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Data Ram Naik
 Department of Agricultural
 Economics, COA, IGKV,
 Raipur, Chhattisgarh, India

VK Choudhary
 Professor and HOD,
 Department of Agricultural
 Economics, COA, IGKV,
 Raipur, Chhattisgarh, India

Praveen Kumar Verma
 Assistant Professor,
 Department of Agricultural
 Economics, COA, IGKV,
 Raipur, Chhattisgarh, India

Yogeshwari Sahu
 Department of Agricultural
 Economics, COA, IGKV,
 Raipur, Chhattisgarh, India

Corresponding Author:
Data Ram Naik
 Department of Agricultural
 Economics, COA, IGKV,
 Raipur, Chhattisgarh, India

Performance of rabi pulses in Chhattisgarh: A district level assessment

Data Ram Naik, VK Choudhary, Praveen Kumar Verma and Yogeshwari Sahu

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Abstract

The present study was conducted in the Raigarh district of Chhattisgarh. In this study 20 to 30 percent of respondents were purposively selected from the total Rabi pulse growers in selected 12 villages and total 108 farmers were selected. The main aim of study was to examine the cost and returns of major pulses in rabi season. The primary data was collected in the cropping year 2023-24 from sampled households through the personal interview method. The average farm size of sample farmers was 2.79 hectares and the average cropping intensity was 151.11 percent. The Total cost accounted 32517.49 Rs./ha share in the cost of cultivation of moong and their production was 9.44 qt./ha. An estimated the total cost of moong production was 3449.68 Rs./qt. The gross income and net income of moong was 73351.38 and 40833.88 Rs./ha. respectively. Overall, the ratio of input to production of moong was 2.25. Urd was reported to have an overall total cost of 27385.31 Rs./ha. and their total production was 7.40 qt./ha. An estimated the total cost of urd production was 3709.79 Rs./qt. The gross income and net income of urd was 60493.84 and 33108.53 Rs./ha. respectively. Overall, the ratio of input to production of urd was 2.20. The total cost of lathyrus was reported to have an 12178.07 Rs./ha. and their total production was 7.23 qt./ha. An estimated the total cost of lathyrus production was 1681.59 Rs./qt. The gross income and net income of lathyrus was 26400.14 and 14222.07 Rs./ha. respectively. Overall, the ratio of input to production of lathyrus was 2.18.

Keywords: Raigarh district, Chhattisgarh, rabi pulse growers

Introduction

Pulses are an excellent source of vitamins, minerals (including iron), fiber, and protein. In comparison to other protein sources, pulses offer a higher protein content at a lower cost. Pulses contain 20 to 25 percent protein by weight; This is twice wheat's protein content and three times rice's protein content. From the viewpoint of agricultural science, Rhizobium bacteria are found in the roots of leguminous crops and these bacteria stabilize the atmospheric nitrogen in the soil, thereby increasing the fertility of the soil. Generally, nitrogen fertilizers are reduced in the field where leguminous crops are cultivated in the next season. India is the world's second-largest agricultural producer country. The Indian Economic Survey 2020-21 states that 20.2% of India's GDP comes from agriculture, which employs more than 50% of the labor force in the nation. India is the largest producer and consumer of pulses in the world and in terms of production, China, Australia, and South Africa come after India respectively. India produces 25% of the pulses in the world, consumes 27%, and imports 14%. The country exported 775,024.48 metric tons of pulses to the world worth Rs. 5,397.86 Crore in 2022-23. Main export destinations; Bangladesh, China, Arab countries, the United States and Nepal (2022-23). The cultivation of pulses contributes greatly to Chhattisgarh's agriculture and economy, and the state government is promoting sustainable agricultural and supporting their production. The total area under pulses in Chhattisgarh in the year 2021-22 was 5.40 lakh hectares whereas in the year 2020-21, it was 5.19 lakh hectares. In the year 2021-22, total pulses production was 3.76 lakh metric tons and productivity was 698 kg per hectare recorded by Chhattisgarh Land Record Department. Chhattisgarh state has also received the "Krishi Karman Award" from the Central Government for record pulse production in the year 2014-15.

Materials and Methods

Cost Concept

To work out the cost of cultivation, standard method of cost analysis was adopted. which include cost A, cost B, and cost C.

Cost A1: Consists of the following 16 items of costs:-

1. Value of hired human labor (permanent & casual).
2. Value of owned bullock labor.
3. Value of hired bullock labor.
4. Value of owned machinery.
5. Hired machinery charged.
6. Value of fertilizers.
7. Value of manure (produced on farm and purchased).
8. Value of seed (both farm-produced and purchased).
9. Value of insecticides and fungicides.
10. Irrigation charges (both of the owned and hired tube wells, pumping sets, etc).
11. Canal-water charges.
12. Land revenue, cesses, and other taxes.
13. Depreciation on farm implements (both bullocks drawn & worked with human labor).
14. Depreciation on farm building, and farm machinery.
15. Interest in the working capital.
16. Miscellaneous expenses (wages of artisans, and repairs to small farm implements).

Cost A2: Cost A1+Rent paid for Leased Land.

Cost B1: Cost A1+Interest on the value of Owned 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 labor.

Cost C2:- Cost B2+Imputed value of Family labor.

Cost C3: Cost C2+ value of management input at 10% of cost C2.

Interest on fixed capital

Interest on the present value of fixed assets (excluding land) such as implements, machinery, and buildings was

calculated at the rate of 10.25 percent per annum.

Interest on working capital

The expansions on cash cost items including seeds, manure, fertilizers, chemicals, manpower (both hired and family labor), and the upkeep and repair of machinery and machines rented for operations were all included in working capital, also known as variable cost. We considered the actual prices that the farmers paid for these goods. The interest on variable cost, excluding owned resources like family labor, was also considered as variable cost and was calculated at the rate of 5 percent per annum.

Land revenue

Land revenue paid to the revenue department by farmers was considered.

Depreciation

It is a reduction in an asset's value brought on by use, degradation, accidents, and time deterioration. Depreciation was calculated on fixed capital items, such as agricultural buildings, irrigation systems, and machinery like threshers, but not on tractors or their accessories, which were considered hired things. For smaller agricultural equipment utilized in crop production, depreciation was calculated.

Result and Discussion

Cost of cultivation of moong

In Tables 1; display the total fixed cost of moong on the sampled farm (Rs/ha) and the total variable cost of moong on the sampled farm (Rs/ha). The table shows that marginal farms had lower total costs per hectare than large farms. The total cost per moong was calculated to be 32517.49 (Rs/ha). The cost of cultivation for marginal, small, medium, and big farms was calculated to be 29946.59, 32302.04, 34365.44, and 35414.44 Rs/ha, respectively. The cost of cultivation per hectare showed an increasing tendency as farm size increased. This was caused by the major farmers' increased expenditure on modern farm inputs, such as premium seed, fertilizer, equipment, and hired labor. The greatest cost is borne by human labor rather than hired labor. Large farmers employed plant protection more often than small farms. Furthermore, a large farmer's marginal cost exceeded its entire cost.

