Asian Journal of Agricultural Extension, Economics & Sociology

Volume 41, Issue 9, Page 353-361, 2023; Article no.AJAEES.102151
ISSN: 2320-7027

An Analysis of Cost and Returns of Chick-pea Cultivation in Chhattisgarh

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJAEES/2023/v41i92052

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/102151

Original Research Article

Received: 28/04/2023
Accepted: 30/06/2023
Published: 07/07/2023

ABSTRACT

The present study aims to examine the cost and returns of Chick pea. The study was conducted in Bemetara district of Chhattisgarh state. From the district two blocks namely Bemetara and Saja were selected and from bemetara block nine villages selected and six villages were selected from Saja block and fifteen chick-pea growing farmers were selected from each village for the investigation of the study. The primary data were collected from the 225 producers through personal interview by survey method. The finding of the study revealed that cost of cultivation per hectare of chick-pea was ₹32486.21 per ha. The cost of cultivation per hectare showed increasing trend with respect to the farm size of holdings. The cost of cultivation in case of marginal farm was higher (₹30469.98/ha.) followed by small farms (₹31235.90/ha.), medium farms (₹33587.90/ha.) and large (₹35839.01ha.) respectively. On an overall basis input-output ratio in chick-pea cultivation was 1:81. On an overall basis net return in chick-pea cultivation was ₹ 26574.80 per ha. The average yield of chick-pea in the study area was 13.03 qt/ha which shows very satisfactory result in respect to average yield of Chhattisgarh i.e. about 1.01 qt/ha.

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Keywords: Cost of cultivation; return; economics; chick-pea.

1. INTRODUCTION

"Chickpea (*Cicer arietinum* (L.), commonly known as bengal gram or garbanzo, belongs to the family Leguminosae and is a major pulse crop that contributes ~20% of the world pulse production after dry beans and dry peas." Reddy et al. [1]. In many developing countries, chickpea is a major source of protein, especially among the poorest segments of the population who depend on vegetable sources to meet their protein and energy needs. In delivering a nutritionally healthy diet, chick-pea plays a major role. For vegetarians, this is the primary form of nutrition. India is the top manufacturer of chick peas in the world, followed by Canada. Chick-pea is the second primary source of protein among all pulses in the Indian diet. India is chick-pea's main manufacturer, customer and importer. There were large differences in both consumption and production of pulse crops to meet the growing domestic demand and to reduce imports and exploit export opportunities. "There should be greater emphasis on the adoption of improved package of practices against the existing traditional production technology so that the desired yield may be realized". Sharma and Zechariah [2]. For nutritional protection and environmental help, chick-pea is an important part of the Indian diet. Chickpea is cultivated primarily as a rainfed crop in India in almost all parts of the country (68 percent area). Chickpea production was projected at around 11.23 million tonnes (mt) during 2017-18, which is 46 percent of the overall production of pulses (23.95 mt) in India. In Chhattisgarh, in 2018-2019, pulse crops were grown in a sizeable area of 703.13 thousand tonnes of total production. Chhattisgarh's most important pulse crops are Lathyrus, Pigeon Pea, Chick-pea, Black Gram and Green Gram. The chick-pea is the most significant pulse crop in the state of Chhattisgarh. It currently occupies an area of 33.09 thousand hectares, with production in Chhattisgarh of 34.55 thousand metric tonnes. Bemetara, Rajnandgaon, Kabirdham and Durg are the major districts for rising chickpeas. Bemetara district takes first position in area of gram with 10.42 thousand hectare with total production of 12.75 thousand metric tonnes with average yield of 1.22 ton per hectare. Chhattisgarh has many agricultural land patches where chickpea crops are produced in a larger region and more study is required to address questions such as, what is the productivity level for major gram crops in the farmer's field? How much is the cultivation cost per area/product unit? How much is the additional return from advanced gram crop technologies over local ones? What is the cost benefit ratio for these crops? Keeping in view, all these questions, the present study was based.

2. METHODOLOGY

The cost concepts approach to farm costing is widely used in India. To work out the cost of cultivation standard method of cost of cultivation employed by Commission on Agricultural Costs and Price (CACP), Directorate of Economics and Statistics, Government of India was adopted which include Cost A1, Cost A2, Cost B1, Cost B2, Cost C1, Cost C2 and Cost C3.

