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Research Paper

Economics of Rapeseed-Mustard Production in Begusarai District of Bihar

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ABSTRACT

An attempt has been made in this study to examine the economic analysis of production of rapeseed-mustard in Begusarai District of Bihar, India. Primary data was collected from 120 rapeseed-mustard growers of Begusarai District from a cluster of three villages each from two blocks through simple random sampling without replacement Technique. Study revealed that average per hectare total cost of cultivation of rapeseed-mustard was estimated as ₹ 63873 on sample farms and the average gross income obtained was ₹ 83746.92 per ha. The return to cost ratio was 1:1.39. Therefore, it is suggested that the improved variety of seeds and technology along with proper package and practices should be targeted in these areas to increase the supply. There is a need to step up investment in agricultural research, education, extension to reach among unreached section of society emphasizing quality of production and value addition. The outreach of most modern crop production technology may be facilitated up to the last frame.

HIGHLIGHTS

- Local rapeseed-mustard varieties cultivated on 66.03 per cent area.
- Average total cost of cultivation of rapeseed-mustard was ₹ 63873.1 per hectare.
- The overall average of returns to costs ratio on the basis of various costs varies from 1:2.27 to 1:1.31.

Keywords: Rapeseed-mustard, costs, return, cost-benefit ratio

India holds a top-ranking in the world not only in terms of rich diversity of oilseed crops but also in terms of area as well. Oilseeds occupy an important position in the Indian economy as they account for 14 per cent of the gross cropped area and contributing more than 4 per cent to the Gross National Product (GNP) as per Directorate of oilseed Development (DOD). India is the third largest rapeseed-mustard producer in the world after China and Canada with 13.5 per cent of world's total production (DES, Government of India 2019-20). The area under rapeseed-mustard in the country was 6.23 Million hectares, produced about 9.34 million tonnes with 1499 kg/ha productivity during the year 2018-19. Bihar ranked ninth among the states, in rapeseed-mustard production, with a growth rate of 7.34% during the eighties whereas Rajasthan state with top ranked. It is the most important crops among oilseeds in terms of both area (0.08 million ha) and production (0.11 million tonnes) in Bihar (DES, Government of Bihar Patna, 2018-19). Production of oilseeds and oils has not fluorescing with increasing demand for edible oils

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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. Taking into account the changing policy environment, increasing demand, and slow growth in domestic production and rising imports, the study has been an attempts to work out the economics of Rapeseed–mustard in the state.

MATERIAL AND METHODS

The study was conducted in two blocks under Rapeseed-mustard in Begusarai district of Bihar. Three villages from each block consisting of 20 rapeseed-mustard growers from each village were selected randomly. Thus, in total from 120 farmers were selected through SRSWOR technique. A semi-structured interview schedule was pretested and data's were collected through personal interview of 120 farme. Thereafter data were compiled, tabulated, analysed and interpreted as per objectives of the study. Various costs associated were worked out using the cost incurred per hectare of sample farmers and return over the costs were estimated by using costs concept based on "Sen Committee" (1979).

The classification of costs based on Dr. Sen's Committee report (1979) is as follows:

- **Cost - A_1:** It included wages of hired human labor, cost of bullock labor, charges of hired machinery, cost of seed, value of organic manure and chemical fertilizers, Insecticides, value of plant protection components, interest on working capital, depreciation on farm machinery, implements, equipment, farm buildings, land revenue etc.

  Note: To calculate depreciation under the straight line method, simply divide the number of years of useful life into the depreciable balance (purchase price minus salvage value).

Depreciation = (Purchase Price − Salvage Value) / Years of Useful Life

- **Cost - A_2:** It consists of Cost 'A1' plus rent paid for leased in the land.
- **Cost - B_1:** Cost 'B1' consists of cost 'A1'or 'A2' plus interest on fixed capital invested in the business excluding the value of the land.
- **Cost - B_2:** Cost 'B2' consists of Cost 'B1' plus the rental value of own land.
- **Cost - C_1:** Cost 'C1' consists of cost 'B1' plus imputed value of family labor.
- **Cost - C_2:** Cost 'C2' consists of Cost 'B2' plus imputed value of family labor.
- **Cost D:** Cost C plus 10 % managerial cost of A.

The above farm management cost concepts were used for calculating the cost of production per hectare of Mustard crop.

Procedure for determining the value of the product

The value of the product was computed at the actual prices received by the respondents from the market agency during the study period.

(a) **Gross Income**: It was evaluated as the value of sum total of main product and by product, calculated at current harvest prices.

(b) **Net Income**: It was estimated as difference between gross income and total cost of cultivation.

(c) **Returns to Cost Ratio**: It was evaluated as the ratio of gross income to the total cost of cultivation.

FINDINGS AND DISCUSSION

The rapeseed-mustard crop is grown as a winter season (*Rabi*) crop sown from Oct. to Nov. and harvested from March to April months with assured irrigation having duration of 125 to 140 days. The most prominent varieties grown in study area were Local seeds, and Varuna & others being cultivated in 66.03 per cent and 33.97 per cent area, respectively.