Table 1: Cost and returns of Moong cultivation in Raigarh block of Raigarh district (Rs/ha)

S. N.	Particulars	Farm Size				
		Marginal (13)	Small (9)	Medium (16)	Large (2)	Overall (40)
A	Variable cost					
1	Human labour					
a	Family labour	7100.00 (23.71)	6250.00 (19.35)	5650.00 (16.44)	4050.00 (11.44)	6176.25 (18.99)
b	Hired labour	2350.00 (7.85)	4000.00 (12.38)	4650.00 (13.53)	5750.00 (16.24)	3811.25 (11.72)
	Total human labour	9450.00 (31.56)	10250.00 (31.73)	10300.00 (29.97)	9800.00 (27.67)	9987.50 (30.71)
2	Machine charge	4750.00 (15.86)	4800.00 (14.86)	5230.00 (15.22)	5320.00 (15.02)	4981.75 (15.32)
3	Seed cost	1650.00 (5.51)	1860.00 (5.76)	2240.00 (6.52)	2460.00 (6.95)	1973.75 (6.07)
4	Manure & Fertilizer cost	4460.00 (14.89)	5120.00 (15.85)	5850.00 (17.02)	6400.00 (18.07)	5261.50 (16.18)
5	Plant Protection Chemicals	2428.00 (8.11)	2662.00 (8.24)	2750.00 (8.00)	3150.00 (8.89)	2645.55 (8.14)

6	Irrigation charges	765.00 (2.55)	940.00 (2.91)	1020.00 (2.97)	1100.00 (3.11)	923.13 (2.84)
7	Miscellaneous	300.00 (1.00)	455.00 (1.41)	632.00 (1.84)	765.00 (2.16)	490.93 (1.51)
8	Interest on working capital @ 5%	702.65 (2.35)	769.10 (2.38)	854.50 (2.49)	921.50 (2.60)	789.28 (2.43)
Sub total		24505.65 (81.83)	26856.10 (83.14)	28876.50 (84.03)	29916.50 (84.48)	27053.38 (83.20)
B	Fixed cost					
1	Land revenue	4.25 (0.01)	4.25 (0.01)	4.25 (0.01)	4.25 (0.01)	4.25 (0.01)
2	Rental value of land	4500.00 (15.03)	4500.00 (13.93)	4500.00 (13.09)	4500.00 (12.71)	4500.00 (13.84)
3	Depreciation	475 (1.59)	480 (1.49)	523 (1.52)	532 (1.50)	498.18 (1.53)
4	Interest on fixed capital @ 10.25%	461.69 (1.54)	461.69 (1.43)	461.69 (1.34)	461.69 (1.30)	461.69 (1.42)
Subtotal fixed cost		5440.94 (18.17)	5445.94 (16.86)	5488.94 (15.97)	5497.94 (15.52)	5464.11 (16.80)
Total cost (A+B)		29946.59 (100)	32302.04 (100)	34365.44 (100)	35414.44 (100)	32517.49 (100)

Note: Figures indicate the proportion of the sum in parentheses

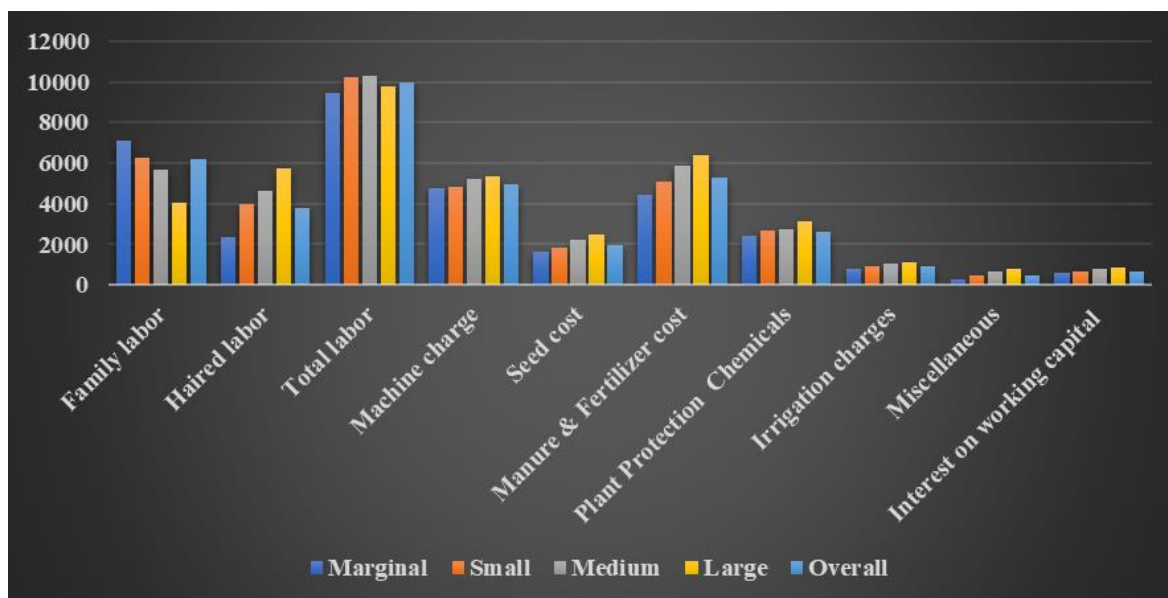


Fig 1: Total variable cost of moong of different size of sample households.

Yield value of output and cost of production per quintal

In Table 2; shows the output of yield value per hectare and cost of production per qt. of gram on sample farms. The overall yield of moong was 9.44 qt/ha. The estimated total cost of production was 3449.68 Rs/qt. For marginal, small, medium, and large farms, the cost of production was determined at 3543.97, 3454.76, 3385.76 and 3325.30 Rs/qt,

respectively. The total gross income per hectare was Rs 73351.38. For marginal, small, medium, and large farmers, the gross income was 61685.00, 74800.00, 81200.00 and 79875.00 Rs/ha, respectively. The greater yield on large farms but medium farmers have more revenue due to they got higher price than other.

Table 2: Yield, value of output and cost of production per quintal of Moong (Rs/ha)

S. N.	Particulars	Marginal (13)	Small (9)	Medium (16)	Large (2)	Overall (40)
1.	Cost of cultivation	29946.59	32302.04	34365.44	35414.44	32517.49
2.	Yield main product (qt/ha)	8.45	9.35	10.15	10.65	9.44
3.	Price (Rs/qt)	7300.00	8000.00	8000.00	7500.00	7747.50
4.	Gross Income	61685.00	74800.00	81200.00	79875.00	73351.38
5.	Cost of production (Rs/qt)	3543.97	3454.76	3385.76	3325.30	3449.68

Note: Figures indicate the proportion of the sum in parentheses

Measures of Farm Profit

In Table 3, sample farms of various sizes had their net income and input-output ratios, calculated per hectare. Net income as a whole was 40833.88 Rs/ha. The overall input-

output ratio was 2.42. In comparison to large farmers, small farmers had the highest net income.