Cost of production per quintal: The average cost of production per quintal has been worked out by dividing the cost (i.e. Cost „A", Cost „B" and Cost „C", respectively) by total output.

Input-Output ratio: Input-output ratio indicates the efficiency of input. It is computed as under:

Input-output ratio = Gross return / Total input cost.

Income analysis: Income analysis was made by using the following income parameters:

1. Farm business income = Gross income – Cost „A1"
2. Family labour income = Gross income – Cost „B2"
3. Net income = Gross income – Cost „C2"
4. Farm investment income = Net income + Rental value of land + Interest on owned fixed capital

Returns: Returns were noted in physical quantities i.e. in quintals and the monetary values were calculated by taking into consideration their average market price.

3. RESULTS AND DISCUSSION

Cost of cultivation of chick pea is demonstrated in Table 1. It clearly indicates that in large farms, the cost of cultivation per hectare was higher than in small farms. The overall production cost per hectare of chick pea was found to be averaging was Rs. 32486.21 per hectare. For

large farms (Rs.35839.01 per ha) the production costs were higher than for marginal farms (Rs 30469 per ha), small (Rs. 31235 per ha.) and medium- sized farms (Rs. 33587 per ha.). Findings were supported by Hegde [3]. Cost of cultivation per hectare of different farm sizes shows an upward trend as the scale of the farm grew this was because the big farmers expended more on modern agricultural inputs such as quality seeds, fertilizers, plant safety products, skilled labor. Table 1 also revealed that under cost of cultivation the maximum cost shared by seed which is 4705.75 (14.48%) on an average basis which varies from 4176 at marginal farmer to 5317.60 at large farmer. Total labor cost share (hired + family) 4976.11 in cost of cultivation where hired labor charge is maximum 2759.32 (8.49%) on an average basis hired labor charges incurred maximum in the case of large farmer 5152.65 (14.37%) followed by medium small and marginal farmers which is 3267.17(9.72%), 1537.76(4.92%) and 1220.45(4.0%) respectively. Fertilizer cost was 1825.79(5.62%) on an average basis respectively which varies from 1543.40(5.06%), 1619.20(5.18%), 1894.76(5.64%) and 2273.25(6.34%) at marginal, small, medium and large farms. Cost of plant protection chemicals is increase with increasing the farm size and the same trend also observed in cost of fertilizer. Machine charges was 1985.31(6.11%) on an average basis respectively which varies from 1850(6.07%), 1920(6.14%), 2040(6.07%) and 2190(6.11%) at marginal, small, medium and large farms. The share of machine charges to total cost higher in large farmers. Interest on working capital was 217.59(0.66%) on an average basis and revenue charges shared same cost 12 rupees on all size of farmers which farmers paid to gram panchayat. Depreciation value rental value of land and interest on fixed capital shows the trends of increasing the farm size depreciation value is 382.23(1.17%) on an average basis and rental value of land incurred 12500 (38.47%) on an average basis of sample farmers followed by interest on fixed capital 838.12 (2.57%) respective with sample farm size. The Findings were supported by Chandan et al. [4] and Amutha, D. [5].

From the Fig 1, it is clear that total cost is maximum for large farmers (Rs. 35839.01), followed by medium farmers (Rs. 33587.90) , small farmers (Rs. 31235.90) and Marginal farmers 30469.98. The total variable cost is more than total fixed cost in large farmers (Rs. 22048.33), followed by medium farmers (Rs. 17538.64), small farmers (Rs. 19814.24) and Marginal farmers (Rs.16802.84). Total fixed cost is Rs. 13667.14, Rs. 13697.20 , Rs. 13773.64, and Rs. 13790.70 for Marginal ,small, medium and large farmers respectively.

