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Study of farm structure, cropping pattern and cropping intensity on mustard growing sample farms in Lakhimpur (Kheri) district of Uttar Pradesh, India

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Abstract
Mustard is an important crop with the view of food and nutritional value and income & employment generation ability, possibility to raise the cropping intensity due to its nature of best fit with food grain production system. Keeping in view the importance of the mustard a study on cultivation of mustard was conducted in Lakhimpur block of Lakhimpur (Kheri) District. A sample of 100 farmers from, marginal, small and medium holding size were drawn through the proportionate random sampling technique, from five selected villages of Lakhimpur block, data were collected through personal interview method with the help of pre-structured schedule and secondary data were collected from block head quarter and district offices. More than 50% of the sample farmers were of marginal holding, very less number of medium size farmer were found. Overall average holding size was found to 0.97 hectare. Paddy, wheat and sugarcane were the major crops of *Kharif*, *Rabi* and zaid season respectively. Mustard under study was also allotted considerable acreage in cropping pattern; cropping intensity was inversely related with farm size. Similarly per farm and per hectare investment on building and livestock were also inversely related with farm size.

Keywords: Cropping pattern, cropping intensity, holding size and investment

Introduction
Mustard is originated from China and spread over India from there. India is one of the largest producers of mustard in the world. The production of mustard in India is around 16.2 million tones which accounts 18% of the total oil seed production of the world.
Mustard is the major *Rabi* oilseed crops of India. It occupies a prominent place being next in importance to groundnut, both in area and production, meeting the fat requirement of about 50 per cent population in the state of Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Bihar, Orissa, West Bengal and Assam. Seed are known by different names in different places e.g. sarson, rai or raya, toria or lahi. While sarson and toria (Lahi) are generally termed as rapeseed, rai or raya or laha is termed as mustard. The oil content varies from 37 to 49 per cent. The oil is utilized for human consumption throughout northern India in cooking and frying purposes. It is also used in preparation of hair oil and medicines. Rapeseed oil is used in the manufacture of greases. The leaves of young plants are used as green vegetable as they supply enough sulphur and minerals in the diet. The oil cake is used as a cattle feed and manure. India is one of the largest producers of rape seed and mustard in the world. India's contribution in the world's rape seed and mustard production is the highest of any country. The oil is utilized for human consumption throughout northern India in cooking and frying purpose. The oil cake is used as a cattle feed and manure. In the tanning industry mustard oil used for softening of leather.
The agriculture sector plays a very important role in India's social security and overall economic welfare. Oilseeds crops are the second most important determinant of agriculture economy, next only to cereals. India is the largest producer of oilseed in world and accounts for about 14 per cent of the global oilseed area, 7% of the total vegetable oil production, and 10% of the total edible oils consumption. In India, oilseeds accounts for 3% to the growth of National Products and 10% to the total value of all agricultural products, and employs 14 and 1 million people respectively in oilseed cultivation and processing. In 2012-13, the total oilseed cultivated area, the total oilseed production and the total edible oil production, under the nine oilseeds crops, respectively, were 27 million ha, 29 mmt and 7.45 mmt. Presently, India's annual edible oil consumption is about 17.5 mmt, which in the last decade has increased

steadily at a compound annual growth rate of 4.6%. The growth in per capita consumption is attributable to both rising income level and living standards.