Table 3: Cost and returns of Moong at the sampled farms of different farm size group of farms (Rs/ha)

S. N.	Particulars	Marginal (13)	Small (9)	Medium (16)	Large (2)	Overall (40)
1.	Cost of cultivation	29946.59	32302.04	34365.44	35414.44	32517.49
2.	Grass Income	61685.00	74800.00	81200.00	79875.00	73351.38
3.	Net income	31738.41	42497.96	46834.56	44460.56	40833.88
4.	Input out ratio	2.06	2.32	2.36	2.26	2.25

Note: Figures indicate the proportion of the sum in parentheses

Cost and returns on the basis of cost concept

The Cost and returns on the basis of the cost concept in the production of moong on the sample farm of different size groups have been presented in Table 4. From the table overall CostA1, CostA2, Cost B1, Cost B2, Cost C1, Cost C2, and Cost3 were Rs. 21379.56, 21379.56, 21841.24,

26341.24, 28017.49, 32517.49 and 35769.24 per hectare for the sample farms, respectively. The overall income over different cost (Table 5) i.e., income over Cost A1, A2, B1, B2, C1, C2 and C3 were Rs. 51971.82, 51971.82, 51510.13, 47010.13, 45333.88, 40833.88 and 37582.13 per hectare, respectively.

Table 4: Cost concept according to CACP of Moong (Rs/ha)

S. N.	Cost Category	Marginal	Small	Medium	Large	Overall
1.	Cost A1	17884.90	21090.35	23753.75	26402.75	21379.56
2.	Cost A2	17884.90	21090.35	23753.75	26402.75	21379.56
3.	Cost B1	18346.59	21552.04	24215.44	26864.44	21841.24
4.	Cost B2	22846.59	26052.04	28715.44	31364.44	26341.24
5.	Cost C1	25446.59	27802.04	29865.44	30914.44	28017.49
6.	Cost C2	29946.59	32302.04	34365.44	35414.44	32517.49
7.	Cost C3	32941.24	35532.24	37801.98	38955.88	35769.24

Note: Figures indicate the proportion of the sum in parentheses

Table 5: Cost concept-wise gross income over different costs in Moong (Rs/ha)

S. N.	Particulars	Marginal	Small	Medium	Large	Overall
1.	Return over cost A1	43800.10	53709.65	57446.25	53472.25	51971.82
2.	Return over cost A2	43800.10	53709.65	57446.25	53472.25	51971.82
3.	Return over cost B1	43338.41	53247.96	56984.56	53010.56	51510.13
4.	Return over cost B2	38838.41	48747.96	52484.56	48510.56	47010.13
5.	Return over cost C1	36238.41	46997.96	51334.56	48960.56	45333.88
6.	Return over cost C2	31738.41	42497.96	46834.56	44460.56	40833.88
7.	Return over cost C3	28743.76	39267.76	43398.02	40919.12	37582.13

