

AN ECONOMIC ANALYSIS OF RAPESEED AND MUSTARD CULTIVATION IN PRAYAGRAJ DISTRICT OF UTTAR PRADESH

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ABSTRACT: Rapeseed and Mustard is a group of crops comprising rapeseed (toria, brown sarson and yellow sarson) cultivar of *Brassica campestris*, Indian mustard (*Brassica juncea*), black mustard (*Brassica nigra*) and taramira (*Eruca sativa*). Some exotic species of Brassicas like gobhi sarson (*B. napus*), Ethiopian mustard or karan rai (*B. carinata*) and white mustard (*Sinapis alba*) have been brought into cultivation in India. Purposive-cum-multi stage stratified random sampling technique was used for the selection of district, block, villages and farmers. Prayagraj district of Uttar Pradesh was selected purposely because of convenience of investigator and to avoid difficulties for collection of data due to shortage of time and budget constraints. The data were collected during the agricultural year 2023-24 for this study. The study indicates that calculated value of cost C_3 came to Rs.28643.94, 31587.63 and 41052.58 on marginal, small and medium size group of farms, respectively along with average value i.e. Rs.29428.32. On average cost A_1 , B_1 , B_2 , C_1 , and Cost C_2 worked out were Rs.14124.31, 16286.91, 19573.82, 20223.71 and 26753.01 per ha. respectively. The gross income per hectare was observed maximum under marginal farms i.e. Rs. 106234.25 followed by small farms (Rs.105401.15) and medium farms (Rs.102841.90), respectively. On an overall average, gross income came to Rs.106015.85 where as average net income was Rs.76587.53 per hectare. Cost of production per quintal of rapeseed and mustard was computed to be Rs.1473.53, Rs.1637.80 and Rs.2181.53 on marginal, small and medium farms, respectively with an average of Rs. 1517.76. Benefit-Cost ratio related to cost C_3 was highest on marginal farms (1:3.71) followed by small farms (1:3.34) and medium farms (1:2.50) with an Average Benefit-Cost ratio on cost A_1 , cost B_1 , cost B_2 , cost C_1 , cost C_2 and cost C_3 were worked out and came to 1:7.50, 1:6.51, 1:5.42, 1:5.24, 1:3.96 and 1:3.60, respectively.

Keywords: Rapeseed and Mustard, cost of cultivation, cost of production, cost concepts, farm income measures and Benefit-Cost ratio.

Historically the brassicas are one of the earliest domesticated crop plants by man. It is mentioned in several ancient scripture and literature and might have been cultivated as early as 5000 BC. There is evidence of its cultivation in Neolithic age (Chang 1968). Seeds of mustard were found from the Channhu- daro of Harrapan civilization ca. 2300-1750 BC (Allchin 1969). Aryans used *Brassica* species as condiments and for oil. However, the use of oil was still commoner with the non-Aryans than the Aryans. Thus it is evident that in a period of over 3500 years, mustard came to occupy an important place in the diets of Indian people as a source of oil and vegetable. The origin of *B. juncea* is conflicting. Middle East seems to be the place of origin since the putative parent species; *B. nigra* and *B. campestris* would have crossed. (Olson 1960, Mizushima and Tsunoda 1967). From there it soon

spread to Europe, Africa, Asia, India and Far-East (Hemingway, 1976). It had arisen more than once with different progenitors and in different localities i.e., China, Eastern India and the Caucasus the present day two centers of diversity (Hemmingway 1976, Prakash and Hinata 1980).

Rapeseed and Mustard is a group of crops comprising rapeseed (toria, brown sarson and yellow sarson) cultivar of *Brassica campestris*; Indian mustard (*Brassica juncea*), black mustard (*Brassica nigra*) and taramira (*Eruca sativa*). Some exotic species of Brassicas like gobhi sarson (*B. napus*), Ethiopian mustard or karan rai (*B. carinata*) and white mustard (*Sinapis alba*) have been brought into cultivation in India.

