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## An economic analysis of production of pigeon pea in Bemetara district of Chhattisgarh

**Krishna and Mahendra Kumar Deshmukh**

### Abstract

The present study aims to examine the production of pigeon pea in the Bemetara district of Chhattisgarh. The study was conducted in Bemetara and Saja blocks in the Bemetara district of Chhattisgarh state. Two villages from each block and pulses growing farmers from Garra (30) Khati (30) Lalpur (30) and Nawrangpur (30) villages were interviewed for the study. The major findings of this study revealed that the average size of the holdings of the sample households was 2.55 ha. The cropping intensity was observed to be 155.10 per cent. The overall cost of cultivation of pigeon pea was found to be Rs. 26758.73 ha<sup>-1</sup>, respectively. The overall input-output ratio of pigeon pea came to 2.16, respectively, on the sample farms. The ha<sup>-1</sup> Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 at the overall level were Rs. 16118.13, Rs. 16118.13, Rs. 16558.73, Rs. 26748.73, Rs. 20586.08, Rs. 30776.08, and Rs. 33853.69 ha<sup>-1</sup>, respectively on the sample farms. The overall income ha<sup>-1</sup> over Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 was worked out at Rs. 41878.01, Rs. 41878.01, Rs. 41437.41, Rs. 31247.41, Rs. 37410.06, Rs. 27220.06, and Rs. 24142.45 respectively.

**Keywords:** cost and returns, profitability of pigeon pea

### Introduction

India is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world. Pulses account for around 20 per cent of the area under food grains and contribute around 7-10 per cent of the total food grains production in the country. Pulses are grown in both Kharif and Rabi seasons, Rabi pulses contribute more than 60 per cent of the total production. Gram is the most dominant pulse having a share of around 40 per cent in the total production followed by Tur/Arhar at 15 to 20 per cent and Urad/Black gram and Moong at around 8-10 per cent each. Per capita net availability of pulses in India, however, has reduced from 51.1 gm/day (1971) to 41.9 gm/day (2013) as against WHO recommendation of 80gm/day. Pulses are grown across the country with highest share coming first from Madhya Pradesh (26.41 per cent), second from Maharashtra (16.19 per cent), and then followed by Rajasthan (12.82 per cent), Uttar Pradesh (8.87 per cent), Andhra Pradesh (8 per cent), Karnataka (7.63 per cent) followed by Gujarat (3.84 per cent), which together accounted about 64 per cent of the total pulse production. In Chhattisgarh, pulse crops were grown in sizeable area of 1.99 lakh hectares in Kharif and 6.84 lakh hectares in Rabi season, with 4.83 lakh tonnes total production in 2013-2014. Chickpea, pigeon pea, lathyrus, black gram and green gram are the most important pulse crops of Chhattisgarh.

### Materials and Methods

Chhattisgarh state consists of 28 districts, out of which Bemetara district has been selected purposely. Bemetara district has four blocks, viz., Berla, Bemetara, Nawagarh, and Saja. Out of these, 2 blocks were selected, which are Bemetara and Saja, because these two blocks contribute the majority of the area of total pulses. Two villages were selected randomly from each block. Lalpur and Nawarangpur from the Bemetara block and Garra and Khati from the Saja block. Were selected. A total of four villages were selected for the study. Out of the list of pulse growers in the selected villages, (Lalpur 30, Nawrangpur 30, Garra 30, and Khati 30), farmers from each of the four selected villages were sampled randomly to collect the required information. In all, a sample of 120 farmers were selected for the present study.

### Results and Discussion

The Table 1: It clearly shows that the cost of cultivation in the case of large farms was higher (Rs. 28597.80 ha<sup>-1</sup>.) as compared to marginal (Rs. 25983.73 ha<sup>-1</sup>.), small farms (Rs. 26452.28