Note: Figures indicate the proportion of the sum in parentheses

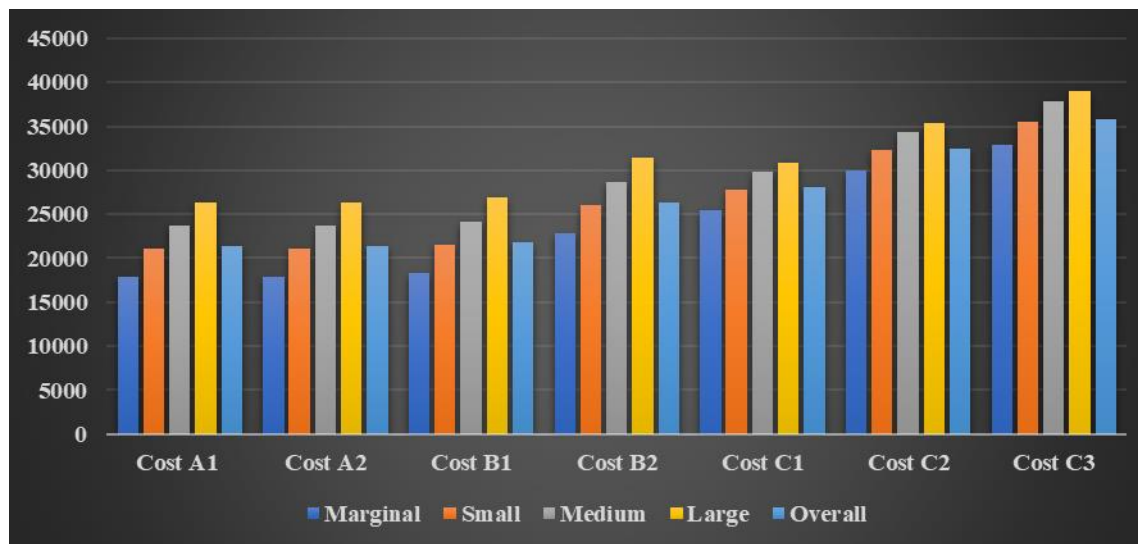


Fig 2: Cost of cultivation of moong of different size of sample households

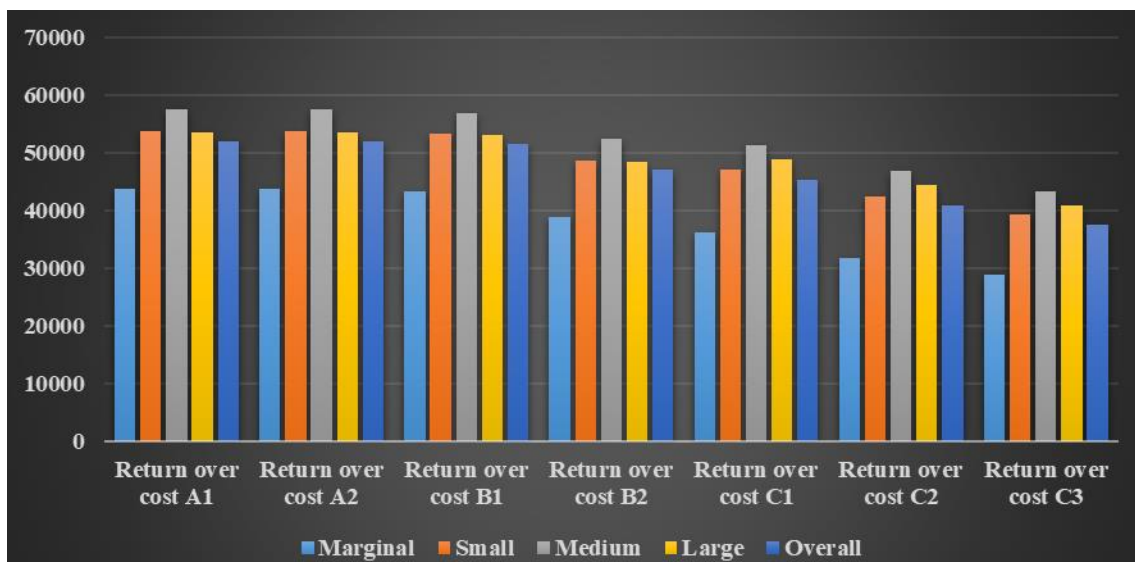


Fig 3: Income over different costs of moong

Cost of cultivation of Urd

Table 6; display the total fixed cost of urd on the sampled farm (Rs/ha) and the total variable cost of urd on the sampled farm (Rs/ha). The table shows that marginal farms had lower total costs per hectare than large farms. The total cost per urd was calculated to be 27385.31 (Rs/ha). The cost of cultivation for marginal, small, medium, and big farms was calculated to be 26278.44, 27358.94, 27978.44 and 29855.44 Rs/ha, respectively. The cost of cultivation per

hectare shows an increasing tendency as farm size increased. This was caused by the major farmers' increased expenditure on modern farm inputs, such as premium seed, fertilizer, equipment, and hired labor. The greatest cost is borne by human labor rather than hired labor. Large farmers employed plant protection more often than small farms. Furthermore, a large farmer's marginal cost exceeded its entire cost.

Table 6: Cost and returns of Urd cultivation in Pussore block of Raigarh district (Rs/ha)

S. N.	Particulars	Farm Size				
		Marginal (9)	Small (12)	Medium (9)	Large (2)	Overall (32)
A	Variable cost					
1	Human labour					
a	Family labour	6450.00 (24.54)	6150.00 (22.48)	5200.00 (18.59)	3800.00 (12.73)	5820.31 (21.25)
b	Hired labour	1850.00 (7.04)	2200.00 (8.04)	2450.00 (8.76)	4200.00 (14.07)	2296.88 (8.39)
	Total human labour	8300.00 (31.58)	8350.00 (30.52)	7650.00 (27.34)	8000.00 (26.80)	8117.19 (29.64)
2	Machine charge	4770.00 (18.15)	4860.00 (17.76)	4980.00 (17.80)	5150.00 (17.25)	4886.56 (17.84)
3	Seed cost	1600.00 (6.09)	1840.00 (6.73)	2050.00 (7.33)	2350.00 (7.87)	1863.44 (6.80)
4	Manure & Fertilizer cost	2760.00 (10.50)	3150.00 (11.51)	3560.00 (12.72)	3840.00 (12.86)	3198.75 (11.68)
5	Plant Protection Chemicals	1890.00 (7.19)	2015.00 (7.37)	2250.00 (8.04)	2650.00 (8.88)	2085.63 (7.62)
6	Irrigation charges	690.00 (2.63)	775.00 (2.83)	950.00 (3.40)	1200.00 (4.02)	826.88 (3.02)
7	Miscellaneous	240.00 (0.91)	285.00 (1.04)	385.00 (1.38)	425.00 (1.42)	309.22 (1.13)
8	Interest on working capital @ 5%	585.50 (2.23)	632.00 (2.31)	689.50 (2.46)	759.50 (2.54)	643.06 (2.35)
	Sub total	20835.50 (79.29)	21907.00 (80.07)	22514.50 (80.47)	24374.50 (81.64)	21930.72 (80.08)
B	Fixed cost					
1	Land revenue	4.25 (0.02)	4.25 (0.02)	4.25 (0.02)	4.25 (0.01)	4.25 (0.02)
2	Rental value of land	4500.00 (17.12)	4500.00 (16.45)	4500.00 (16.08)	4500.00 (15.07)	4500.00 (16.43)
3	Depreciation	477 (1.82)	486 (1.78)	498 (1.78)	515 (1.72)	488.66 (1.78)
4	Interest on fixed capital @ 10.25%	461.69 (1.76)	461.69 (1.69)	461.69 (1.65)	461.69 (1.55)	461.69 (1.69)
	Subtotal fixed cost	5442.94	5451.94	5463.94	5480.94	5454.59

	(20.71)	(19.93)	(19.53)	(18.36)	(19.92)
Total cost (A+B)	26278.44	27358.94	27978.44	29855.44	27385.31
	100	100	100	100	100

Note: Figures indicate the proportion of the sum in parentheses

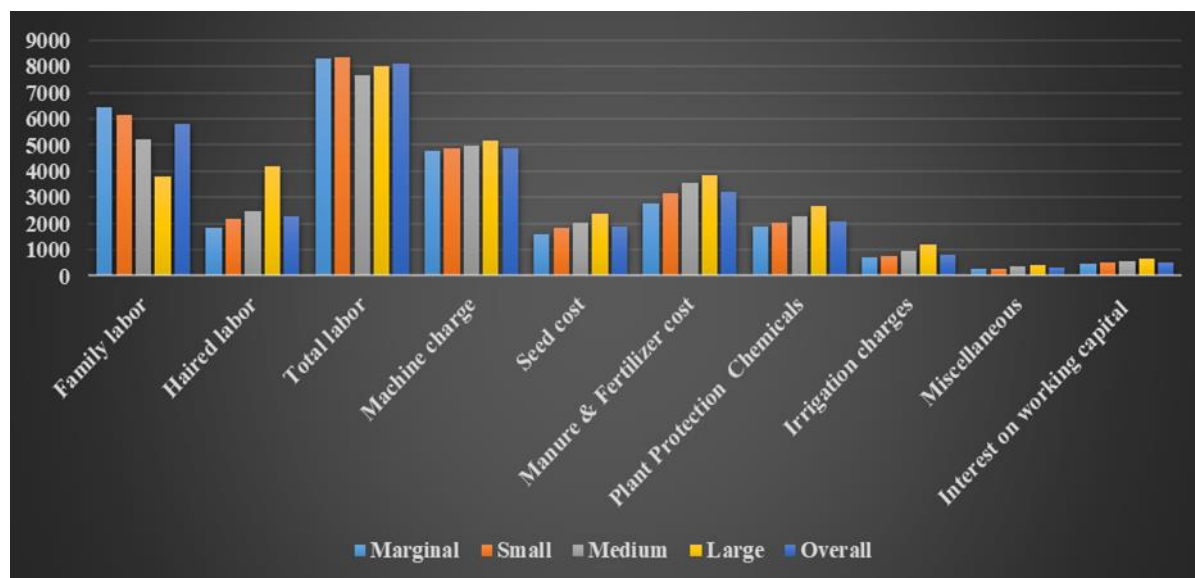


Fig 4: Total variable cost of urd of different size of sample households

Yield value of output and cost of production per quintal of Urd

Table 7 shows the output of yield value per hectare and cost of production per qt. of gram on sample farms. The overall yield of urd was 7.40 qt/ha. The estimated total cost of production was 3709.79 Rs/qt. For marginal, small, medium, and large farms, the cost of production was

determined as 3864.48, 3773.65, 3519.30 and 3487.78 Rs/qt, respectively. The total gross income per hectare was Rs 60493.84. For marginal, small, medium, and large farmers, the gross income was 50320.00, 61625.00, 67575.00 and 67624.00 Rs/ha, respectively. The greater yield on large farms generates higher revenue the other groups of farmers.

