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An economic analysis of cost and returns of linseed in Rajnandgaon district of Chhattisgarh, India

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Abstract
An attempt has been made in this study to examine the economic analysis of cost and return of linseed in Rajnandgaon District of Chhattisgarh State, India. The present study was conducted in Rajnandgaon district of Chhattisgarh State, India. Out of 10 blocks in the district, three blocks namely; Rajnandgaon, Khairagarh and Chhuikhadan blocks was selected purposively for the study. Each selected blocks, 2-3 per cent of villages were selected purposively and total 300 respondents was selected purposively for the study. The primary data was collected from the linseed producers through personal interview method with the help of well prepared schedule and questionnaire for the year 2017-18. The major finding of this study revealed that on an average the per hectare cost of cultivation of linseed was worked out as Rs. 25593.47/ha., Net returns as Rs.7148.41, Cost of production rupees per quintals as Rs. 2923.72 and Input-Output ratio was observed 1.28 respectively.

Keywords: Linseed, cost and returns, cultivation, quintal and major constraints

Introduction
India ranks third in the world in respect to area and production of linseed. Linseed is the principal oilseed crop grown in Chhattisgarh under utera in rainfed conditions. It occupies 34% share in total oilseeds production in the state and 17% in India. The total area of linseed is 162 thousand ha, production is 74.7 thousand tonnes and productivity is 288 kg ha-1(Hegde, 2005). Despite the premier position, the country holds in the production of oilseed, the productivity level has remained virtually static in the last couple of year with no major breakthrough in achieving productivity enhancement and yield stabilization. This is mainly due to cultivation of oilseed crops under rain-fed condition (76%) and the vulnerability of the released cultivars to an array of stresses, both biotic and abiotic in nature. Linseed (*Linum usitatissimum* L.). In India, it is grown mainly for seed used for extracting oil. The oil content of the seed varies from 33-47%. Linseed oil is an excellent drying oil used in manufacturing paints and varnishes, oilcloth, waterproof fabrics and linoleum and as edible oil in some areas. Linseed-cake is a very good manure and animal feed. Linseed is used in making paper and plastics.

Materials and Methods
Primary data was collected for the year 2017-18. Multi-stage sampling design was adopted for the ultimate selection of linseed growing farmers. The Chhattisgarh state is divided into 3 agroclimatic zones and Rajnandgaon district will be selected purposively. Out of 10 blocks in the district, three blocks namely, Rajnandgaon, Khairagarh and Chhuikhadan, will be selected purposively for the study. Each selected blocks, 2-3 per cent of villages will be selected purposively and the total 300 respondents will be selected purposively for the study. The zone was the first stage, district was the second stage, blocks were the third stage and villages were the fourth stage. Households of farm categories were the ultimate stage. To work out the cost of cultivation standard method of cost of cultivation as per CACP will be adopted which includes cost A, cost B and cost C. These cost concepts and the items of costs included under each concept are given below:

Cost A1

1. Value if hired human labour.
2. Value of hired bullock labour
3. Value of owned bullock labour.
4. Value of owned machinery labour.
5. Hired Machinery Charges.
6. Value of seed (both farm produced and purchase).
7. Value of insecticides and pesticides.
8. Value of manure (owned and purchase)
9. Value of fertilizer.
10. Depreciation on implements and farm buildings.
11. Irrigation charges.
12. Land revenue, cesses and other taxes.
13. Interest on working capital.
14. Miscellaneous expenses (Artisans etc.).

Cost A2: **1**Cost A1 + rent paid for leased in land
Cost B1: Cost A1 + interest on value of owned fixed capital assets (excluding land).
Cost B2: Cost B1 + rental value of owned land (net of land revenue) and rent paid for leased-in land.
Cost C1: Cost B1 + imputed value of family labour
Cost C2: Cost B2 + imputed value of family labour
Cost C2*: Cost C2 adjusted to take into account valuation of human labour at market rate or statutory minimum wage rate whichever is higher.
Cost C3: Cost C2* + value of management input at 10 percent of total cost (C2*).