Different cost on the basis of cost concept at sample farms: From the Table 2 it was seen that Cost A1, which includes all actual expenses, is Rs. 21327.42 at large farms, Rs. 17909.76at medium farms, Rs.15019.65 at small farms and Rs.13659.51 marginal farms. Cost A2, which includes cost A1 along with rent paid for leased in land, is same as A1, as there was no rent amount which was paid for leased in land. Cost B1, which includes cost A1 along with interest on value of owned fixed capital is maximum in large farms Rs. 22169.1, followed by medium farms Rs. 18750.4 small farms Rs. 15855.63 and marginal farms Rs.14493.65. Cost B2, which includes cost B1 along with rental values of owned land and rent paid for leased in land was 26993.65, 28355.63, 31250.4 and 34669.1 for marginal, small, medium and large farmers respectively. Similarly cost C1, which includes cost B1 along with imputed value of family labor is Rs.17969.98 for marginal, Rs. 18735.90 for small Rs. 21087.9 for medium and Rs.23.339.01 for large farmers. Cost C2, has cost B2 and imputed value of family labor as constituents as amount of Rs. 30469.98, Rs. 31236.5, Rs.33587.9 and Rs.35839.01 for marginal, small, medium and large farmers respectively. Cost C3 including cost C2 and 10% of cost C2 on account of managerial function performed by farmers is (Rs. 39422.91) for large farms, (Rs. 36946.69) for medium farms, (Rs. 34360.15) small farms and (Rs. 33516.97). All costs were comparatively higher at large farms followed by and medium, small and marginal.

The Fig 2 represents the overall amounts of various cost of cultivation components. It is clear from the above figures that maximum cost amount occurred in cost C3 followed by cost C2, B2, C1, B1, and A1, A2 with amounts of Rs. 35734.831, Rs. 32486.21, Rs. 19,986.21, Rs. 30269.42, Rs. 17769.42and Rs. 16931.3 respectively. The maximum cost occurred in Cost C3 which includes Cost C2 and 10% cost of C2 on account of managerial function performed by farmer, which is again maximum in large farms followed by medium and small farms. Whereas, the minimum cost occurred in Cost A1 and A2 which includes all actual expenses, however this is also maximum in large farms followed by medium and smallfarms.

Table 1. Cost of cultivation of chick pea on sampled farm

(Rs./ha)

S. No	Particulars	Farm size				
	A. Variable cost	**Marginal**	**Small**	**Medium**	**Large**	**Overall**
1	Family labor	3476.33 (11.40)	2880.27 (9.22)	2337.50 (6.50)	1169.91 (3.39)	2216.79 (8.58)
2	Hired human labor	1220.45 (4.0)	1537.76 (4.92)	3267.17 (9.72)	5152.65 (29.68)	2759.32 (27.56)
3.	Machine charges	1850 (6.07)	1920 (6.14)	2040 (6.07)	2190 (6.11)	1985.31 (6.11)
4.	Seed cost	4176 (13.70)	4555.56 (14.58)	4783.21 (14.24)	5317.60 (14.83)	4705.75 (14.48)
5.	Fertilizer	1543.40 (5.06)	1619.20 (5.18)	1894.76 (5.64)	2273.25 (6.34)	1825.79 (5.62)
6.	Plant protection Chemicals	2361.11 (7.74)	2718.75 (8.70)	3031.25 (9.02)	3350 (9.34)	2867.92 (8.82)
7.	Irrigation charges	1751.20 (5.74)	1841.23 (5.89)	1941.40 (5.78)	1997.20 (5.57)	1892.39 (5.82)
8.	Miscellaneous	249 (0.81)	273 (0.87)	289 (0.86)	323 (1.04)	283 (0.87)
9.	Interest on workingCapital	175.35 (0.57)	192.87 (0.61)	229.95 (0.68)	274.72 (0.76)	217.59 (0.66)
A.	**Total Variable Cost**	**16802.84 (55.14)**	**17538.64 (56.14)**	**19814.24 (59.00)**	**22048.33 (61.52)**	**18754.10 (57.72)**
10.	Rental value of land	12500 (41.02)	12500 (40.01)	12500 (37.21)	12500 (34.87)	12500 (38.47)
11.	Land revenue	12 (0.03)	12 (0.03)	12 (0.03)	12 (0.03)	12 (0.03)
12.	Depreciation on Implements	321 (1.05)	349.21 (1.11)	421 (1.25)	437 (1.21)	382.23 (1.17)
13.	Interest on fixedcapital	834.14 (2.73)	835.98 (2.67)	840.64 (2.50)	841.68 (2.34)	838.12 (2.57)
B.	**Total Fixed Cost**	**13667.14 (44.85)**	**13697.20 (43.85)**	**13773.64 (41.00)**	**13790.70 (38.47)**	**13732.12 (42.27)**
C.	**Total Cost(A+B)**	**30469.98 (100)**	**31235.90 (100)**	**33587.90 (100)**	**35839.01 (100)**	**32486.21 (100)**

Table 2. Break-up of total cost, cost concept wise income over different cost in chick-pea

