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Shivani Bawankar

P.G. Student, Department of Agriculture Economics, Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj, Uttar Pradesh, India

Dr. Sanjay Kumar

Assistant Professor, Department of Agriculture Economics, Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj, Uttar Pradesh, India

Madhusudan Tiwari

Ph.D. Research Scholar, Department of Agriculture Economics, Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj, Uttar Pradesh, India

Corresponding Author:

Shivani Bawankar

P.G. Student, Department of Agriculture Economics, Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj, Uttar Pradesh, India

A study on cost and return of red gram (Maruti and Charu variety) in Chandrapur district of Maharashtra

Shivani Bawankar, Dr. Sanjay Kumar and Madhusudan Tiwari

Abstract

The study was conducted in 2022–2023 to study the "Cost and Return of Red gram (Maruti and Charu) in Chandrapur District of Maharashtra" with a sample of 100 respondents. The Red gram respondent were divided into three farms groups marginal, small and medium (27, 13, 10 in Maruti and 27, 14 and 9 in Charu variety), respectively. The total cost of cultivation of red gram for marginal, small and medium farms was Rs. 54030/ha, Rs. 52520/ha, and Rs. 50000/ha in Maruti and Rs. 53740/ha, Rs. 52230/ha, Rs. 49920/ha in Charu variety respectively. The gross returns obtained per hectare by medium farms were high (Rs. 123031.25/ha) as compared to small and marginal farms (Rs. 119062.5/ha and Rs. 115093.75 /ha) in Maruti variety and in Charu variety medium farms were high (Rs. 118500/ha) as compared to small and marginal farms (Rs. 114550/ha and Rs. 110600/ha, respectively). And the net returns per hectare were highest in medium farms (Rs. 73031.25/ha) as compared to small and marginal farms (Rs. 66542.5/ha and 61063.75/ha) in Maruti variety and in Charu variety, highest in medium farms (Rs. 56860/ha) as compared to small and marginal farms (Rs. 62320/ha and 68580/ha) respectively. The input-output ratio per hectare was highest in medium farms (1:1.30) compared to small and marginal farms (1:1.26 and 1:1.27) in Maruti variety and in Charu variety hectare was highest in medium farms (1:1.31) compared to small and marginal farms (1:1.20 and 1:1.17), respectively.

Keywords: Cost and returns, farm profitability

Introduction

The main food grains that play an important role in the Indian economy are cereals, oil seeds, and pulses. In India, cereals are used as a direct source of food by humans. Hence, cereals occupy the largest area in the Indian situation. The important pulse crops in India are Bengal gramme, red gramme, green gramme, and black gramme, of which 60 percent of the pulse area is in Rabi and 40 percent in Kharif.

Similarly, pulses are second only to cereals in the protein requirement of the people. Pulses are almost an essential component of the Indian diet as Dal, Roti, or Bhat, which denote complete and satisfying food. Vegetarians by choice depend mainly on pulse grains for their protein requirements. As the average diet of the Indian population is deficient in protein content, more protein can be supplied by the increased use of pulses, and hence there is a need for multiple increases in the production of pulses.

On account of balanced amino acid consumption and a cereal and pulse blend that matches milk protein, the importance of pulses in a vegetarian diet cannot be over emphasised. The importance of pulses is greater as they are cheaper than meat and are also referred to as "poor men's meat". In developing countries like India, pulses play an equally important role in irrigated and rainfed areas by improving the physical, chemical, and biological properties of soil and functioning as a "mini nitrogen factory". It is also considered an excellent crop for natural resource management, environmental security, crop diversification, and consequently, for visible agriculture.

Pulses play an important role in the Indian agricultural economy as they are rich sources of proteins and constitute 10 to 15 percent of India's food grain diet. A major portion of the Indian population belongs to the vegetarian group, and every person on average is required to consume 70 to 80 grammes of pulses per day in order to maintain good health and physique, according to the recommendations of the Indian Council of Medical Research.