Area under rapeseed-mustard varieties on sample farms

It was observed that Local varieties were important rapeseed-mustard varieties cultivated on 66.03 per cent area by the sample farmers and may be due to unavailability of improved seed varieties. It was also revealed that marginal & small farmers cultivated 85.31 per cent area and semi-medium

farmers cultivated 73.52 per cent area under local traditional varieties while medium and the large farmer preferred to grow both varieties on large area.

Cost of cultivation of Rapeseed- Mustard in the study area

The per ha average total cost of cultivation of rapeseed-mustard was estimated as ₹ 63873.1 per ha on sample farms (n=120). The cost of cultivation was found to be highest for marginal & small farmers (₹ 71327.22/ ha) followed by semi medium (₹ 63328.23/ha), semi-medium farmers (₹ 63214.29/ ha) and medium farmers (₹ 63214.29/ha). The average total cost of cultivation included Variable Cost and Fixed Cost, while the variable cost included material cost and labour cost. The variable cost was estimated as ₹ 34657.24, covering 57.6 per cent of total cost. The manures & fertilizer (₹ 7382.22 per ha) and irrigation cost (₹ 3011.75 per ha) contributed 45.41 per cent and 18.52 per cent of the material cost. The highest labour cost

Table 1: Area under Rapeseed-Mustard varieties on sample farmers (ha)

Name of the Variety	Category of farmers				
	Marginal & Small	Semi-Medium	Medium	Large	Average
	n_1=25	n_2= 49	n_3=33	n_4=13	N=120
Local	12.20	38.75	24.68	16.03	91.66
	(85.31)	(73.52)	(69.03)	(45.92)	(66.03)
Varuna, Pusa bold & others	2.10	13.95	11.07	19.20	46.32
	(14.68)	(26.47)	(30.97)	(54.08)	(33.97)
Total area of Rapeseed-Mustard cultivated	14.30	52.70	35.75	35.50	138.25
	(100)	(100)	(100)	(100)	(100)

Note: *Figure in Parentheses shows percent to total.*

Table 2: Costs of cultivation of Rapeseed-Mustard crop on different size group of sample farms in the study area (₹/ha)

Sl. No.	Particular	Size of sample farms (ha)				Average n=120
		Marginal & Small n=25	Semi- Medium n=49	Medium n=33	Large n=13	
1	Family labour	6517.8 (9.69)	3166.2 (5.31)	2699.27 (4.54)	2487.38 (4.33)	3140.06 (5.22)
2	Hired labour	18375.38 (27.30)	15462.44 (25.9)	15818.78 (26.6)	14386.4 (25.00)	15260.75 (25.4)
	Total human labour	24893.18 (37.00)	18628.64 (31.2)	18518.05 (31.1)	16873.78 (29.40)	18400.81 (30.60)
3	Tractor labour	4537.88 (6.74)	4414.24 (7.4)	4338.96 (7.29)	4231.3 (7.36)	4399.48 (7.31)
5	Seed	528.88 (0.79)	474.79 (0.8)	484.55 (0.81)	461.73 (0.8)	487.57 (0.81)
6	Manures and fertilizers	7556.72 (11.20)	7143.96 (12.00)	6953.70 (11.70)	6474.45 (11.3)	7382.22 (12.3)
7	Irrigation charge	3141.84 (4.67)	3030.53 (5.08)	2922.83 (4.91)	2916.5 (5.08)	3011.75 (5.0)
8	Plant protection	2215.94 (3.29)	2338.26 (3.92)	2624.67 (4.41)	3192.28 (5.56)	2515.16 (4.18)
9	Miscellaneous charges	1858.58 (2.76)	1650.94 (2.77)	1695.03 (2.85)	1548.83 (2.70)	1688.35 (2.81)
10	Interest on working capital (@3% Rate of Interest)	1151.71 (1.71)	1164.34 (1.95)	1161.98 (1.95)	1310.95 (2.28)	1171.38 (1.95)
11	Rental value of owned land	18500 (27.5)	18000 (30.2)	18000 (30.2)	18000 (31.3)	18250 (30.3)
12	Interest on fixed capital (@ 8% Rate of Interest)	1859.03 (2.76)	1809.13 (3.02)	1803.11 (3.03)	14754.50 (2.53)	1827.95 (3.04)
13	Land revenue	200.00 (0.3)	200.00 (0.34)	200.00 (0.34)	200.00 (0.35)	200.00 (0.33)
14	Depreciation	842.52 (1.25)	810.45 (1.36)	810.33 (1.36)	787.60 (1.37)	842.52 (1.4)
15	Managerial Cost, 10 % of variable cost	4040.94 (5.66)	3668.99 (5.79)	3701.08 (5.85)	3551.00 (5.82)	3695.91 (5.78)
	Grand total	**71327.22 (100)**	63328.23 **(100)**	63214.29 **(100)**	**61002.92 (100**	**63873.10 (100)**

Note: *Figure in Parentheses shows percent to total;* ***Source:*** *Compiled by the Authors.*