India is the 3rd largest rapeseed and mustard producer in the world, with 12% of total production. with it being the country's main edible oilseed crop,

the rapeseed and mustard crop accounts for approximately one-third of the oil produced in our country, so India has to re-categorize the import of edible oils. (Pathak et al., 2024). Total area, production and yield of Rapeseed and Mustard in world during 2019-20 was 35.95 million hectares (m ha), 71.49 million tonnes (mt) and 1990 kg/ha, respectively. There has been a considerable increase in production and productivity from 2013-14 to 2019-20. There was slight decrease in production and productivity from 2017-18 to 2018-19. However, there was slight increase in area, production and productivity in 2019-20. The Rapeseed and Mustard acreage increased from 6.12 m ha (2018-19) to 6.86 m ha (2019-20). However, production got slightly decreased from 9.26 mt (2018-19) to 9.12 mt (2019-20). The Rapeseed and Mustard yield slightly decreased during 2019-20 as compared to the previous years. Rajasthan, Uttar Pradesh and Madhya Pradesh are the major Rapeseed and Mustard growing states with 45.5%, 13.1% and 11.1% contribution, respectively, to the national acreage during the last five years. The corresponding contribution to production was 48.6%, 13.4% and 9.8%, respectively. Nevertheless, yield (kg/ha) was in general higher in Gujarat varying from 1 072 to 1 635 kg/ha but during 2008-09 and 2009-10, Haryana recorded the highest yield, 1738 and 1656 kg/ha, respectively (Agricultural Statistics at a Glance 2010. www.dacnet.nic.in). (Chauhan et al., 2011).

In India, the rapeseed and mustard is the most important oil seed crop after groundnut accounting around 25 per cent of total oilseed production. It is one of the important oilseed crop grown in Indo Gangetic plains. Besides, the utilities of oil obtained from mustard, rapeseed, the seeds, sprouts, leaves, tender plants are also useful to human health, when they are consumed as spices and vegetables. They contain selenium, calcium, magnesium, iron, phosphorus, zinc, magnesium, manganese, etc. Several biotic-abiotic and socio-economic constraints inhibits exploitation of the yield potential and these need to be addressed. Verma and Prasad (2023). 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. Mustard is the third important crop of Rabi season in Prayagraj. 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 but still if we compare it with other districts, we find that

Prayagraj district lags behind.

RESEARCH METHODOLOGY

Purposive-cum-multi stage stratified random sampling technique was used for the selection of district, block, villages and farmers. Prayagraj district of Uttar Pradesh was selected purposely because of convenience of investigator and to avoid difficulties for collection of data due to shortage of time and budget constraints. A list of all the 23 Blocks of Prayagraj district was prepared and one Block namely Saidabad was selected randomly for the study. A list of all the villages of the selected block was prepared separately along with the area under rapeseed and mustard cultivation with the help of block and revenue personnel. 5 villages from the block were selected randomly. A list of all Rapeseed and Mustard growers of the 5 selected villages was prepared and classified according to size of holding into three size groups i.e. marginal (below 1.0 ha), small (1.0-2.0 ha) and medium (2.0 to 4.0 ha and above), 100 growers from the block were selected randomly in proportion to their number in universe in the each size group. The reference period for the study was agricultural year 2023-24.

RESULTS AND DISCUSSION

Table No.1, indicate that calculated value of cost C_3 came to Rs.28643.94, 31587.63 and 41052.58 on marginal, small and medium size group of farms, respectively along with an average value i.e. Rs.29428.32. On an average cost A_1 , B_1 , B_2 , C_1 , and Cost C_2 worked out were Rs.14124.31, 16286.91, 19573.82, 20223.71 and 26753.01 per ha., respectively. Per hectare gross income was observed maximum under marginal farms i.e. Rs. 106234.25 followed by small farms (Rs.105401.15) and medium farms (Rs.102841.90), respectively. Per hectare gross income was highest on marginal farms due to maximum use of family labour resulted higher productivity. Productivity on these farms might be due to better management followed by the other farmers. On an average, gross income came to Rs.106015.85 where as an average net income was Rs.76587.53 per hectare. On an average, farm business income, family labour income and farm investment income were worked out to be Rs. 91891.54, Rs.83199.63 and Rs.87954.74 per hectare, respectively. Cost of production per quintal of rapeseed and mustard was computed to be Rs.1473.53, Rs.1637.80 and Rs.2181.53 on marginal, small and medium farms, respectively with an average of Rs. 1517.76.

Table-1: Per hectare Cost and Returns from the production of Rapeseed and Mustard crop on the basis of various Cost Concepts