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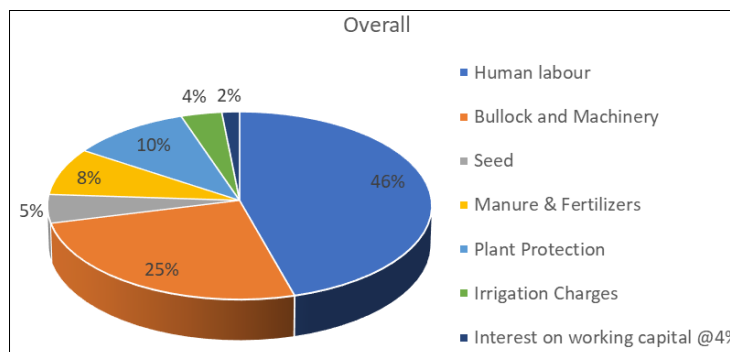
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ha<sup>-1</sup>.) and medium farms (Rs. 27479.33 ha<sup>-1</sup>). On an overall, the cost of cultivation ha<sup>-1</sup> of pigeon pea was found to be Rs. 26758.73 ha<sup>-1</sup>. Out of this, Rs. 15804.28 was incurred as variable cost and the remaining Rs. 10954.46 was the expenditure towards fixed cost. It may be noted that nearly one third of the total cost was incurred on total human labour. In view of this and looking at the problems of labour availability, it is suggested that low-cost machinery should be developed and supported by government agencies to

encourage pulse growers. The rental value of land at Rs. 10200.00 ha<sup>-1</sup> was quite low but constituted 38.12 per cent of the total cost of pigeon pea. The Table shows that the share of total human labour (26.95 per cent) was the maximum of the total input cost for pigeon pea followed by bullock labour (2.67 per cent), machine power (12.38 per cent), seed cost (2.89 per cent), manure and fertilizer (4.86 per cent) and plant protection (6.23 per cent) costs observed.

**Table 1:** Resource use and Cost of Cultivation of Pigeon pea crop per hectare in different Size of Farms Group

S. No.	Particulars	Marginal	Small	Medium	Large	Overall
A	Variable Cost					
1	Human labour					
	Family	4704.55(18.11)	4241.04(16.03)	3604.34(13.12)	2202.18(7.70)	4027.35(15.05)
	Hired	2735.54(10.53)	3013.65(11.39)	3508.54(12.77)	4382.14(15.32)	3183.52(11.90)
2	Bullock and Machinery					
	Bullock	585.12(2.25)	600.65(2.27)	886.32(3.23)	1084.21(3.79)	714.79(2.67)
	Machinery	3085.34(11.87)	3365.58(12.72)	3424.34(12.46)	3694.28(12.92)	3313.82(12.38)
3	Seed	580.34(2.23)	645.34(2.44)	1047.46(3.81)	1200.45(4.20)	774.13(2.89)
4	Manure & Fertilizers	1185.65(4.56)	1251.28(4.73)	1375.25(5.00)	1645.33(5.75)	1301.75(4.86)
5	Plant Protection	1620.34(6.24)	1704.12(6.44)	1600.21(5.82)	1840.34(6.44)	1668.08(6.23)
6	Irrigation Charges	472.12(1.82)	523.64(1.98)	637.64(2.32)	875.51(3.06)	572.05(2.14)
7	Interest on working capital @4%	221.61(0.85)	238.12(0.90)	271.12(0.99)	317.92(1.11)	248.78(0.93)
	Total variable cost	15190.61(58.46)	15583.42(58.91)	16355.22(59.52)	17242.36(60.29)	15804.28(59.06)
B	Fixed Cost					
8	Land Revenue and Taxes	10.00(0.04)	10.00(0.04)	10.00(0.04)	10.00(0.03)	10.00(0.04)
9	Interest on fixed capital	432.77(1.67)	436.61(1.65)	448.77(1.63)	459.78(1.61)	440.60(1.65)
10	Depreciation	150.35(0.58)	222.25(0.84)	465.34(1.69)	685.66(2.40)	303.86(1.14)
11	Rental Value of land	10200.00(39.26)	10200.00(38.56)	10200.00(37.12)	10200.00(35.67)	10200.00(38.12)
	Total fixed cost	10793.12(41.54)	10868.86(41.09)	11124.11(40.48)	11355.44(39.71)	10954.46(40.94)
C	Total Cost (A+B)	25983.73(100.00)	26452.28(100.00)	27479.33(100.00)	28597.80(100.00)	26758.73(100.00)