Pigeon pea, or Tur, or Arhar (*Cajanus cajan* (L) Millsp) belongs to the family Fabaceae and is a protein-rich staple food consumed in the form of split pulses as Dal, but also consumed as a vegetable in many countries. Pigeon pea is of dietary importance with a seed protein content of about 21 percent, which is the highest in the case of legumes.

It originated in Asia and has been cultivated for 3,000 years. It is a perennial shrub with a short annual crop in India and as a perennial in many other countries, where pods are harvested at regular intervals. The crop has a deep root system and can be cultivated in a wide range of soils, from black clay to sandy soil, but is very sensitive to waterlogged conditions. Being a drought-resistant crop, it is suitable for dry-land farming. The main producing regions are the Indian subcontinent, Eastern Africa, and Central America. It ranks second important pulse crop next to Bengal gram. It finds important place in farming systems adopted by small holding peasants in large number of developing countries.

Objective

To find out the Costs and Returns per hectare of red gram crop in different size of farms groups.

Research Methodology

Sampling design

Multi stage sampling design was adopted for the selection of district as the first stage unit, block as the second stage unit, villages as the third stage units and farm holding as the final and ultimate stage units.

Selection of the districts

The state comprises 35 districts, among these districts,

Chandrapur district was selected purposively for the study of red gram for present study.

Selection of blocks

There are 13 blocks in Chandrapur District. Out of them Ghugus block was selected purposively for this study.

Selection of Villages

A complete list of all village was obtained from the related Gram Panchyat, of which 5% villages were selected randomly. In order to select the villages from these districts Chandrapur was selected randomly having soybean for the study. Taluka development officer was contacted and lists of red gram growing villages were prepared. From the prepared Information about the selected Districts, Taluka, Villages and respondents. The village Borgaon, Belsani, Mursa, Shengaon, Usgaon.

Selection of Respondents/Farmers

A separate list of farmers growing soybean of selected villages were obtained from Gram Pradhan. There after these farmers were categorized into different size farm groups. Out of that, 10% of respondents were selected randomly on the basis of soybean cultivation for the study. Based on size of holding farmers were classified into three groups i.e.

Table 1: Selection number of household/farmers on bases of farm group

Sr. No	Name of Village	Total number of red gram farmer	Selection number of household/farmers on bases of farm group						Total
			Maruti			Charu			
			Medium	Small	Medium	Marginal	Small	Medium	
1	Borgaon	240	7	4	2	7	4	2	24
2	Belsani	230	6	2	3	6	3	3	23
3	Mursa	160	4	2	2	5	2	1	16
4	Shengaon	160	5	2	1	5	2	1	16
5	Usgaon	190	5	3	2	4	3	2	19
	Total	980	27	13	10	27	14	9	100

From this list 100 respondents were selected randomly through proportionate allocation to the population.

Analysis of data

Measures of cost concept

The different cost items that are included under each cost concept are detail below with their procedures.

Cost - A1: It includes the value of:

Imputed value of machine charges (hired and owned)

Bullock charges (hired and owned)

Cost of seeds

Cost of manure and fertilizers

Cost of plant protection chemical

Miscellaneous charges

Interest on working capital

Description on fix resource

Land revenue paid to government

The total of all these cost items make up Cost A1

“Cost - A2: Cost-A1 + rent paid for leased in land, if any”

“Cost - B: Cost-A2 + imputed rental value of own land + interest on own fixed capital”

“Cost - C: Cost B + imputed value of family labour” Cost C is the total cost of cultivation or Gross income.

Measures of farm profitability

1. Gross income = Price per quintal × yield per hectare in quintal.
2. Farm business income = Gross income - Cost A2
3. Farm investment income = Net income + rental value of owned land + interest on fixed capital
4. Net income = Gross income - cost C
5. Family labor income = gross income - cost B
6. Input-output ratio (cost-benefit ratio) = Gross income/Cost C
7. Cost of Production per quintal = Total Cost of cultivation divided by total yield

Results and Discussion

The Table 2 revealed that among different size of farms, total cost incurred by the marginal size farms were high (Rs. 54030/ha) as compared to and large size farms (Rs. 52520/ha and Rs. 50000/ha). Sample average for total cost was Rs. 52,099.7/ha in different size of farms group.

