard per unit of volume (per quintal) are introduced in Table 9.

The normal per quintal ranch business pay, ranch venture pay, family work salary and net homestead pay were Rs. 3640.52, 3510.93, 3332.35 and 2938.24 individually.

## 4. CONCLUSION

The investigation is about the mustard crop of the district Neemuch of M.P. An example of eighty Mustard cultivators was drawn from the arbitrarily chosen towns of Javad square of Neemuch area. From each chose town three mustard developing ranchers from every class for example small, medium and huge size of land holding were chosen. In this manner 35 little, 30 medium and 15 enormous land holding ranchers were at long last chosen. Accordingly, the complete example size was 80 from 7 towns for examination. For gathering data on showcasing cost and edges. Along these lines, 10 wholesalers and 10 retailers were chosen haphazardly. It finds that:

- In Neemuch area, Soybean was primary *Kharif* crop on all size of test possessions.
- Maize and Cotton are additionally developed as minor harvests on the example possessions.
- In the *Rabi* season, mustard crop was developed as significant harvest. On a normal almost 39.23hac. Edited zone is given to this yield. In the zaid season moong was developed as significant yield.
- Average cost of development of Mustard crop was 17455.42 per hectare
- The normal efficiency of Mustard crop on test property was 1041.66 quintals per hectare.
- The absolute productivity of the Mustard development was substantially more remunerative. When we consider just factor cost then gainfulness from Mustard crop was more appealing. Regardless of increment in cost per hectare with the expansion in size of holding, benefit increments mostly because of increment in profitability and cost per quintal with the increment in size of holding. This is obvious from the examination of the expense of creation.
- The variable expense per quintal was emphatically related with the size of property, while different costs, which incorporate fixed expense, were

legitimately related with the size of possessions.

## DISCLAIMER

The researcher promises to maintain high ethical standards throughout the research. The data will be just used for the analysis of this study, which help in the economic of India.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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