Table 7: Yield, value of output, and cost of production per quintal of Urd (Rs/ha)

S.N.	Particulars	Marginal (9)	Small (12)	Medium (9)	Large (2)	Overall (32)
1.	Cost of cultivation	26278.44	27358.94	27978.44	29855.44	27385.31
2.	Yield main product (qt/ha)	6.80	7.25	7.95	8.56	7.40
3.	Price (Rs/qt)	7400.00	8500.00	8500.00	7900.00	8153.13
4.	Gross Income	50320.00	61625.00	67575.00	67624.00	60493.84
5.	Cost of production (Rs/qt)	3864.48	3773.65	3519.30	3487.78	3709.79

Note: Figures indicate the proportion of the sum in parentheses

Measures of Farm Profit

In Table 8, sample farms of various size had their net income and input-output ratio, calculated per hectare. Net

income as a whole was 33108.53 Rs/ha. The overall input-output ratio was 2.45. In comparison to large farmers, medium farmers had the highest net income.

Table 8: Cost and returns of Urd at the sampled farms of different farm size group of farms (Rs/ha)

S.N.	Particulars	Marginal (9)	Small (12)	Medium (9)	Large (2)	Overall (32)
1.	Cost of cultivation	26278.44	27358.94	27978.44	29855.44	27385.31
2.	Gross Income	50320.00	61625.00	67575.00	67624.00	60493.84
3.	Net income	24041.56	34266.06	39596.56	37768.56	33108.53
4.	Input out ratio	1.91	2.25	2.42	2.27	2.20

Note: Figures indicate the proportion of the sum in parentheses

Cost and returns according to CACP of Urd

The Cost and returns on the basis of the cost concept in the production of urd on the sample farm of different size groups have been presented in Table 9. From the table overall CostA1, CostA2, Cost B1, Cost B2, CostC1, Cost C2, and Cost3 were Rs. 16603.31, 16603.31, 17065.00,

21565.00, 22885.31, 27385.31 and 30123.84 per hectare for the sample farms, respectively. The overall income over different costs (Table 10) i.e., income over Cost A1, A2, B1, B2, C1, C2, and C3 were Rs. 43890.53, 43890.53, 43428.85, 38928.85, 37608.53, 33108.53 and 30370.00 per hectare, respectively.

Table 9: Cost concept according to CACP of Urd (Rs/ha)

S. N.	Cost/ Category	Marginal	Small	Medium	Large	Overall
1.	Cost A1	14866.75	16247.25	17816.75	21093.75	16603.31
2.	Cost A2	14866.75	16247.25	17816.75	21093.75	16603.31
3.	Cost B1	15328.44	16708.94	18278.44	21555.44	17065.00
4.	Cost B2	19828.44	21208.94	22778.44	26055.44	21565.00
5.	Cost C1	21778.44	22858.94	23478.44	25355.44	22885.31
6.	Cost C2	26278.44	27358.94	27978.44	29855.44	27385.31
7.	Cost C3	28906.28	30094.83	30776.28	32840.98	30123.84

Table 10: Cost concept-wise gross income over different costs in Urd (Rs/ha.)

S. N.	Particulars	Marginal	Small	Medium	Large	Overall
1.	Return over cost A1	35453.25	45377.75	49758.25	46530.25	43890.53
2.	Return over cost A2	35453.25	45377.75	49758.25	46530.25	43890.53
3.	Return over cost B1	34991.56	44916.06	49296.56	46068.56	43428.85
4.	Return over cost B2	30491.56	40416.06	44796.56	41568.56	38928.85
5.	Return over cost C1	28541.56	38766.06	44096.56	42268.56	37608.53
6.	Return over cost C2	24041.56	34266.06	39596.56	37768.56	33108.53
7.	Return over cost C3	21413.72	31530.17	36798.72	34783.02	30370.00