The cost of human labour, fertilizers, seeds and bullock labour were the items of cost with major share in the variable costs, because most of the operations like harvesting, and weeding were human labour intensive operations and the

other operations like land preparation and Interculture were bullock labour intensive. The distribution of pattern of operational cost under various inputs revealed that cost of human labour in Maruti was the highest in the marginal size farms (Rs. 6250/ha), compared to small size farms (Rs. 5500/ha) and lowest on marginal size farms (Rs.5000/ha) in Charu was the highest in the marginal size farms (Rs. 5500/ha), compared to small size farms (Rs. 5200/ha) and lowest on medium size farms (Rs.5000/ha. Whereas, bullock labour cost in Maruti was the highest in case of marginal size farms (Rs. 3600/ha) as compared to small (Rs. 3600/ha) and medium farms (Rs. 3000/ha) in Charu was the highest in case of marginal size farms (Rs. 4800/ha) as compared to small (Rs. 4200/ha) and medium farms (Rs. 3600/ha).

Machinery labour cost was Rs. 4533.3/ha of Maruti and Charu variety in different size of farms group. The cost of seeds in Maruti was the highest on marginal size farms (Rs.1280/ha) as compared to small (Rs. 1250/ha) and lowest in medium size farms (Rs. 1230/ha) and in Charu was the highest on marginal size farms (Rs.1300/ha) as compared to small (Rs. 1280/ha) and lowest in medium size farms (Rs.

1230/ha) respectively. As Red gram would respond well with chemical fertilizer so the cost of farm yard manure used in Maruti and Charu was ranged from Rs. 1670 (marginal size farms) to 1600 (medium size farms). Whereas, the expenditure on fertilizers in Maruti was the highest (Rs.2850/ha) for marginal size farms as compared to small size farms (Rs.2750/ha) and medium size farms (Rs.2710/ha) in Charu was the highest (Rs.2850/ha) for marginal size farms as compared to small size farms (Rs.2760/ha) and medium size farms (Rs.2710/ha) respectively. It was also noticed that the highest expenditure on pesticide was seen on marginal size farms (Rs.1800/ha in Maruti and Rs. 1810/ha in Charu variety) as compared to small and medium size farms respectively. Sample average of Maruti and Charu for depreciation on fixed resources was Rs.3100, interest on working capital Rs.1136.66, interest on fixed capital was Rs. 1676. Land revenue paid to government was Rs.500 in different size of farms group. The cost of rental value of own land was Rs.15000/ha in different size of farms group. Sample average for rental value of own land was Rs 15000/ha.

Table 2: Cost of Cultivation of Maruti variety Red gram crop per hectare in different size of farm groups.

Sr. No	Particulars of Farm Operations	Maruti				Charu			
		Size of Farms Groups			Sample Average	Size of Farms Groups			Sample Average
		Marginal	Small	Medium		Marginal	Small	Medium	
1	Hired Human Labour Charges	6250	5500	5000	5500	5500	5250	5000	5250
2	Bullock Labour Charges	3600	3600	3000	3400	4800	4200	3600	4200
3	Machinery Labour Charges	4800	4800	4000	4533.3	4800	4800	4000	4533.3
4	Cost of Seeds	1280	1250	1230	1253.3	1300	1280	1230	1270
5	Cost of Farm Yard Manure	1670	1620	1600	1630	1670	1620	1600	1630
6	Cost of chemical Fertilizers	2850	2750	2710	2770	2850	2760	2710	2773.33
7	Cost of Irrigation charges	1220	1210	1160	1196.6	1810	1210	1160	1196.6
8	Cost of Plant Protection charges	1800	1760	1750	1770	1810	1770	1850	1776.6
9	Miscellaneous charges	2000	1850	1800	1883.3	2000	1920	1850	1923.3
10	Interest on Working Capital @ 08%	1160	1150	1100	1136.66	1160	1150	1100	1136.6
11	Deprecation on Fixed Resources	3200	3100	3000	3100	3200	3100	3000	3100
12	Land Revenue Paid to government	500	500	500	500	500	500	500	500
13	Interest on Fixed Capital @ 10%	1700	1680	1650	1676.6	1680	1670	1670	1675
14	Rental Value of Own Land	15000	15000	15000	15000	15000	15000	15000	15000
15	Imputed value of Family Labour charge	7000	6750	6500	6750	6250	6000	5750	6000
16	Total Cost of Cultivation	54030	52520	50000	52,099.7	53740	52230	49920	51964.7

