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## Economic study of mustard (*Brassica oleracea*) growers in Meerut district of western Uttar Pradesh

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### Abstract

Mustard are important with the view of their food and nutritional security and also income and employment generation ability possibility to raise the cropping intensity due to its nature of best fit with oilseeds production system. India is the largest producer of oilseeds in the world and accounts for about 14 per cent of the global oilseeds area, 7 % of the total vegetable oils production, and 10 % of the total edible oils consumption. Keeping in view the importance of the Mustard a study on production and marketing of Mustard was conducted in Sarurpur & Sarurpur Khurd block of Meerut district. A sample of 100 farmers belonging to marginal, small medium and large holding size were drawn through purposive cum proportionate random sampling technique, from five selected villages of Sardhana & Sarurpur Khurd block, personal interview method with the help of restructured schedule was applied to collect the primary and secondary data were collected from block and district offices. Tabular and functional analysis was done to analyse the data and presentation of the result.

**Keywords:** production, marketing

### Introduction

Mustard belong to cruciferae family and genus Brassica. Mustard (*Brassica juncea*) is also known as Rabi or laha. Rapeseed and mustard seeds are sources of rapeseed-mustard seed oil and oilcake. Yellow colour oil is obtained by extraction process of the crushed rapeseed-mustard seeds. In the market, rape oil is not distinguished from mustard oil as both of these come from the same species and possess same properties. During the production of oil, pressed cakes of the seeds are left over that have some amount of oil content. The oil makes up about 30% of mustard seeds. It can be produced from black mustard (*Brassica nigra*), brown Indian mustard (*Brassica juncea*), and white mustard (*Brassica hirta*). Mustard oil is the most important cooking medium in most parts of the country including almost all the northern states of J&K, Punjab, Haryana, Uttar Pradesh, Uttarakhand and large parts of Madhya Pradesh, Bihar, Jharkhand. However, due to its high content of erucic acid, which is considered noxious, mustard oil is not considered suitable for human consumption in the United States. Canada is the major exporter of oil too. US is the major importer of oil. India produces 4-7, 1-2, 2-4 million tonnes of seed, oil and mustard. India does not export or import seed and oil. India is the third largest rapeseed-mustard producer in the world after China, accounting for about 12% of the world's total rapeseed-mustard "seed" and about 8.5% of the world's total rapeseed-mustard "oil". In India, rapeseed-mustard is grown in diverse agro-climatic conditions ranging from north-eastern/north-western hills to down south. The crop is grown sole or in mixed cropping under both rainfed or irrigated conditions of the total area and production under the nine oilseeds crops grown in India, rapeseed-mustard accounts for 22.2% of the acreage and 22.6% of the production. The average rapeseed-mustard yield in India is about 1145 kg/ha compared to the combined oilseeds crops average of 1135 kg/ha. In India, although, rapeseed-mustard is cultivated in 13 states, production in Rajasthan, Uttar Pradesh, Haryana and West Bengal, with their respective share of 45, 13, 11 and 8% accounts for 77% of the National total. In the last 15 years, introduction of high-yielding rapeseed-mustard varieties, hybrids, improved production technology, increased area under cultivation; government price support policies and institutional support have revealed positive trends. Rapeseed-mustard is the major source of income especially even to the marginal and small farmers in rainfed areas since these crops are cultivated mainly in the rain-fed and resource scarce regions of the country, their contribution to livelihood security of the small and marginal farmers in these regions is also very important. By increasing the domestic production substantial import substitution can be achieved. Due to its low water requirement

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(80-240 mm), rapeseed-mustard crops fit well in the rainfed cropping system. Nearly 30.7% area under rapeseed-mustard is under rainfed farming. In India Rapeseed-Mustard (22.40%) group of crop rank second among the oil seed crops after soybean (38.52%). The important oilseed crops grown in the country are groundnut, rapeseed-mustard, soybean, sunflower and sesame.

Area, production and productivity of Rapeseed- mustard in India were 5.80 million hectares, 6.28 million tonnes, and 1083 kg/ha respectively (Directorate of Economics and statistics, New Delhi 2014-15). While area, production, and productivity in Uttar Pradesh were 0.63 million hectare, 0.58 million tones and 930.00 kg/hectare respectively (Directorate of Economics and Statistics, New Delhi. 2014-15). Contribution of area 10.79 per cent and production 9.27 per cent in total area and production of India.

Area, production, and productivity of Rapeseed- mustard in Meerut district were 18533.00 hectare, 22352 metric tonnes, and 12.06 Q/ha respectively during the period 2014-2015. (Statistical Report District Meerut 2014-15)

### Methodology

**Sampling technique:** The purposive com random sampling design was used for the selection of district, block, villages and respondents.