S. No.	Particulars	Average size of sample farms			Weighted / Overall Average
		Marginal (below 1.0 ha)	Small (1.0 – 2.0 ha)	Medium (2.0 – 4.0 ha & above)	
1	Cost A₁	13911.76	14819.02	16762.89	14124.31
2	Cost A₂	13911.76	14819.02	16762.89	14124.31
3	Cost B₁	15341.76	19307.46	28340.37	16286.91
4	Cost B₂	21839.95	25736.03	36200.63	19573.82
5	Cost C₁	19541.76	22287.46	29460.27	20223.71
6	Cost C₂	26039.95	28716.03	37320.53	26753.01
7	Cost C₃	28643.94	31587.63	41052.58	29428.32
8	Yield (q / ha)				
a.	Main Product	17.45	17.31	16.86	16.95
b.	By Product	54.35	54.01	53.51	54.27
9	Gross Income	106234.25	105401.15	102841.90	106015.85
a.	Main Product	95364.25	94599.15	92139.90	95160.41
b.	By Product	10870.00	10802.00	10702.00	10855.44
10	Net Income	77590.31	73813.52	61789.32	76587.53
11	Family Income	84394.30	79665.12	66641.27	83199.63
12	Farm Business Income	92322.49	90582.13	86079.01	91891.54
13	Farm Investment Income	88122.49	87602.13	84959.11	87954.74
14	Cost of Production	1473.53	1637.80	2181.53	1517.76

Table- 2, indicate average benefit-cost ratio on cost A₁, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were worked out and came to 1:7.50, 1:6.51, 1:5.42, 1:5.24, 1:3.96 and 1:3.60, respectively. Benefit-Cost ratio related to cost C₃ was highest on marginal farms (1:3.71) followed by small farms (1:3.34) and medium farms (1:2.50). In respect of cost C₂, benefit-cost ratio was highest on marginal farms (1:4.08) followed by small farms (1:3.67) and medium farms (1:2.75). In respect of Cost C₁, Benefit-Cost ratio was observed highest on marginal farms (1:5.44) followed by small farms (1:4.73) and

medium farms (1:3.49). In respect of cost B₂, Benefit-Cost ratio was found highest on marginal farms (1:4.86) followed by small farms (1:4.09) and medium farms (1:2.84) whereas, in cost B₁ the benefit-cost ratio was highest on marginal farms (1:6.92) followed by small farms (1:5.46) and medium farms (1:3.63). In respect to Benefit-Cost ratio of Cost A₁, was highest on marginal farms (1:7.64) followed by small farms (1:7.11) and medium farms (1:6.14), respectively.

Table-2: Benefit - Cost Ratio (Input – Output ratio)

S. No.	Particulars	Average size of sample farms			Weighted / Overall Average
		Marginal (below 1.0 ha)	Small (1.0 – 2.0 ha)	Medium (2.0 – 4.0 ha & above)	
1	On the Basis of Cost A₁	1: 7.64	1: 7.11	1: 6.14	1: 7.50
2	On the Basis of Cost B₁	1: 6.92	1: 5.46	1: 3.63	1: 6.51
3	On the Basis of Cost B₂	1: 4.86	1: 4.09	1: 2.84	1: 5.42
4	On the Basis of Cost C₁	1: 5.44	1: 4.73	1: 3.49	1: 5.24
5	On the Basis of Cost C₂	1: 4.08	1: 3.67	1: 2.75	1: 3.96
6	On the Basis of Cost C₃	1: 3.71	1: 3.34	1: 2.50	1: 3.60

SUMMARY AND CONCLUSIONS

Per hectare cost C_3 (cost of cultivation) rapeseed and mustard was shows positive relation with size of holding as it was highest under medium size of sample farms which was mainly due to heavy investment towards fixed capital as compared to the other size group of farms. On an average, cost of cultivation of rapeseed and mustard was observed to be Rs.29428.32. Incomes from rapeseed and mustard production were calculated and per hectare gross income was observed maximum under marginal farms i.e. Rs. 106234.25 followed by small farms (Rs.105401.15) and medium farms (Rs.102841.90), respectively. Per hectare gross income was highest on marginal farms due to maximum use of family labour resulted higher productivity. Productivity on these farms might be due to better management followed by the other farmers. On an overall average, gross income came to Rs.106015.85 where as average net income was Rs.76587.53 per hectare. On an overall average, farm business income, family labour income and farm investment income were worked out to be Rs. 91891.54, Rs.83199.63 and Rs.87954.74 per hectare, respectively. Cost of production per quintal of rapeseed and mustard was computed to be Rs.1473.53, Rs.1637.80 and Rs.2181.53 on marginal, small and medium farms, respectively with an average of Rs. 1517.76. Average Benefit-Cost ratio on cost A_1 , cost B_1 , cost B_2 , cost C_1 , cost C_2 and cost C_3 were worked out and came to 1:7.50,

1:6.51, 1:5.42, 1:5.24, 1:3.96 and 1:3.60, respectively. Benefit-Cost ratio related to cost C_3 was highest on marginal farms (1:3.71) followed by small farms (1:3.34) and medium farms (1:2.50).

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