Out of 65.55 million tonnes of estimated rapeseed-mustard produced over 34.69 million hectares in the world. India is the third largest rapseed-mustard producer in the world, accounting for about 12% of the world's total rapeseed-mustard "seed" and about 8.5% of the world's total rapeseed-mustard "oil". Rape seed and mustard growing countries of the world are India, Canada, China, Pakistan, Poland, Bangladesh, and Sweden. India ranks first in the world in respect of acreage and second in production next to Canada. India produces 7.96 million tonnes from 9.89 million hectares with 11.88 qtl/ha productivity. In India its cultivation is mainly confined to Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh, West Bengal, Gujarat, Assam, Bihar, and Punjab. In Uttar Pradesh, it is grown over an area of 1.67 million hectare with total production of about 0.77 million tonnes and productivity 11.62 qtl/ha. Rajasthan, and Uttar Pradesh are the major mustard producing state in the country. Rajasthan is the largest mustard producer in the country with a contribution of (54%) to the country's total mustard production followed by Punjab and Haryana which simultaneously contributes (14%) in India, (D.E.S, New Delhi, 2014). In Lakhimpur Kheri district mustard is grown in 1999 hectare with a production 19010 M.T. while productivity 6.95 qtl/ha. (Arth evam Sankhykiy Prabhag, 2016). Since an scientific study has been conducted during recent year on economic aspects of mustard cultivation in the district. Thus seeing the importance of the crop in regards of income and employment generation. This study was framed with following specific objectives.

1. To study the farm structures on mustard growing farms of the study area.
2. To study the cropping pattern, cropping intensity on mustard growing farms.

Materials and methods

Sampling Technique

The multistage stratified, purposive cum random sampling procedure was used for the selection of district, block, village and respondents.

A) Selection of District

The study was purposively undertaken in Lakhimpur Kheri district in order to avoid operational inconvenience of the investigator.

B) Selection of Block

At first, a list of all 15 blocks of Lakhimpur (Kheri) district of Uttar Pradesh along with acreage of mustard cultivation were prepared and arranged in descending order. The block namely "Lakhimpur" having highest area covered under mustard cultivation was selected purposively for this study.

C) Selection of Village

A list of all the villages falling under Lakhimpur block was prepared, and five villages were selected randomly from this list.

D.) Selection of Farmers

A separate list of mustard growers of five selected villages was prepared along with their size of holding and stratified into three categories i.e.

1. Marginal (Below 1 ha)
2. Small (1 to 2 ha)
3. Medium (2 to 4 ha)

From this list, a sample of 100 respondents was drawn following the proportionate random sampling technique.

Methods of enquiry

The primary data were collected by survey method through personal interview with use of pre-structured and pre-tested schedule, while secondary data were collected from block head quarter and district offices etc.

Period of enquiry

The data was pertained to the agricultural year 2016-2017.

Methods and techniques of analysis

The data collected from the sample farmers were analyzed and estimated with certain statistical tools.

Average

The simplest and important measures of average which have been used into statistical analysis were the weighted average. The formula used to estimate the average is as below-

$$\text{W. A.} = \frac{\sum \text{Wi Xi}}{\sum \text{Wi}}$$

Where,

W. A. = Weighted average, X_i = Variable and W_i = weights of X_i

Sampling design used for selection of respondents Structure of farms

The study on the structure of sample farms has its importance as this influence the resource use pattern on farms. The structure of sample farms highlights overall conditions within and around the farms, such as size of holding, cropping pattern and cropping intensity etc. The character existing on sample farms are discussed below.

Average holding size of sample farms

Land is the base for any agricultural enterprise. The availability of land on sample farms of different size groups are presented in table-1. It is depicted from the table that overall average size of holding was 0.97 hectare in the study area which was found to 0.54, 1.35 and 2.55 hectares on marginal, small and medium size group of sample farms, respectively. The total cultivated area at all categories of sample farms were found in irrigated condition.

Table 1: Average holding size of sample farms

S. No.	Size groups of farmers	No. of farmers	Net cultivated area (ha)	Average size of holdings (ha)
1.	Marginal	62	33.37 (34.52)	0.54
2.	Small	28	37.83 (39.13)	1.35
3.	Medium	10	25.48 (26.35)	2.55
All farms		100	96.68 (100)	0.97*

*****Indicate overall average

Farm assets at sample farms of the study area

Description of the investment on farm assets is given in two ways, (i) Per farm investment & (ii) Per hectare investment.