Note: Figures indicate the proportion of the sum in parentheses

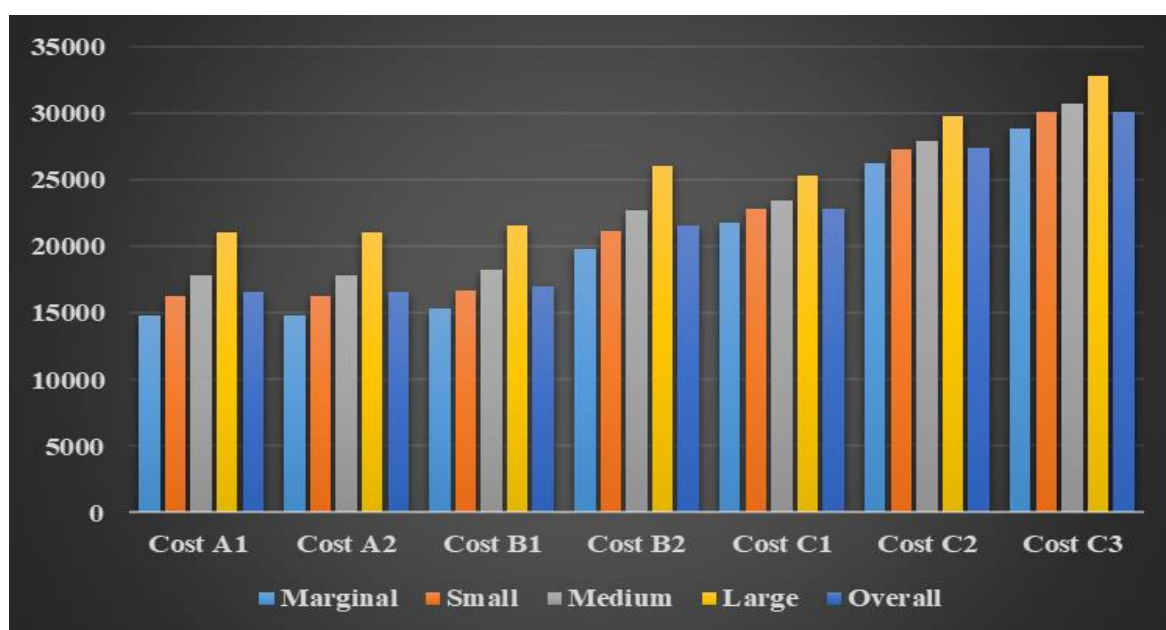


Fig 5: Cost of cultivation of urd of different size of sample households

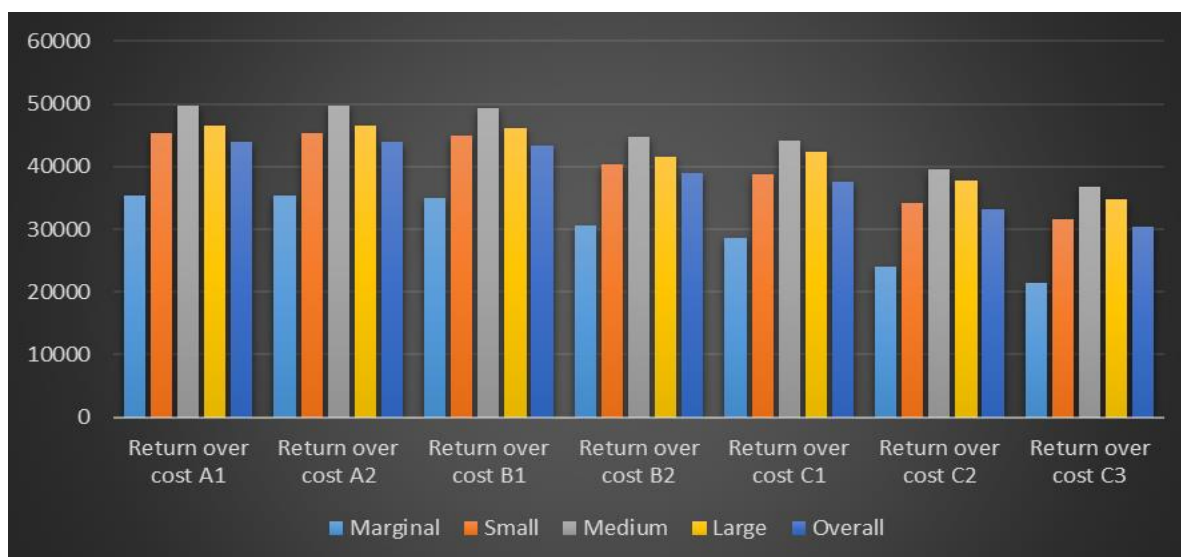


Fig 6: Income over different costs of urd

Cost of Cultivation of Lathyrus

Tables 11; display the total fixed cost of lathyrus on the sampled farm (Rs/ha) and the total variable cost of lathyrus on the sampled farm (Rs/ha). The table shows that marginal farms had lower total costs per hectare than large farms. The total cost per lathyrus was calculated to be 12178.07 (Rs/ha). The cost of cultivation for marginal, small, medium, and big farms was calculated to be 10302.88, 11598.63, 13678.88 and 12864.38 Rs/ha, respectively. The

cost of cultivation per hectare shows an increasing tendency as farm size increased. This was caused by the major farmers' increased expenditure on modern farm inputs, such as premium seed, fertilizer, equipment, and hired labor. The greatest cost is borne by human labor rather than hired labor. Large farmers employed plant protection more often than small farms. Furthermore, a large farmer's marginal cost exceeded its entire cost.

Table 11: Cost and returns of Lathyrus cultivation in Lailunga block of Raigarh district

S. N.	Particulars	Farm Size				
		Marginal (7)	Small (13)	Medium (12)	Large (4)	Overall (36)
A	Variable cost					
1	Human labour					
a	Family labour	4900.00 (47.56)	5200.00 (44.83)	5700.00 (41.69)	3800.00 (29.54)	5152.78 (42.31)
b	Hired labour	750.00 (7.28)	1150.00 (9.91)	1850.00 (13.53)	2400.00 (18.66)	1444.44 (11.86)
Total human labour		5650.00 (54.84)	6350.00 (54.75)	7550.00 (55.23)	6200.00 (48.20)	6597.22 (54.17)
2	Machine charge	550.00 (5.34)	750.00 (6.47)	1200.00 (8.78)	1450.00 (11.27)	938.89 (7.71)
3	Seed cost	700.00 (6.79)	850.00 (7.33)	970.00 (7.10)	1020.00 (7.93)	879.72 (7.22)
4	Manure & Fertilizer cost	120.00 (1.16)	135.00 (1.16)	250.00 (1.83)	340.00 (2.64)	193.19 (1.59)
5	Plant Protection Chemicals	600.00 (5.82)	750.00 (6.47)	810.00 (5.93)	890.00 (6.92)	756.39 (6.21)
6	Miscellaneous	210.00 (2.04)	245.00 (2.11)	290.00 (2.12)	315.00 (2.45)	260.97 (2.14)
7	Interest on working capital @ 5%	98.50 (0.96)	124.25 (1.07)	161.50 (1.18)	185.00 (1.44)	138.41 (1.14)
Sub total		7928.50 (76.95)	9204.25 (79.36)	11231.50 (82.16)	10400.00 (80.84)	9764.80 (80.18)
B	Fixed cost					
1	Land revenue	3.75 (0.04)	3.75 (0.03)	3.75 (0.03)	3.75 (0.03)	3.75 (0.03)
2	Rental value of land	2100.00 (20.38)	2100.00 (18.11)	2100.00 (15.36)	2100.00 (16.32)	2100.00 (17.24)
3	Depreciation	55.00 (0.53)	75.00 (0.65)	120.00 (0.88)	145.00 (1.13)	93.89 (0.77)
4	Interest on fixed capital @ 10.25%	215.63 (2.09)	215.63 (1.86)	215.63 (1.58)	215.63 (1.68)	215.63 (1.77)
Subtotal fixed cost		2374.38 (23.05)	2394.38 (20.64)	2439.38 (17.84)	2464.38 (19.16)	2413.27 (19.82)
Total cost (A+B)		10302.88 (100)	11598.63 (100)	13670.88 (100)	12864.38 (100)	12178.07 (100)