**Selection of District:** Meerut district of Western U.P. was selected purposively to avoid the operational inconvenience of the investigator.

**Selection of Block:** The two blocks with maximum percentage area under mustard were selected purposively.

**Selection of village:** A list of all the villages falling under selected two block was prepared and arranged in ascending order according to area covered by Rapeseed- mustard and ten villages were selected randomly from the list. (Table -3.1)

**Selection of respondents:** A lists of Rapeseed- mustard growers of selected villages were prepared along with their size of holding. Thus, the farm holding categorised into three size groups (1) Marginal: (Below 1.0 ha;) (2) Small: (1.0-2.0 ha) (3) Medium: (2.0-4.0 ha) (4) (4 ha & above). From this list a sample of 100 respondents were selected following the proportionate random sampling technique.

**Collection of Data:** Primary data were collected through personal interview method on well pre-structured schedule specially designed for this study, while secondary data were collected from published/ unpublished record of district and

blocks, headquarters, books, journals, periodicals, and news bulletins etc. among different Rapeseed- mustard grown in Meerut district.

**Period of study:** The data pertained for the agriculture year 2012-2013.

**Analytical Tools:** Analytical tools used for the analysis and interpretations of the data are given below.

**Tabular analysis:** Tabular analysis was used to compare the different parameters among marginal, small medium and large size group of the farmers. Investment pattern per hectare and per farm, cropping pattern and cropping intensity etc. were computed and presented in tabular forms. In this computation weighted average was used.

$$\text{Weighted avergae} = \frac{\sum W_i X_i}{\sum W_i}$$

Where,

$X_i$  =variable

$W_i$  =Weights of variable

### Result and Discussion

This discussion deals with the finding of the present study i.e cropping pattern and cropping intensity, per farm investment and per hectare investment.

#### Cropping pattern

Cropping pattern presents the area devoted to the various crops during the given period, conventionally in a single year. It indicates the yearly sequence and arrangement of crops grown by farmer in a particular area. The cropping patterns followed by the sample farms are presented in table -1

It is depicted from the table-1 that on an average the highest area was cropped under Paddy (13.25 per cent) followed by wheat (12.98 per cent), Mustard (11.60 per cent), and jwar (9.68 per cent) of total cropped area on the sample farms. Paddy and wheat are the main crops raised by the sample farms followed by Mustard. The gross cultivated area was higher in the kharif season and less in the Zaid season on all farm situations. It is also clear from the table 4.1.2 that Mustard was grown on (11.60 per cent) of total cropped area, during Rabi season in the study area. Marginal farmers devoting higher proportion of their area for cultivation of mustard (12.32 per cent) followed by small (10.67 per cent), medium (8.29 per cent), and large (7.47 per cent), respectively of their total cultivated area.

**Table 1:** Cropping pattern under different size group of farms (Area in ha)

S. No.	Crops	Average size of sample farms			Overall average	
		Marginal	Small	Medium		Large
<b>A</b>		<b>Kharif</b>				
1.	Jwar	0.15 (10.27)	0.35 (10.67)	0.47 (7.35)	0.62 (6.91)	0.35 (9.68)
2.	Paddy	0.20 (13.69)	0.40 (12.19)	0.91 (14.24)	1.08 (12.05)	0.48 (13.25)
3.	Maize	0.08 (5.48)	0.18 (5.48)	0.32 (5.00)	0.51 (5.69)	0.27 (7.45)
4.	Pearl Millet	0.05 (3.42)	0.16 (4.87)	0.41(6.41)	0.45 (5.02)	0.18 (4.97)
5.	Vegetables	0.06 4.10	0.15 (4.57)	0.35 (5.47)	0.73 (8.14)	0.17 (4.69)
	Total	0.54 (36.96)	1.24 (37.78)	2.46 (38.47)	3.39 (37.81)	1.45 (40.05)
<b>B</b>		<b>Rabi</b>				
1.	Mustard	0.18 (12.32)	0.35 (10.67)	0.53 (8.29)	0.67 (7.47)	0.42 (11.60)
2.	Wheat	0.27 (18.49)	0.48 (14.63)	1.09 (17.05)	1.05 (11.71)	0.47 (12.98)
3.	Pea	0.01(0.68)	0.12 (3.65)	0.32 (5.00)	0.41 (4.57)	0.16 (4.41)