- **Interest on working capital:** It was calculated @4% per annum for half of the crop period.
- **Interest on fixed capital:** It was calculated @10% per annum for the crop period.
- **Rental value of owned land:** It was calculated based on the prevailing rates in the sampling villages.
- **Depreciation:** It presents the value by which a farm resource decreased in value as a result of cause other than a change in general price of the item. Straight line method was used for calculating the depreciation:

$$\text{Depreciation} = \frac{\text{Purchase value of asset} - \text{junk value}}{\text{No. of useful years of life (expected life)}}$$

Income measures

a. **Gross income:** It includes the final price of main product and by product of the crop.
b. **Net income:** Net income = Gross income – Cost C2
c. **Family labour income:** It is measured on earning of a farmer and his labour and managerial work. It is equal to gross income minus total expenses excluding wage of unpaid family labour.
   Family labour income = Gross income - Cost B2
d. **Farm business income:** It is a measure of earning of farmer and his family for his capital investment, labour and managerial work.
   Farm business income = Gross income – Cost A_1
e. **Farm investment income:** This is the sum of net income, rental value of owned land and interest on fixed capital.
   Farm investment income = Farm business income – Imputed value of family labour.
f. **Input: Output ratio:** It is ratio between input and output and computed by dividing value of total output by value of total input.

Input output ratio = O / I

Where
I = Total input and
O = Total output

Results and Discussion

The productivity and income from the crop production can be judged in better way, if we analyse it with respect to the different costs incurred during cultivation of a particular crop. The cost of cultivation and cost of production of any crop is the most important aspect of the farm economy both at micro and macro level point of views; it provides guideline to the government in promulgating the price policy both for factors of production and the produce. Input wise cost was worked out in two broad heads namely variable cost and fixed cost. The variable cost includes cost of human labour (family and hired), machinery labour, seeds, manures, fertilizers, pesticides, herbicides, and interest on working capital. On the other hand, fixed cost involves land revenues, rental value of owned land and depreciation.

Input wise cost of cultivation of Linseed

The economics of cultivation of linseed grown in the study area. (Table 1) clearly shows input wise cost of cultivation of linseed per hectare, which is highest in case of large farms (Rs. 26974.79/ ha) and lowest in case of small farms (Rs. 23484.03/ ha). Cost of cultivation showed increasing trend from marginal to large farmers. It is due to the fact that large farmers could incur more expenditure on modern farm inputs like quality seed, fertilizers, plant protection chemicals, hired labours etc. The major share of cost among different cost items were found in total labour cost which is 37.23 per cent to the total cost of cultivation out of which 20.75 per cent contribution was of human labour and bullock and machine labour together contribute 17.48 per cent. Total labour cost was increased from marginal to large farms but its contribution in total cost was found maximum in case of small and medium farms which was 38.90 and 37.61, respectively. The average total input cost was found 55.51 per cent, whereas average total fixed cost was 44.49 per cent to the total cost. Rental value of land is highest among fixed costs, which is 41.03 per cent to the total cost of cultivation.

Table 1: Input wise cost of cultivation of linseed under different farm size groups (Rs/ha)

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
A	**Input Cost**					
1	**Human labour**					
	Family	5663.64 (24.12)	4542.61 (17.46)	3902.28 (14.56)	2822.46 (10.46)	4550.80 (17.78)
	Hired	235.65 (1.00)	686.49 (2.64)	1076.89 (4.02)	1904.49 (7.06)	759.40 (2.97)
	Total human Labour	5899.29 (25.12)	5229.10 (20.10)	4979.17 (18.58)	4726.95 (17.52)	5310.20 (20.75)
2	**Bullock and Machinery Labour**					
	Family	2209.45 (9.41)	4145.94 (15.93)	4365.91 (16.29)	2966.24 (11.00)	3572.26 (13.96)
	Hired	929.23 (3.96)	747.35 (2.87)	732.02 (2.73)	2099.03 (7.78)	901.87 (3.52)
3	Total machine and bullock labour	3138.68 (13.37)	4893.29 (18.81)	5097.93 (19.03)	5065.27 (18.78)	4474.13 (17.48)
	Total Labour Cost	9037.97 (38.49)	10122.39 (38.90)	10077.10 (37.61)	9792.22 (36.30)	9784.33 (37.23)
4	Seed	180.47 (0.77)	209.32 (0.80)	191.49 (0.71)	227.80 (0.84)	198.24 (0.77)
5	Manure & Fertilizers	1824.05 (7.77)	2918.92 (11.22)	3393.60 (12.67)	3342.44 (12.39)	2771.72 (10.83)
6	Plant Protection	741.22 (3.16)	789.18 (3.03)	816.69 (3.05)	963.02 (3.57)	796.88 (3.11)
	Total material cost	2445.74 (10.41)	3617.42 (13.90)	4081.78 (15.23)	4133.26 (15.32)	3453.71 (13.49)
8	Irrigation Charges	670.27 (2.85)	765.14 (2.94)	848.42 (3.17)	919.38 (3.41)	772.61 (3.02)
9	Interest on working capital	133.09 (0.57)	204.69 (0.79)	232.20 (0.87)	256.62 (0.95)	196.10 (0.77)
	Sub Total	12287.07 (52.32)	14709.64 (56.53)	15239.50 (56.88)	15101.48 (55.98)	14206.74 (55.51)
B	**Fixed Cost**					
10	Land Revenue and Taxes	10 (0.04)	10 (0.04)	10 (0.04)	10 (0.04)	10 (0.04)
11	Interest on fixed capital	532.71 (2.27)	538.11 (2.07)	549.75 (2.05)	564.92 (2.09)	541.75 (2.12)
12	Depreciation	154.25 (0.66)	262.16 (1.01)	495.04 (1.85)	798.39 (2.96)	334.98 (1.31)
13	Rental Value of land	10500 (44.71)	10500 (40.35)	10500 (39.19)	10500 (38.93)	10500 (41.03)
	Sub Total	11196.96 (47.68)	11310.27 (43.47)	11554.79 (43.12)	11873.31 (44.02)	11386.73 (44.49)
C	Total Cost (A+B)	23484.03 (100.00)	26019.91 (100.00)	26794.29 (100.00)	26974.79 (100.00)	25593.47 (100.00)