Table 3: Average Costs and Returns in Maruti variety Red gram crop per hectare in different Size of Farms Group.

Sr. No	Particulars	Maruti				Charu			
		Size of Farm Group			Sample Average	Size of Farm Group			Sample Average
		Marginal	Small	Medium		Marginal	Small	Medium	
1	Total Cost of Cultivation	54,030	52,520	50,000	52,099.7	53740	52230	49920	51964.7
2	Yield in quintal per ha	14.5	15	15.5	14.90	14	14.5	15	14.5
3	Gross Returns per ha in rupee	115,093.75	119,062.5	123031.25	118,268.75	110600	114550	118500	117,710
4	Net Return per ha	61,063.75	66,542.5	73,031.25	66,168.45	56860	62320	68580	62585.3
5	Input-Output (B:C)	1: 1.27	1: 1.26	1: 1.30	1: 1.27	1: 1.17	1: 1.20	1: 1.31	1: 1.23
6	Price per quintal	7937.5	7937.5	7937.5	7937.5	7900	7900	7900	7900

Table 3 reveals that Costs and Returns in Red gram cultivation in different size of farms group. Among different size of farms groups, the total cost of cultivation incurred in Maruti and Charu by the marginal farms were high (Rs. 54030/ha & Rs.53740/ha) as compared to small (Rs.52520/ha & Rs. 52230/ha) and medium farms (Rs.50000/ha & Rs.49920/ha). Sample average for total cost of cultivation in Maruti and Charu was Rs.38685/ha and Rs.51964.7/ha, respectively. The gross returns obtained per hectare by Maruti and Charu in medium size farms were high (Rs. 123031.25/ha

and Rs.118500/ha) as compare to small and marginal size farms (Rs. 119,062.5/ha, Rs. 114550 and Rs. 115,093.75/ha, Rs. 110600/ha) respectively. The net returns per hectare obtained in Maruti and Charu by medium size farms were high (Rs. 73,031.25/ha and Rs. 68580/ha) as compared to small and marginal size farms (Rs. 66,542.5/ha, Rs. 62320/ha and Rs. 61,063.75/ha, Rs.56860/ha) respectively.

The average yield of red gram in different size of farms group was Rs.14.90/ha. The yield in Maruti and Charu was highest in case of medium size farms 15.5 & 15 quintals/ha as

compared to small (15 & 14.5 quintals/ha) and marginal size farms (14.5 & 14 quintals/ha) respectively. Average Gross

Price per quintal in Maruti and Charu was Rs.7967.5/quintal & Rs.7900/quintal.

Table 4: Cost Concepts in Red gram crop per hectare in different Size of Farms Group

Sr. No	Particulars	Maruti				Charu			
		Size of Farms Group			Sample Average	Size of Farms Group			Sample Average
		Marginal	Small	Medium		Marginal	Small	Medium	
1	Cost A1	30,330	29,090	26,850	28,673.1	30,810	29,560	27,500	29,289.7
2	Cost A2	30,330	29,090	26,850	28,673.1	30,810	29,560	27,500	29,289.7
3	Cost B	47,030	45,770	43,500	45,349.7	47,490	46,230	44,170	45,964.7
4	Cost C	54,030	52,520	50,000	52,099.7	53,740	52,230	49,920	51,964.7