Sr. No.	Break up cost	Farm size				
		Marginal	**Small**	**Medium**	**Large**	**0verall**
1	Cost A 1 (All actual expenses)	13659.51	15019.65	17909.76	21327.42	16931.3
2	Cost A 2 =Cost A1 + Rent paid for leased inland	13659.51	15019.65	17909.76	21327.42	16931.3
3	Cost B 1 =Cost A1 + Interest on value of owned fixed capital	14493.65	15855.63	18750.4	22169.1	17769.42
4	Cost B 2 = Cost B1 + Rental value of owned land & Rent paidfor leased in land	26993.65	28355.63	31250.4	34669.1	30269.42
5	Cost C 1 =Cost B 1 + imputed value of family Labor	17969.98	18735.90	21087.9	23.339.01	19,986.21
6	Cost C 2 = Cost B 2 + imputed value of family Labor	30469.98	31236.5	33587.9	35839.01	32486.21
7	Cost C 3 = Cost C 2 + 10% of Cost C 2 on account ofmanagerial function performed by farmer	33516.97	34360.15	36946.69	39422.91	35734.831

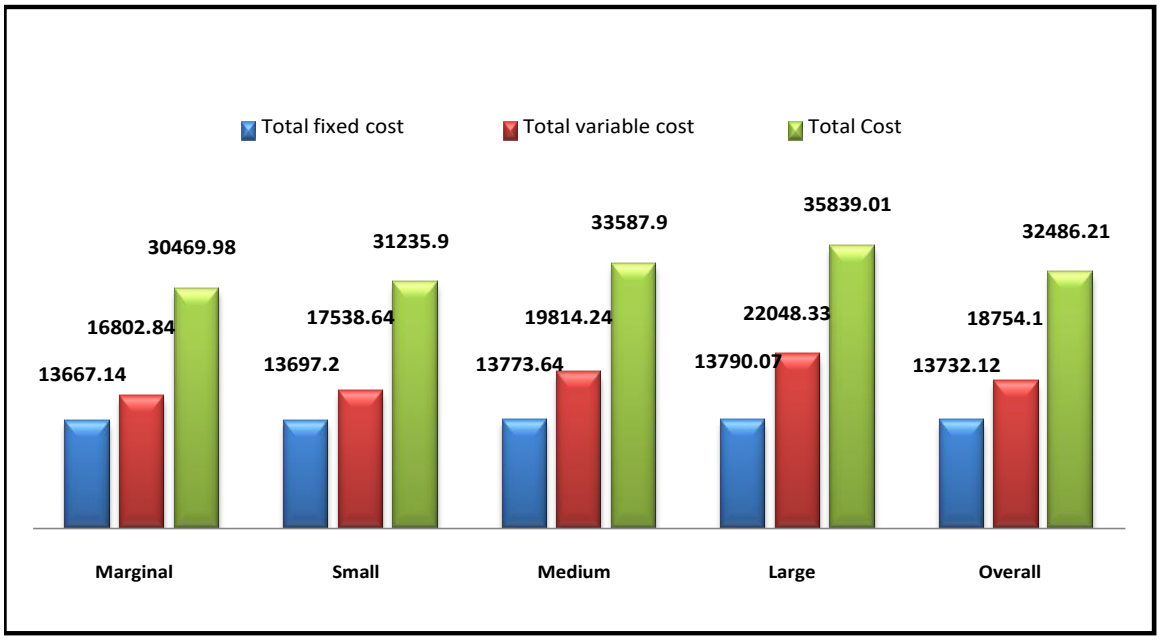

Fig. 1. Total fixed cost, total variable cost & total cost
Note: Figures indicate proportion of sum in parentheses