(i) Per farm investment

Per farm investment on different size group of sample farm is presented in table-2.The total farm assets available at the

sample farms are categories as buildings, machinery & implements and livestock. It is depicted from the table that the maximum share of the total farm investment i.e. 61.56 per cent was occurred on building followed by machinery & implements 30.25 per cent and Livestock 8.19 per cent on an overall average. The situation emphasizes the system of custom hiring of farm machineries in study area. It is revealed from the table that per farm total investment was Rs. 399300.10 an overall farm, which was maximum on medium farms i.e. Rs.858720.80 followed by small Rs.571949.90 and marginal Rs. 247229.10, respectively. Per farm total investment on marginal size of farms shared as higher percent on building (64.28) followed by machinery & implements (25.01) and livestock 10.71percent. Similar trend of per farm investment was found on small and medium size group of farms. It is concluded that per farm investment on sample farms was having positive relationship with farm size.

Table 2: Per farm investment on different size group of farms (Rs.)

S. No.	Particulars	Size of farms			
		Marginal (62)	Small (28)	Medium (10)	Over all
1.	Buildings	158912.50(64.28)	351982.30(61.54)	487467.00(56.77)	245827.50(61.56)
I	Residential	152684.60(61.76)	344871.09(60.30)	480512.10(55.96)	179679.8045.00)
	a. Kachcha	9070.50(3.67)	1100.42(0.19)	0000	5931.83(1.49)
	b. Pucca	143614.10(58.09)	130914.40(22.89)	480512.10(55.96)	173748.00(43.51)
II.	Cattle shed	6227.85(2.52)	7111.21(1.24)	6954.88(0.81)	6547.89(1.64)
	a. Kachcha	3072.50(1.24)	1084.62(0.19)	892.76(0.10)	2297.92(0.58)
	b. Pucca	3155.35(1.28)	6026.59(1.05)	6062.12(0.71)	4249.97(1.06)
2.	Live stock	26480.16(10.71)	44844.06(7.84)	37284.47(4.34)	32702.48(8.19)
I.	Milch Animals	26480.16(10.71)	44844.06(7.84)	37284.47(4.34)	32702.488.19)
a.	Cow	2250.05(0.91)	2255.55(0.39)	1672.33(0.19)	2193.82(0.55)
b.	Buffalo	15174.57(6.14)	34576.29(6.05)	35612.14(4.15)	22650.81(5.67)
c.	Goat	9055.54(3.66)	8012.22(1.40)	0000	7857.86(1.97)
3.	Machinery and Implements	61836.47(25.01)	175123.50(30.62)	333969.30(38.89)	120770.10(30.25)
	Minor Implements	1319.35(0.53)	2511.34(0.44)	3151.15(0.37)	1836.29(0.46)
	Major Implements	60517.12(24.48)	172612.10(30.18)	330818.20(38.52)	118933.80(29.79)
4.	Grand total	247229.10(100)	571949.90(100)	858720.80 (100)	399300.10(100)

(Figures in parenthesis indicate percentage to the total)

(ii) Per hectare investment

The per hectare investment on sample farms are presented in table-3. It is depicted from the table that the major percent share of the total investment was spent on building i.e. 62.95 per cent on an overall farms, followed by the expenditure on farm machinery & implements and livestock which accounted for 27.61 and 9.44 per cent respectively. The per hectare investment on different size group of farms are also presented in the table. It is revealed from the table that per hectare total investment was Rs. 436157.60 an overall farm, which were maximum on marginal farms i.e. Rs.457831.70 followed by small Rs.423666.60 and medium Rs. 336753.30, respectively. Per hectare total investment on marginal size of farms shared as higher percent on building (64.28) followed by machinery & implements (25.01) and livestock (10.71) group similar trend of the per hectare investment was found on small and medium size group of farms. It may be concluded that per farm investment had the direct relation with farm size, whereas per hectare of that was inversely related.

Table 3: Per hectare investment on different size group of farms (Rs.)