**Fig 1:** Cost of cultivation of pigeon pea (Rs. ha<sup>-1</sup>)

**Yield, value of output and cost of production qtl.<sup>-1</sup> of pigeon pea**

The Table 2: It indicates that the overall yield ha<sup>-1</sup> of pigeon pea was 9.23 qtl. On the sample farms. The cost of production qtl.<sup>-1</sup> of pigeon pea on an overall was worked out at Rs. 2995.35. It came to Rs. 3649.40, Rs. 2674.65, Rs. 2629.60 and Rs. 2391.12 for marginal small, medium and large farm

sizes respectively. The cost of production increased with the increase in the size of farms, with the exception of large farms due to lower yields. The overall value of production (gross income) ha<sup>-1</sup> came to Rs. 57996.15. It was Rs. 45072.50, Rs. 61895.00, Rs. 65512.50 and Rs. 75142.50 on marginal, small, medium and large farms respectively.

**Table 2:** ha<sup>-1</sup> yield, value of output and cost of production qtl.<sup>-1</sup> of pigeon pea

Particulars	Marginal	Small	Medium	Large	Overall
Total Cost (Rs)	25983.73	26452.28	27479.33	28597.80	26758.73
Production (qtl)					
a. Main product	7.12	9.89	10.45	11.96	9.23
b. By product	9.41	10.22	11.25	13.53	10.54
Value of production (Rs.)					
a. Main product@6000	42720.00	59340.00	62700.00	71760.00	55360.00
b. By product@250	2352.50	2555.00	2812.50	3382.50	2636.15
Gross income	45072.50	61895.00	65512.50	75142.50	57996.15
Cost of production (Rs. qtl. <sup>-1</sup> )	3649.40	2674.65	2629.60	2391.12	2995.35

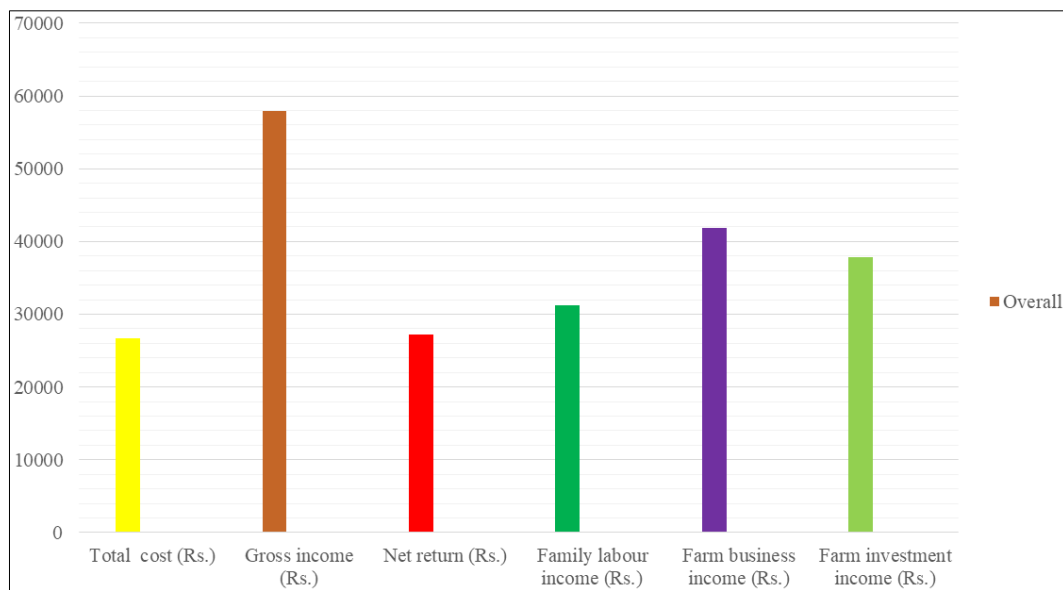
**Measures of farm profits of pigeon pea**

The Table 3: indicates that, on an overall, the value of net income, family labour income, farm business income, and farm investment income ha<sup>-1</sup> came to Rs. 27220.06, Rs. 31247.41, Rs. 41878.01, and Rs. 37850.66 respectively, on

the sample farms. On an overall, the input-output ratio of pigeon pea came to 2.16 on the sample farms. It was observed to be highest in the case of large farmers, with 2.63 exhibiting an increasing trend with farm size.