Table 3: Costs and income from the production of Rapeseed-Mustard crop on various costs concept (₹/ha)

Sl. No.	Particular	Size of sample farms				Average
		Marginal & Small	Semi-Medium	Medium	Large	
1	Cost C	67286.28	59659.24	59513.21	57451.92	60177.19
2	Total cost or Cost D	**71327.22**	63328.23	63214.29	**61002.92**	**63873.10**
3	Gross income	**80803.75**	82204.5	83399.87	**96073.5**	**83743.92**
4	Net income	13517.47	22545.26	23886.66	38621.58	**23566.73**
5	Farm investment Income	9476.52	18876.26	20185.57	**35070.57**	19870.81
6	Yield (q/ha)	15.36	15.85	16.04	16.18	15.83
7	Cost of production per (q)	4380.61	3763.98	3710.29	3550.79	**3801.46**
		Input output relationship				
8	On the basis of Cost C	1:1.20	1:1.38	1:1.40	1:1.67	**1:1.39**
9	On the basis of Cost D	**1:1.3**	1:1.29	1:1.31	**1:1.57**	**1: 1.31**

Source: *Compiled by the Authors.*

(₹ 24893.18 per ha) was observed at marginal and small with 60.20 per cent of total Variable cost whereas 34.89 per cent of total cost of cultivation. Average yield on sample farms was obtained as 15.83 quintal per ha. The average price received by rapeseed-mustard farmers ranged between ₹ 5280 per quintal (marginal & small farmers) to ₹ 5977 per quintal (large farmers) with average price of ₹ 5287 per quintal. The gross income obtained by rapeseed-mustard farmers was lowest (₹ 80803.75/ha) for marginal & small farmers, while semi-medium and medium farmers obtained a slightly higher income of ₹ 82204.5 and ₹ 83399.87 per ha, respectively. The large farmers received highest gross income of ₹ 96073.5 per ha, with an overall average was ₹ 83746.92 per ha. The return to cost ratio analysis was done on from cost A to Cost D. It varies from 1:1.20 to 1:1.3 in case of marginal & small farms, 1:2.24 to 1:1.29 on semi medium farms, 1:2.25 to 1:1.31 on medium and 1:2.71 to 1:1.57 on large size of farms. The large farmers obtained highest return to cost ratio of 1.57. The overall average of returns to costs ratio on the basis of various costs varies from 1:2.27 to 1:1.31.

CONCLUSION

The most prominent varieties grown in study area were Local seeds, cultivated in 66.03 per cent area. The costs and returns were worked out using the cost concept given by CACP, Govt. of India. Study observed that average total cost of cultivation of rapeseed-mustard was ₹ 63873.1 per hectare, which was highest on small & marginal farm (₹ 71327.22/ha) and lowest on large farms (₹ 61002.92/ha). The major share of cost items to the total cost was estimated for cost of hired labour, manures & fertilizer, followed by irrigation, plant protection measures, and leased in land rent etc. The variable cost was estimated as ₹ 34657.24, accounted 57.6 per cent of total cost. Data pertaining to labour cost was found highest (₹ 24893.18 per ha) at marginal & small farmers accounted 60.20 percent of total variable cost whereas 34.89 percent of total cost of cultivation.

An average yield on sample farms was obtained as 15.83 quintal /ha and average price received by rapeseed-mustard farme. The gross income obtained by rapeseed-mustard farmers was ₹ 83746.92 per ha & was lowest (₹ 80803.75/ha) for marginal & small farmers, whereas semi-medium and medium farmers obtained a slightly higher income of ₹ 82204.5 and ₹ 83399.87 per ha, respectively. However large farmers received highest gross income of ₹ 96073.5 per ha, with an overall average was ₹ 83746.92 per ha. The main reason behind higher return to cost ratio and higher net income against total cost of large farmers was the better prices and higher yield obtained by large farmers compared to marginal & small farme.

The average of returns to costs ratio varied from 1:2.27 to 1:1.31in area under study. Among categories, it varied from 1:1.20 to 1:1.3 in case of marginal & small farms, 1:2.24 to 1:1.29 on semi medium farms, 1:2.25 to 1:1.31 on medium and 1:2.71 to 1:1.57 on large size of farms respectively. The large farmers obtained highest return to cost

ratio of 1.57, it implies that the farmers earn ₹ 57 paisa to each rupee invested for rapeseed-mustard production.

Suggestions and policy implication: There is a need to step up investment in agricultural research, education, extension to reach among unreached section of society emphasizing quality of production and value addition. The outreach of most modern crop production technology may be facilitated up to the last farme.

The recent estimates of cost of cultivation will also provide information to stakeholders in deciding the prices of outputs and also provides the feedback & valuable information to the different research institutions, departments, associated universities and various non-governmental organizations working in agricultural and allied departments to strengthen the research-extension farmer linkage by providing credible input on time to the frame. Therefore, the technology should be targeted in these areas as cost effective or/ less costly than the competitive crop so that the farmers could get the net returns equivalent to that they get from the competitive crops especially from wheat. Only then, the farmers will go for cultivation of rapeseed-mustard.

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