S. No.	Particulars	Size of farms			
		Marginal	Small	Medium	Overall average
1.	Buildings	294282.40(64.28)	260727.70(61.54)	191163.50(56.77)	274575.20(62.95)
A.	Residential	282749.30(61.76)	255460.14(60.30)	188436.10(55.96)	221529.00(50.79)
	a. Kachcha	16797.22(3.67)	815.13(0.19)	0000	10642.51(2.44)
	b. Pucca	265952.10(58.09)	96973.6(22.89)	188436.10(55.96)	210886.50(48.35)
B.	Cattle shed	11533.06(2.52)	5267.56(1.24)	2727.40(0.81)	8898.15(2.04)
	a. Kachcha	5689.82(1.24)	803.42(0.19)	350.10(0.10)	3787.65(0.87)
	b. Pucca	5843.24(1.28)	4464.14(1.05)	2377.30(0.71)	5110.50(1.17)
2.	Live stock	49037.33(10.71)	33217.82(7.84)	14621.36(4.34)	41166.27(9.44)
A.	Milch Animals	49037.33(10.71)	33217.82(7.84)	14621.36(4.34)	41166.27(9.44)
a.	Cow	4166.76(0.91)	1670.780.39)	655.820.19)	3116.79(0.71)
b.	Buffalo	28101.06(6.138)	5612.076.05)	13965.55(4.15)	25990.59(5.96)
c.	Goat	16769.52(3.66)	934.98(1.40)	00(00)	12058.9(2.76)
3.	Machinery and Implements	114512(25.01)	129721.10(30.62)	130968.40(38.89)	120416.2(27.61)
a.	Minor Implements	2443.24(0.53)	1860.25(0.44)	1235.75(0.37)	2159.25(0.50)
b.	Major Implements	112068.70(24.48)	127860.80(30.18)	129732.60(38.52)	118256.90(27.11)
4.	Grand total	457831.70(100)	423666.60(100)	336753.30(100)	436157.60(100)

(Figures in parenthesis indicate percentage to the total)

Cropping pattern

It indicates the yearly sequence and spatial arrangement of crops followed in a particular area. The roping pattern followed by the sample farmers presented in Table -4. It is depicted from the table that among the various crops grown by the sample farmers of the study area paddy occupied first place of gross cropped area which covered 33.34 per cent and second place was occupied by Maize crop i.e. 4.44 per cent of the *Kharif* season. In *Rabi* season wheat had occupied maximum area i.e. 26.32 per cent and second place occupied Mustard 10.06 per cent area on an overall average. During zaid season on overall average sugarcane had covered maximum area i.e. 7.45% followed by maize crop 6.07 percent. It may be concluded that being low input and high price crop mustard had accepted by the farmers next to the food grain crops.

Table 4: Cropping pattern under different size group of farms (ha)

S. No.	Crop	Average size of sample farms			Overall Average
		Marginal	Small	Medium	
A.	*Kharif*				
1.	Paddy	0.280(25.00)	0.990(36.83)	2.010(39.89)	0.652(33.34)
2.	Maize	0.080(7.14)	0.090(3.35)	0.120(2.38)	0.087(4.44)
3.	Chari	0.020(1.79)	0.030(1.12)	0.038(0.75)	0.025(1.26)
4.	Vegetable	0.033(2.95)	0.049(1.82)	0.144(2.86)	0.049(2.48)
5	Sub Total	0.413(36.88)	1.159(43.12)	2.312(45.88)	0.812(41.52)
B.	*Rabi*				
1.	Wheat	0.214(19.11)	0.710(26.41)	1.830(36.32)	0.514(26.32)
2.	Mustard	0.144(12.86)	0.280(10.42)	0.290(5.76)	0.197(10.06)
3.	Lentil	0.054(4.82)	0.165(6.14)	0.166(3.29)	0.096(4.92)
4.	Berseem	0.01(0.89)	0.010(0.37)	0.051(1.01)	0.014(0.72)
5	Sub Total	0.42(37.68)	1.165(43.34)	2.337(46.38)	0.822(42.02)
C.	Zaid				
1.	Sugarcane	0.120(10.71)	0.180(6.70)	0.210(4.17)	0.146(7.45)
2.	Maize	0.11(9.82)	0.130(4.84)	0.140(2.78)	0.119(6.07)
3.	Chari	0.005(0.45)	0.004(0.15)	0.020(0.40)	0.006(0.32)
5	Sub Total	0.285(25.45)	0.379(14.10)	0.390(7.74)	0.322(16.46)
Grand Total (a+b+c)		1.120(100)	2.703(100)	5.039(100)	1.955(100)