**Table 3:** Yield, cost and return of pigeon pea on the sample farms (Rs ha<sup>-1</sup>)

Particulars	Marginal	Small	Medium	Large	Overall
Total cost (Rs.)	25983.73	26452.28	27479.33	28597.80	26758.73
Gross income (Rs.)	45072.5	61895	65512.5	75142.5	57996.15
Net return (Rs.)	14394.22	31211.68	34438.83	44352.52	27220.06
Family labour income (Rs.)	19098.77	35452.72	38043.17	46554.70	31247.41
Farm business income (Rs.)	29721.54	46079.33	48681.94	57204.48	41878.01
Farm investment income (Rs.)	25016.99	41838.29	45077.60	55002.30	37850.66
Input-Output ratio	1.73	2.34	2.38	2.63	2.16



**Fig 2:** Cost and return of Pigeon pea on the sample farms (Rs ha<sup>-1</sup>)

**Cost and returns on the basis of cost concept**

The cost and returns on the basis of the cost concept in the production of pigeon pea have been presented in Table 4: It is evident from the Table that the ha<sup>-1</sup> Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 at the overall level were Rs. 16118.13, Rs. 16118.13, Rs. 16558.73, Rs.

26748.73, Rs. 20586.08, Rs. 30776.08, and Rs. 33853.69 ha<sup>-1</sup>, respectively on the sample farms. The overall income ha<sup>-1</sup> over Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 was worked out at Rs. 41878.01, Rs. 41878.01, Rs. 41437.41, Rs. 31247.41, Rs. 37410.06, Rs. 27220.06, and Rs. 24142.45 respectively.

**Table 4:** Break-up of total cost, cost concept wise and income over different costs in pigeon pea cultivation

S.N.	Particulars	Marginal	Small	Medium	Large	Overall
A.	Break-up of costs					
	Cost A1	15350.96	15815.67	16830.56	17938.02	16118.13
	Cost A2	15350.96	15815.67	16830.56	17938.02	16118.13
	Cost B1	15783.73	16252.28	17279.33	18397.80	16558.73
	Cost B2	25973.73	26442.28	27469.33	28587.80	26748.73
	Cost C1	20488.28	20493.32	20883.67	20599.98	20586.08
	Cost C2	30678.28	30683.32	31073.67	30789.98	30776.08
	Cost C3	33746.11	33751.65	34181.03	33868.98	33853.69
B	Income over different cost					
	1. Income over cost A1	29721.54	46079.33	48681.94	57204.48	41878.01
	2. Income over cost A2	29721.54	46079.33	48681.94	57204.48	41878.01
	3. Income over cost B1	29288.77	45642.72	48233.17	56744.70	41437.41
	4. Income over cost B2	19098.77	35452.72	38043.17	46554.70	31247.41
	5. Income over cost C1	24584.22	41401.68	44628.83	54542.52	37410.06
	6. Income over cost C2	14394.22	31211.68	34438.83	44352.52	27220.06
	7. Income over cost C3	11326.39	28143.35	31331.47	41273.52	24142.45
C	Gross income	45072.50	61895.00	65512.50	75142.50	57996.15

## Conclusions

The average family size was 6 and the average literacy percentage was about 32.21 per cent in the study area. Agriculture was the main occupation, at 90.84 per cent in the study area. The overall size of the holdings of pulse growers was 2.55 ha. It varied from 0.88 ha on marginal farms to 7.11 ha on large farms. The overall irrigated area was 2.27 ha, which was 2.55 ha of the overall total cropped area, and the major source of irrigation was tube well. The overall cropping intensity observed in the study area was 155.10 per cent. Gross income, net income, family labour income, farm business income and farm investment income ha<sup>-1</sup> were found to be Rs. 57996.15, Rs. 27220.06, Rs. 31247.41, Rs. 41878.01, and Rs. 37850.66 respectively in the cultivation of pigeon pea. The ha<sup>-1</sup> Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 at the overall level were Rs. 16118.13, Rs. 16118.13, Rs. 16558.73, Rs. 26748.73, Rs. 20586.08, Rs. 30776.08, and Rs. 33853.69 ha<sup>-1</sup>, respectively on the sample farms. The overall income ha<sup>-1</sup> over Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2 and Cost-C3 was worked out at Rs. 41878.01, Rs. 41878.01, Rs. 41437.41, Rs. 31247.41, Rs. 37410.06, Rs. 27220.06, and Rs. 24142.45 respectively.

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