Note: Figures indicate the proportion of the sum in parentheses

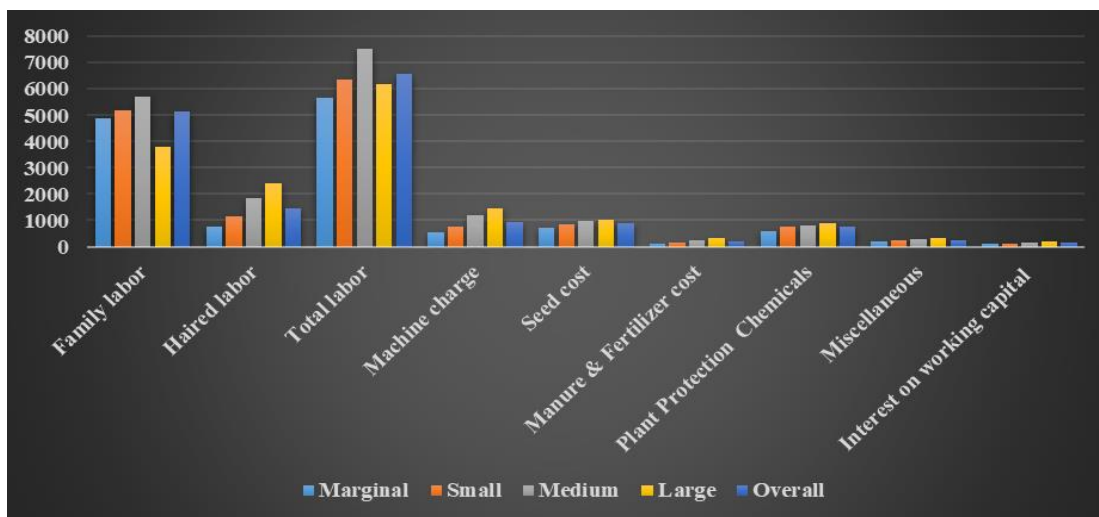


Fig 7: Total variable cost of Lathyrus of different size of sample households

Yield value of output and cost of production per quintal of Lathyrus

Table 12 shows the output of yield value per hectare and cost of production per qt. of gram on sample farms. The overall yield of lathyrus was 7.23 qt/ha. The estimated total cost of production was 1681.59 Rs/qt. For marginal, small, medium, and large farms, the cost of production was

determined 1597.35, 1619.92, 1808.32 and 1649.28 Rs/qt, respectively. The total gross income per hectare was Rs 26400.14. For marginal, small, medium, and large farmers, the gross income was 22575.00, 26492.00, 27972.00 and 28080.00 Rs/ha, respectively. The greater yield on large farms generates higher revenue than the other groups of farmers.

Table 12: Yield, value of output, and cost of production per quintal of Lathyrus (Rs/ha)

S. N.	Particulars	Marginal (7)	Small (13)	Medium (12)	Large (4)	Overall (36)
1.	Cost of cultivation	10302.88	11598.63	13670.88	12864.38	12178.07
2.	Yield main product (qt/ha)	6.45	7.16	7.56	7.80	7.23
3.	Price (Rs/qt)	3500.00	3700.00	3700.00	3600.00	3650.00
4.	Gross Income	22575.00	26492.00	27972.00	28080.00	26400.14
5.	Cost of production (Rs/qt)	1597.35	1619.92	1808.32	1649.28	1681.59

Note: Figures indicate the proportion of the sum in parentheses.

Measures of Farm Profit

In Table 13, sample farms of various size had their net income and input-output ratio, calculated per hectare. Net

income as a whole was 14222.07 Rs/ha. The overall input-output ratio was 2.18. In comparison to large farmers, small farmers had the highest net income.

Table 13: Cost and returns of Lathyrus at the sampled farms of different farm size groups of farms (Rs/ha)

S.N.	Particulars	Marginal (7)	Small (13)	Medium (12)	Large (4)	Overall (36)
1.	Cost of cultivation	10302.88	11598.63	13670.88	12864.38	12178.07
2.	Gross Income	22575.00	26492.00	27972.00	28080.00	26400.14
3.	Net income	12272.12	14893.37	14301.12	15215.62	14222.07
4.	Input out ratio	2.19	2.28	2.05	2.18	2.18

Note: Figures indicate the proportion of the sum in parentheses.

Cost and returns according to CACP of Lathyrus

The Cost and returns based on the cost concept in the production of Lathyrus on the sample farm of different size groups have been presented in Table 14. From the table overall CostA1, CostA2, Cost B1, Cost B2, CostC1, Cost C2, and Cost3 were Rs. 4709.66, 4709.66, 4925.29,

7025.29, 10078.07, 12178.07 and 13395.88 per hectare for the sample farms, respectively. The overall income over different costs (Table 4.25) i.e., income over Cost A1, A2, B1, B2, C1, C2 and C3 were Rs. 21690.48, 21690.48, 21474.84, 19374.84, 16322.07, 14222.07 and 13004.26 per hectare, respectively.

Table 14: Cost concept according to CACP of Lathyrus (Rs/ha)

S. N.	Cost/ Category	Marginal	Small	Medium	Large	Overall
1.	Cost A1	3087.25	4083.00	5655.25	6748.75	4709.66
2.	Cost A2	3087.25	4083.00	5655.25	6748.75	4709.66
3.	Cost B1	3302.88	4298.63	5870.88	6964.38	4925.29
4.	Cost B2	5402.88	6398.63	7970.88	9064.38	7025.29
5.	Cost C1	8202.88	9498.63	11570.88	10764.38	10078.07
6.	Cost C2	10302.88	11598.63	13670.88	12864.38	12178.07
7.	Cost C3	11333.17	12758.50	15037.97	14150.82	13395.88

Table 15: Cost concept-wise gross income over different cost in Lathyrus (Rs/ha.)

S.N.	Particulars	Marginal	Small	Medium	Large	Overall
1.	Return over cost A1	19487.75	22409.00	22316.75	21331.25	21690.48
2.	Return over cost A2	19487.75	22409.00	22316.75	21331.25	21690.48
3.	Return over cost B1	19272.12	22193.37	22101.12	21115.62	21474.84
4.	Return over cost B2	17172.12	20093.37	20001.12	19015.62	19374.84
5.	Return over cost C1	14372.12	16993.37	16401.12	17315.62	16322.07
6.	Return over cost C2	12272.12	14893.37	14301.12	15215.62	14222.07
7.	Return over cost C3	11241.83	13733.50	12934.03	13929.18	13004.26

Note: Figures indicate the proportion of the sum in parentheses

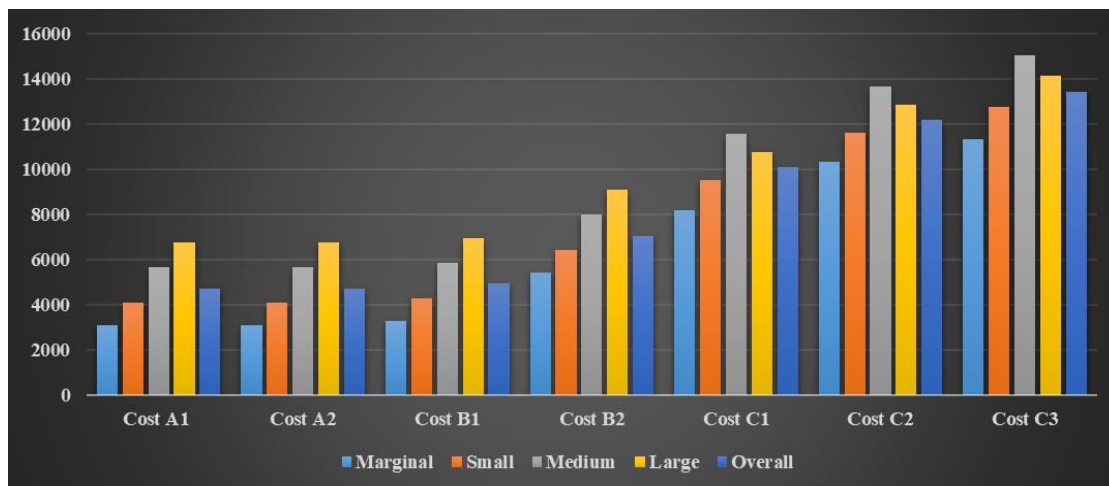


Fig 8: Cost of cultivation of Lathyrus of different size of sample households.