Measures of yield, cost and return in linseed

It is quite evident from table 2 and fig 1, that on an average, the total average cost, value of net income, family labour income and farm business income per hectare came to Rs. 25593.47, Rs. 7148.41, Rs. 11867.54 and Rs 22909.29 respectively from linseed crop. Gross income of the farms by main product and by product together was found to be Rs. 32910.21 per hectare, which was found increasing from marginal to large farms. Whereas, net income was found maximum on large farms (11966.81 Rs./ha.) and minimum on marginal farms (5275.47 Rs./ha.) respectively. The total average input-output ratio was found 1:1.28 in the cultivation of linseed crop. It is due the fact that increased productivity on small to large farms was the result of extra cost incurred, which decreased the input output ratio. Secondly, family labours do work more efficiently on the farms and marginal farmers were using more family labours as compared to hired labours whereas contribution of family labour found decreasing with the increase in farm size.

Table 2: Yield, cost and return of linseed crop at the sampled farms (Rs./ha)

S. No.	Particulars	Marginal	Small	Medium	Large	Average
1	Total cost (Rs.)	23484.03	26019.91	27294.29	27474.79	25593.47
2	Yield (Qtl)	7.70	8.98	9.21	10.56	8.81
3	Gross return (Rs.)	28759.50	33540.30	34399.35	39441.60	32910.21
4	Net return (Rs.)	5275.47	7520.39	7105.06	11966.81	7148.41
5	Family labour income	10939.11	12063.00	11507.34	15289.27	11867.54
6	Farm Buisiness income	21971.82	23101.11	22557.09	26354.19	22909.29
7	Cost of production (Rs./qtl)	3049.87	2897.54	2963.55	2601.78	2923.72
8	Input-Output ratio	1.22	1.29	1.26	1.44	1.28

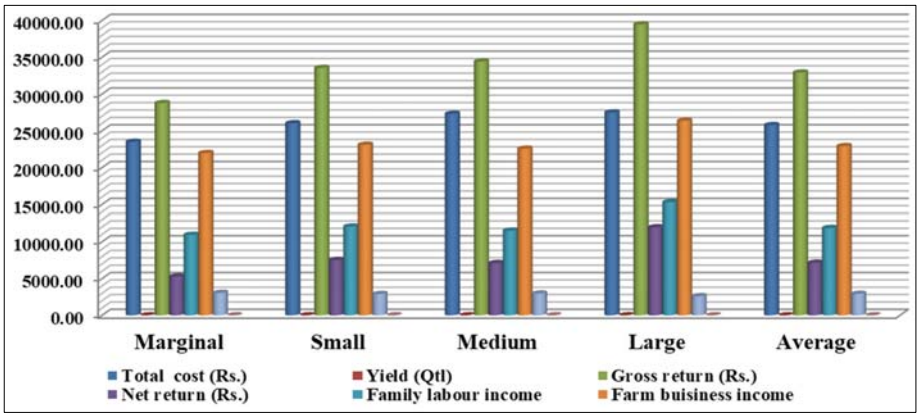

Fig 1: Yield, cost and return of linseed crop at the sampled farms (Rs./ha)

Cost concept wise income over different cost in Linseed

The cost and returns on the basis of cost concept in the production of linseed have been presented in the table 3 and fig 2, which portrays that, on an average cost A1, cost A2, cost B1, cost B2, cost C1, cost C2 and cost C3 were worked out to Rs. 10000.92, Rs. 10000.92, Rs. 10542.67, Rs. 21042.67, Rs. 15093.47, Rs. 25593.47 and Rs. 28152.82 per hectare respectively on the sample farms. It was noted that rupees 10500 were considered as imputed rental value of owned land for one crop season. Cost A1 is showing increasing trend from marginal to large sized farms because of more use of hired labour, plant protection chemicals, manure and fertilizers etc. An break-up of cost, cost concept wise income over different average cost A1, cost A2, cost B1, cost B2, cost C1,cost C2 and cost C3 were worked out to Rs. 22909.29, Rs. 22909.29, Rs. 22367.54, Rs. 11867.54, Rs. 17816.74, Rs. 7316.74 and Rs. 4757.39 per hectare respectively on the sample farms.