Table 4 reveals that Cost Concepts on different size of farms group per hectare. Cost A1 and cost A2 in Maruti and Charu was highest in marginal size farms (Rs.30330/ha and Rs.30810/ha) followed by small size farms (Rs.29090/ha and Rs.29560/ha) and lowest in medium size farms (Rs.26850/ha and Rs.27500/ha), respectively. Cost B in Maruti and Charu was highest in marginal size farms (Rs.47030/ha and Rs.47490/ha) as compared to small size farms (Rs. 45770/ha

and Rs. 46230/ha) and lowest in medium size of farms (Rs. 43500/ha and Rs. 44170/ha) respectively. Cost C in Maruti and Charu was highest in marginal size farms (Rs. 54030/ha and Rs. 53740/ha) and lowest in medium size farms (Rs. 50000/ha and Rs. 49920/ha). Sample average for Cost A2, Cost B and Cost C in Maruti and Charu was Rs.28673.1/ha, Rs.45349.7/ha and Rs.52099.7/ha and Rs.29289.7/ha, Rs.45964.7, Rs.51964.7/ha, respectively.

Table 5: Measures of Farm Profitability in Red gram crop per hectare in different Size of Farms Group

Sr. No.	Particulars	Maruti				Charu			
		Size of Farm Group			Sample Average	Size of Farm Group			Sample Average
		Marginal	Small	Medium		Marginal	Small	Medium	
1	Gross Return	115,093.75	119,062.5	123,031.25	118,268.75	110,600	114,550	118,500	114,550
2	Farm Business Income	84,763.75	89,972.5	96,181.25	89,595.65	79,790	84,990	91,000	85,260.3
3	Farm Investment Income	77,763.75	83,222.5	89,681.25	83,555.76	73,540	78,990	85,250	79,260.3
4	Net income	61,063.75	69,512.54	68,753.75	66,879.16	56,860	62,320	68,580	62,585.3
5	Family Labour Income	7000	6750	6500	6750	6250	6000	5750	6000

Table 5 that Measures of Profitability in red gram cultivation in different size of farms group. Farm business income in marginal, small and medium size of farms group was Rs.60545.8/ha, Rs.64449/ha and Rs.68564.2/ha in Maruti and Rs.79,790/ha, Rs. 84,990, Rs. 91,000 in Charu variety, respectively. Sample average for farm business income come in Maruti and Charu was Rs. 89,595.65/ha Rs. 85,260.3/ha, respectively. Farm investment income in Maruti and Charu was highest in medium size farms (Rs. 89,681.25/ha and Rs.85,250/ha) as compared to small size farms (Rs. 83222.5/ha and Rs.78990/ha) and lowest in marginal size farms (Rs.77763.75/ha and Rs.73540/ha.) respectively. The sample average for Farm investment income in Maruti and Charu variety was Rs.83555.76/ha and Rs.79260.3/ha, respectively. Sample average of net returns was Rs. 44055.85/ha in different size of farms group. Sample average of Family labour income in Maruti and Charu was Rs. 6750/ha and Rs.6000/ha, respectively.

Problems observed during the study should accordingly be handled to minimize their incidence. Proper borrowing facility and marketing information should also be followed which influence the return of this crop.

Conclusion

The study shows that the production and of red gram in Chandrapur district, The main objective is to study the Costs and Returns. Economics of red gram production is more profitable in medium farms as compared to small size farms and marginal size farms, It was evident that Maruti variety is more profitable as cost of cultivation was found to be lower than the cost of cultivation of Charu variety and the price of the Maruti variety is more than the Charu variety The list of

results obtained in this research study concludes that the investment on manures and fertilizers and plant protection followed by labour charges should highly be considered. Factors having higher elasticity of production value would be looked after carefully and increase their input level for securing a higher return. Problems observed during the study should accordingly be handled to minimize their incidence. Proper borrowing facility and marketing information should also be followed which influence the return of this crop.

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