Cropping intensity on sample farms

The intensity of cropping refers to the number of crops grown on a farm during a year. It is calculated as gross cropped area divided by net cultivated area multiplied by hundred. Cropping intensity is presented in terms of percentage. Cropping intensity on the different size of sample farms is presented in Table-5. On an overall average cropping intensity came to 201.55 per cent. The table shows that the cropping intensity was 207.41, 200.22 and 197.61 per cent marginal, small and medium size group of farms respectively. Cropping intensity was higher on marginal size group of sample farms due to awareness of the sample farmers regarding better utilization of little land with optimum use of family labour.

Table 5: Cropping intensity of different size group of farms

S. No.	Size group of farms	No. of farms	Net Cultivated area (ha)	Gross Cropped area (ha)	Cropping intensity (%)
1.	Marginal	62	0.54	1.120	207.41
2.	Small	28	1.35	2.703	200.22
3.	Medium	10	2.55	5.039	197.61
Total/ overall Average		100	0.97	1.955	201.55

Conclusion

Seeing the importance of the crop with regard of human nutrition, generating income & employment to the farm families the necessities of studying the present of mustard economics was felt of most importance. Thus a sample study was conducted in Lakhimpur (Kheri) district of Uttar Pradesh. The study revealed that mustard had occupied a prominent place in cropping pattern just after food grain crops. Present study was mainly covered the objectives of farm structure, cropping pattern and cropping intensity on sample farms.

Result shows that overall average holding size was 0.97 hectare which was 0.54, 1.35 and 2.55 hectare on marginal, small and medium size of farms. In cropping pattern paddy in Kharif, wheat in *Rabi* and sugarcane in Zaid season stood on first position. Mustard crop under the study area was found on second position in *Rabi* season after the wheat. Similarly the cropping intensity was found of opposite trend with size of holding which varied from 207.41% on marginal, 200.22% on small and 197.61 per cent on medium size group of farm and it was 201.55 per cent on over all farms. It may be concluded that cropping intensity decreases with an increase in size of holding. Per farm investment on overall farms were Rs. 399300.10 which was distributed as 61.56 on building 30.25 per cent on machinery & implements and 8.19 on livestock. Per hectare investment on overall farms were Rs. 436157.60 which was distributed as 62.95 on building 27.61 per cent on machinery & implements and 9.44 on livestock. At least it is concluded that per farm investment was positive and per hectare investment was negative associated with size of farms. The inverse relation of cropping intensity with farm size shows that marginal holdings were best utilized by optimum combination with family labour.

Reference

1. Saikia TN. Prospects of changing cropping pattern in favor of oilseed and pulses production in Assam" Agricultural Situation in India. 1989; 4:283-285.
2. Kaur, Kamalpreet, Kaur, Parminder. Rapeseed and mustard cultivation in Bathinda district –an appraisal of productivity and profitability. Indian Journal of

Economics and development. 2017; 13(2a):204-210.
3. Mondal RI, Begum F, Aziz A, Sharif SH. Crop sequences for increasing cropping intensity and productivity. SAARC Journal of Agriculture. 2015; 13(1):135-147.
4. Abha Mayank. of changes in cropping pattern in Bikaner district, Rajasthan Current Agriculture. 2013; 37(1/2):55-64.