4.	Potato	0.04(2.73)	0.16 (4.87)	0.37 (5.79)	0.70 (7.81)	0.19 (5.24)
5.	Berseem	0.04(2.73)	0.09 (2.74)	0.19 (2.97)	0.46 (5.13)	0.13 (3.59)
	Total	0.53 (36.95)	1.20 (36.56)	2.41 (39.10)	3.29 (36.69)	1.37(37.84)
<b>C</b>	<b>Zaid</b>					
1.	Sugarcane	0.12 (8.21)	0.38 (11.58)	0.90 (14.08)	1.52 (16.96)	0.43 (11.87)
2.	Green gram	0.07 (4.80)	0.12 (3.65)	0.17 (2.66)	0.23 (2.56)	0.09(2.48)
3.	Black gram	0.08 (5.47)	0.17 (5.18)	0.20 (3.12)	0.24 (2.67)	0.12 (3.31)
4.	Vegetable	0.12 (8.21)	0.17 (5.18)	0.25 (3.91)	0.29 (3.23)	0.16 (4.41)
	Total	0.39 (26.69)	0.84 (25.59)	1.52 (23.78)	2.28 (25.44)	0.80 (22.09)
	Gross cropped area (ha)	1.46 (100.00)	3.28 (100.00)	6.39 (100.00)	8.96 (100.00)	3.62 (100.00)
	Net cultivated area (ha)	0.66	1.62	3.36	4.91	1.88

### Cropping intensity

Table -2 reflects the cropping intensity of different size group of farms, which was found highest on marginal farms (221.22 per cent) followed by small (202.47 per cent), medium

(190.17 per cent), and large farms (182.48 per cent), respectively. The overall average of cropping intensity on sample farms was worked out to 192.55 percent. Cropping intensity revealed the inverse relationship with size group of farms.

**Table 2:** Cropping intensity on different size group of farms in the study area.

S. No.	Size of farms	Net cultivated area (ha)	Gross cropped area (ha)	Cropping intensity
1.	Marginal farms	0.66	1.46	221.22
2.	Small farms	1.62	3.28	202.46
3.	Medium farms	3.36	6.39	190.17
4.	Large farms	4.91	8.96	182.48
	Total/ overall average	1.88	3.62	192.55

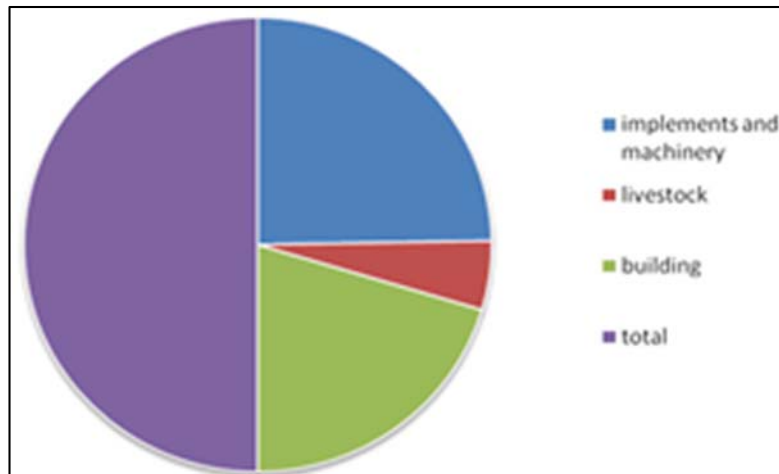
### Farm asset structure on sample farms

Table-3 presents the per- farm asset structure on sample farms. It is evident from this table that major components of farm asset structure are farm building, implements & machinery and live-stocks which were constituting 40.75 per

cent, 49.44 per cent and 9.80 per cent of total asset value, respectively on the basis of overall average. Per farm value on building, implements & machinery and livestock came to Rs.269851.84, Rs