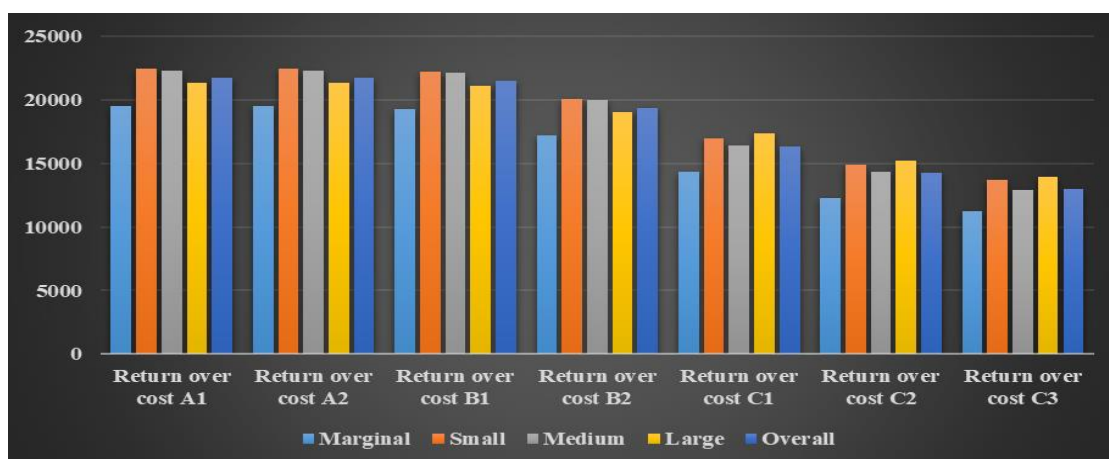


Fig 9: Income over different costs of Lathyrus

Conclusion

It was found that the overall cost of cultivation for Moong was Rs 32517.49/ha. For marginal, small, medium, and big farms, the costs of cultivation per hectare was Rs 29946.59, 32302.04, 34365.44 and 35414.44, respectively. Overall moong yield was 9.44 qt/ha. An estimate of the overall production cost per unit was Rs. 3449.68. The cost of production for marginal, small, medium, and large farms was Rs 3543.97, 3454.76, 3385.76 and 3325.30/qt respectively. There was Rs 73351.38 as the overall gross income per hectare. The gross income per hectare was Rs 61685.00 for marginal, Rs 74800.00 for small, Rs 81200 for medium, and Rs 79785.00 for large farmers. The net income of moong was Rs 40833.88/ha. The overall ratio of input to output was 2.25. The highest net income was earned by medium farmers as compared to other farms. Overall costs for the sample farms were Rs. 21379.56, 21379.56, 21841.24, 26341.21, 28017.49, 32517.49 and 35769.24 per

hectare, respectively. Costs A1, A2, B1, B2, C1, C2, and C3 were also included. The overall income over the various costs, or income over Cost A1, A2, B1, B2, C1, C2, and C3, was Rs. 51971.82, 51971.82, 51510.13, 47010.13, 45333.88, 40833.88, and 37582.13 per hectare, respectively. The overall cost of cultivation for Urd was found Rs 27385.31/ha. For marginal, small, medium, and large farms, the costs of cultivation per hectares was Rs 26278.44, 27358.94, 27978.44 and 29855.44, respectively. Overall urd yield was 7.40 qt/ha. An estimate of the overall production cost per quintal was Rs. 3709.79. The cost of production for marginal, small, medium, and big farms was 3864.48, 3773.65, 3519.30 and 3487.78 Rs/qt., respectively. There was Rs 60493.84 as the overall gross income per hectare. The gross income per hectare was 50320.00 Rs/ha for marginal, 61625.00 Rs/ha for small, 67575 Rs/ha for medium, and 67624.00 Rs/ha for large farmers. The net income of urd was 33108.53 Rs/ha. The overall ratio of

input to output was 2.20. Large farmers earned the highest net income as compared to other farm sizes. Overall costs for the sample farms were Rs. 16603.31, 16603.31, 17065.00, 21505.00, 22885.31, 27885.31 and 30123.84 per hectare, respectively. Costs A1, A2, B1, B2, C1, C2, and C3 were also included. The overall income over the various costs, or income over Cost A1, A2, B1, B2, C1, C2, and C3, was Rs. 43890.53, 43890.53, 43428.85, 38928.85, 37608.53, 33108.53 and 30370.00 per hectare, respectively. The overall cost of cultivation for Lathyrus was found Rs 12178.07 Rs/ha. For marginal, small, medium, and large farms, the costs of cultivation per hectares was Rs 10302.88, 11598.63, 13670.88 and 12864.38, respectively. Overall Lathyrus's yield was 7.23 qt/ha. An estimate of the overall production cost per quintal was Rs. 1681.59. The cost of production for marginal, small, medium, and big farms was 1597.35, 1619.92, 1808.32 and 1649.28 Rs/qt, respectively. There was Rs 26400.14/ha as the overall gross income per hectare. The gross income per hectare was 22575.00 Rs/ha for marginal, 26492.00 Rs/ha for small, 27972 Rs/ha for medium, and 28080.00 Rs/ha for large farmers. Net income of lathyrus was 14222.07 Rs/ha. The overall ratio of input to output was 2.18. Large farmers earned the highest net income as compared to other farm sizes. Overall costs for the sample farms were Rs. 4709.66, 4709.66, 4925.29, 7025.29, 10078.07, 12178.07 and 13395.88 per hectare, respectively. Costs A1, A2, B1, B2, C1, C2, and C3 were also included. The overall income over the various costs, or income over Cost A1, A2, B1, B2, C1, C2, and C3, was Rs. 21690.48, 21690.48, 21474.84, 19374.84, 16322.07, 14222.07 and 13004.26 per hectare, respectively.

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