Table 3: Break-up of cost, cost concept wise income over different cost in linseed at the sample farm (Rs./ha)

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
A.	Break-up of costs					
	Cost A1	6787.68	10439.19	11842.26	13087.41	10000.92
	Cost A2	6787.68	10439.19	11842.26	13087.41	10000.92
	Cost B1	7320.39	10977.3	12392.01	13652.33	10542.67
	Cost B2	17820.39	21477.3	22892.01	24152.33	21042.67
	Cost C1	12984.03	15519.91	16294.29	16474.79	15093.47
	Cost C2	23484.03	26019.91	26794.29	26974.79	25593.47
	Cost C3	25832.43	28621.9	29473.72	29672.26	28152.82
B	Income over different cost					
	1. Income over cost A1	21971.82	23101.11	22557.09	26354.19	22909.29
	2. Income over cost A2	21971.82	23101.11	22557.09	26354.19	22909.29
	3. Income over cost B1	21439.11	22563.00	22007.34	25789.27	22367.54
	4. Income over cost B2	10939.11	12063.00	11507.34	15289.27	11867.54
	5. Income over cost C1	15775.47	18020.39	18105.06	22966.81	17816.74
	6. Income over cost C2	5275.47	7520.39	7605.06	12466.81	7316.74
	7. Income over cost C3	2927.07	4918.40	4925.63	9769.34	4757.39
C	Gross income	28759.50	33540.30	34399.35	39441.60	32910.21
D	Total cost at C3	25832.43	28621.9	29473.72	29672.26	28152.82
E	Input - Output ratio	1.11	1.17	1.17	1.33	1.17

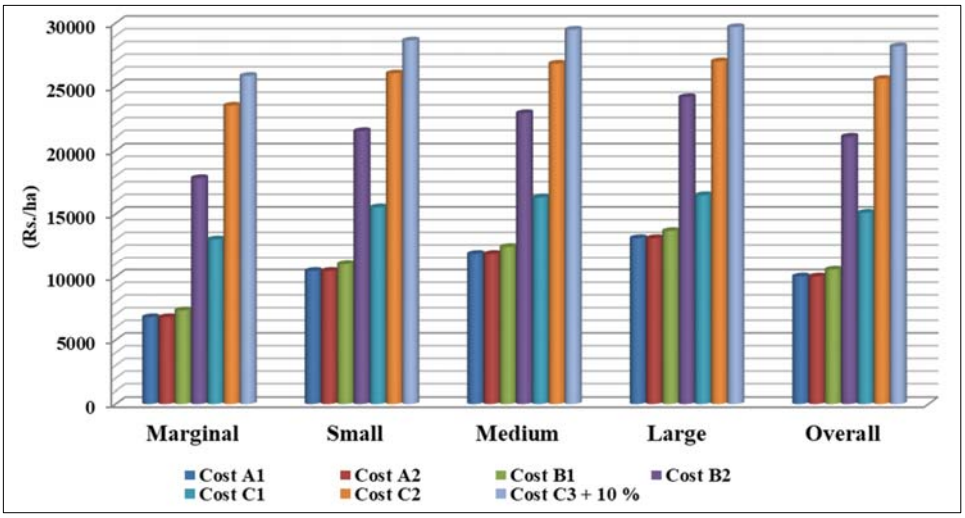

Fig 2: Cost concept – cost and return of Linseed on the sampled households.

Summary and Conclusion

The major findings of this study revealed that on an average the per hectare cost of cultivation of linseed was calculated as Rs. 25593.47, on an average yield of linseed was observed 8.81 quintals and average cost of production per quintal of linseed is (Rs. 2923.72). The input-output ratio of linseed was (1:1.28). The cost and returns on the basis of cost concept in the production of linseed on an average cost A1, cost A2, cost B1, cost B2, cost C1, cost C2 and cost C3 were worked out to to Rs. 10000.92, Rs. 10000.92, Rs. 10542.67, Rs. 21042.67, Rs. 15093.47, Rs. 25593.47 and Rs. 28152.82 per hectare respectively on the sample farms.

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