**Table 3:** Per farm investment on different size group of farms in the study area. (Rs.)

S. No.	Particular	Size of farms				Overall average
		Marginal	small	Medium	Large	
A	Implements and machinery	144930.56 (33.59)	625265.00 (63.68)	525223.92 (55.30)	411414.49 (48.33)	327397.61 (49.44)
1.	Desi plough	596.00 (0.13)	613.50(0.06)	309.37(0.03)	476.42(0.05)	536.20(0.08)
2.	Tractor	57500.00 (13.32)	329150.00(33.52)	262812.50(27.67)	217142.85(25.51)	167030.00(25.22)
3.	Trolley	7160.00 (1.66)	59800.00(6.09)	55375.00(5.83)	32857.14(3.86)	29000.00(4.37)
4.	Harrow	7980.00 (1.84)	40450.00(4.11)	39125.00(4.11)	34571.42(4.06)	23180.00(3.50)
5.	Cultivator	7520.00 (1.74)	42650.00(4.34)	40500.00(4.26)	29071.42(3.41)	22840.00(3.34)
6.	Thresher	4160.00 (0.96)	55950.00(5.69)	36375.00(3.83)	14571.42(1.71)	21130.00(3.19)
7.	Bullock cart	17220.00 (4.00)	28050.00(2.85)	21612.00(2.27)	15642.85(1.83)	19868.00(3.00)
8.	Tube well	20160.00 (4.67)	42300.00(4.30)	42750.00(4.50)	40142.85(4.71)	31000.00(4.68)
9.	Pumping set (diesel)	7580.00 (1.75)	10685.00(1.08)	9837.50(1.03)	11321.42(1.33)	9086.00(1.37)
10.	Pumping set(electric)	4940.00 (1.14)	6690.00(0.68)	5418.75(0.57)	4857.14(0.57)	5355.00(0.80)
11.	Chaff cutter	8914.00 (2.06)	7075.00(0.72)	8856.25(0.93)	9192.85(1.07)	8544.00(1.29)
12.	Patella	246.00 (0.05)	536.50(0.05)	698.43(0.07)	472.50(0.05)	408.00(0.06)
13.	Other (minor implements)	476.56 (0.11)	833.00(0.08)	585.37(0.06)	665.64(0.07)	591.33(0.08)
14.	Sprayer	478.00 (0.11)	482.50(0.04)	968.75(0.10)	428.57(0.05)	550.59(0.08)
B	Livestock	58954.00 (13.66)	65610.00(6.68)	78625.00(8.27)	77142.85(9.06)	64907.38(9.80)
1.	Bullock	4454.00 (1.03)	5250.00(0.53)	10750.00(1.13)	7714.28(0.90)	6077.00(0.91)
2.	He buffalo	16280.00 (3.77)	26725.00(2.72)	27437.50(1.04)	26428.57(3.10)	21575.00(3.25)
3.	Cow	4830.00 (1.11)	2475.00(0.25)	9937.50(3.21)	6000.00(0.70)	5340.00(0.80)
4.	Buffalo	33390.00 (7.74)	31160.00(3.17)	30500.00(2.88)	37000.00(4.34)	32987.00(4.98)
C.	Buildings	227500.00 (52.73)	291000.00(29.63)	345875.00(36.41)	362642.85(42.60)	269851.84(40.75)
a.	Residential	127880.00(29.64)	173000.00(17.61)	222500.00(23.42)	252857.14(29.70)	166055.55(25.07)
b)	Cattle shed	65840.00(15.26)	83100.00(8.46)	81062.50(8.53)	69285.71(8.13)	69351.85(10.47)
c)	Godown	33780.00(7.83)	34900.00(3.55)	42312.50(4.45)	40500.00(4.75)	34444.44(5.20)
	Grand total(a+b+c)	431384.00(100.00)	981875.00(100.00)	949722.49(100.00)	851200.19(100.00)	662156.83(100.00)

**Graphic present in per farm investment.****Fig 1:** Per farm investment on different size group of farms.

327397.61 and 64907.38, respectively. On an average per farm investment was found Rs. 662156.83. The highest investment was recorded on small farm (Rs.981875.00) followed by large farm (Rs 851200.19), medium (Rs

949722.49) and lowest on marginal farms (Rs 431384.00), respectively. The per farm investment on farm assets in variably showed the direct relationship with size of holding except large size group of farms.

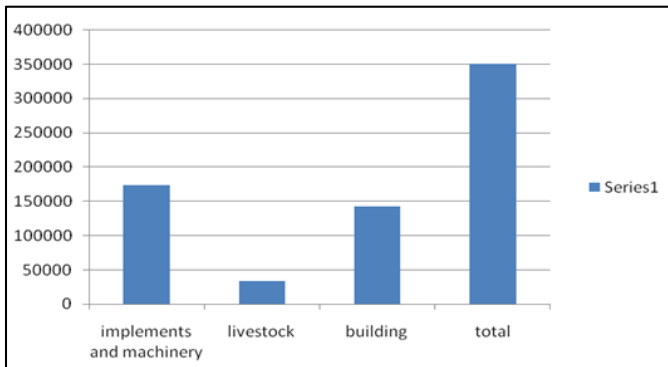
**Table 4:** Per hectare investment on different size group of sample farms. (Rs.)

S. No.	Particular	Size of farms				Overall average
		Marginal	Small	Medium	Large	
A	Implements and machinery	218268.86 (33.59)	324813.17(63.68)	155851.32(55.27)	83717.99(48.33)	173621.11(49.51)
1.	Desahi plough	897.59 (0.13)	318.70(0.06)	91.83(0.03)	96.94(0.05)	276.18(0.07)
2.	Tractor	86596.38 (13.32)	170987.01(33.52)	78014.84(27.67)	44186.04(25.51)	85920.78(24.50)
3.	Trolley	10783.13(1.66)	31064.93(6.09)	16437.84(5.83)	6686.04(3.86)	14917.69(4.25)
4.	Harrow	12018.07(1.84)	21012.98(4.11)	11614.10(4.11)	7034.88(4.06)	11923.86(3.40)
5.	Cultivator	11325.30(1.74)	22155.84(4.34)	12022.26(4.26)	5915.69(3.41)	11454.36(3.26)
6.	Thresher	6265.06(0.96)	29064.935.69	10797.77(3.83)	2965.11(1.71)	10596.79(3.02)
7.	Bullock cart	25933.73(4.00)	14571.42(2.85)	6415.58(2.27)	3183.13(1.83)	9963.89(2.84)
8.	Tube well	30361.44(4.67)	21974.02(4.30)	12690.16(4.50)	8168.60(4.71)	15946.50(4.54)
9.	Pumping set (diesel)	11415.66(1.75)	5550.64(1.08)	2920.22(1.03)	2303.77(1.33)	4673.86(1.33)
10.	Pumping set(electric)	7439.75(1.14)	3475.32(0.68)	1608.53(0.57)	988.37(0.57)	2754.62(0.80)
11.	Chaff cutter	13424.69(2.06)	3675.32(0.72)	2569.57(0.93)	1870.63(1.07)	4395.06(1.25)
12.	Patella	370.48(0.05)	278.70(0.05)	207.32(0.07)	96.14(0.05)	209.97(0.06)
13.	Other (minor implements)	717.71(0.11)	432.72(0.08)	173.74(0.06)	135.45(0.07)	304.38(0.08)
14.	Sprayer	719.87(0.11)	250.64(0.04)	287.56(0.10)	87.20(0.05)	283.17(0.08)
B	Livestock	88786.13(13.66)	34083.10(6.68)	23339.50(8.27)	15697.65(9.06)	33957.80(9.69)
1.	Bullock	6707.83(1.03)	2727.27(0.53)	3191.09(1.13)	1569.76(0.90)	3126.02(0.89)
2.	He buffalo	24518.07(3.77)	13883.11(2.72)	8144.71(1.04)	5377.90(3.10)	11098.25(3.16)
3.	Cow	7274.09(1.11)	1285.71(0.25)	2949.90(3.21)	1220.93(0.70)	2764.91(0.78)
4.	Buffalo	50286.14(7.74)	16187.01(3.17)	9053.80(2.88)	7529.06(4.34)	16968.62(4.83)
C.	Buildings	342620.47 (52.73)	151168.82(29.63)	102761.59(36.44)	73793.5842.60)	143034.97(40.80)
a.	Residential	19259.36(29.64)	89870.12(17.61)	66048.23(23.42)	51453.48(29.70)	87211.93(24.87)
b)	Cattleshed	99156.62(15.26)	43168.83(8.46)	24063.07(8.53)	14098.83(8.13)	37145.06(10.59)
c)	Godown	50873.49 (7.83)	18129.87(3.55)	12650.29(4.48)	8241.27(4.75)	18677.98 (5.32)
	Grand total (a+b+c)	649675.46(100.00)	510065.09(100.00)	281952.41(100.00)	173209.22(100.00)	350613.88(100.00)

**Per hectare investment on different size group of farms**

Investment on different size group of farm on per hectare basis is presented in table-4. On an overall average, per hectare investment was found Rs. 350613.88 which was recorded higher on marginal farms Rs. 649675.46, followed by small 510065.09, medium Rs. 281952.41, and was lowest on large farms i.e. 173209.22, respectively. The major

component of farm structure was constituted by building, implements and machinery, and livestock with (40.80 per cent), (49.51 per cent), and (9.69 per cent), respectively. Major difference among size group of farms on per hectare investment was found due to comparatively higher investment on implement and machinery by marginal and medium than the small and large group of farms.



**Fig 2:** Per hectare investment on different size group of farms

### Conclusion

In this study Meerut district of western U.P was selected purposively for the data collection of mustard cultivation and marketing. Data of production and marketing of mustard cultivation was collectively by the 100 respondents through personal interview method. In the case of cropping pattern marginal farmer used higher proportion of their area of cultivation and higher cropping intensity were marginal farmers. Per farm investment highest recorded on small farmers size of group respectively. The per farm investment on farm assets direct relationship with size of land holding. In the case of per hectare investment over all average investment 350613.88 which was recorded highest on marginal farmers.

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