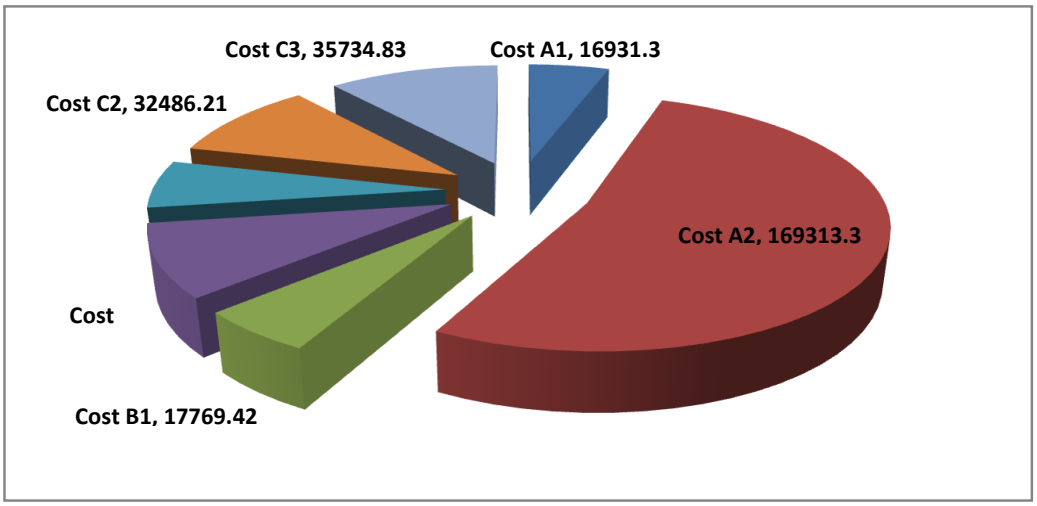

Fig. 2. Break-up of total cost and cost concepts

Yield, cost and return of Chickpea at the sampled farms: The Table 3 represents the yield and return of Chickpea. The average yield per ha from the sample farms was maximum in large (14.67qt) followed by medium (13.50qt), small farms (12.15qt) and marginal farms (11.75qt). The average price was 4500 for marginal, small medium and large farmers. The maximum cost of cultivation occurred in large farms (Rs. 35839.01), followed by medium farms (Rs. 33587.90), small farms (Rs. 31235.90) and marginal farms (Rs. 30469.98) which resulted due to farm size and amounts of input expenditure. As far as cost of production per quintal is concerned, it is minimum in large farms which is Rs. 2443.00 followed by medium farms Rs. 2488.00 followed by small farms Rs. 2508.90 and maximum in marginal farms with Rs. 2593.18 per quintal.

Gross return was highest in large farms (Rs. 67013.00) followed by medium small farms and marginal farms with Rs. 61177.00, Rs.55083 and Rs. 53247.00 respectively. Net returns (gross return-Cost C) was maximum in large farms (Rs. 31173.99) followed by medium farms (Rs.

Table 3. Per hectare yield, value of output and cost of production per quintal of Chick pea

(Rs./ha)

Sr. No.	Particular	Marginal	Small	Medium	Large	Overall
1.	Average Yield(qt.)	11.75	12.15	13.50	14.67	13.03
2.	Average price (Rs./qt.)	4500	4500	4500	4500	4500
3.	Average by-product Yield(qt.)	3.10	3.40	3.56	4.15	3.55
4.	Average by-product price (Rs./qt.)	120	120	120	120	120
5.	Cost of cultivation/ha	30469.98	31235.90	33587.90	35839.01	32486.21
6.	Cost of production/qt	2593.18	2508.90	2488	2443	2493.18
7.	Gross return= (Main + byproduct)	53247	55083	61177	67013	59061
8.	Net return= (Gross return-cost C2)	22777.02	23847.10	27589.1	31173.99	26574.80
9.	Family labor income= (Gross income-Cost B2)	26253.35	26727.27	29926.6	32343.9	28791.58
10.	Farm business income = (Gross income-Cost A1)	39587.49	40063.35	43267.24	45685.58	42129.7
11.	Farm investment income= (Net income + rentalvalue of own land + interest on fixed capital)	36111.16	37183.08	40930.64	44017.67	39912.92
12.	Input-output ratio	1.74	1.76	1.82	1.85	1.81

Table 4. Income over different cost at sampled farms

Sr. No.	Income over different cost	Marginal	Small	Medium	Large	Overall
1.	Income over Cost A1	13659.51	40,063.35	43267.24	45685.58	42129.9
2.	Income over Cost A2	13659.51	40,063.35	43267.24	45685.58	42129.9
3.	Income over Cost B1	38753.35	39227.37	42426.6	44843.9	41291.58
4.	Income over Cost B2	26253.35	26727.37	29926.6	32343.9	28791.58
5.	Income over Cost C1	35277.02	36347.1	40089.1	43673.99	39074.79
6.	Income over Cost C2	22,777.02	23846.5	27589.1	31173.99	26574.79
7.	Income over Cost C3	19730.03	20722.85	24230.31	27590.09	23326.169

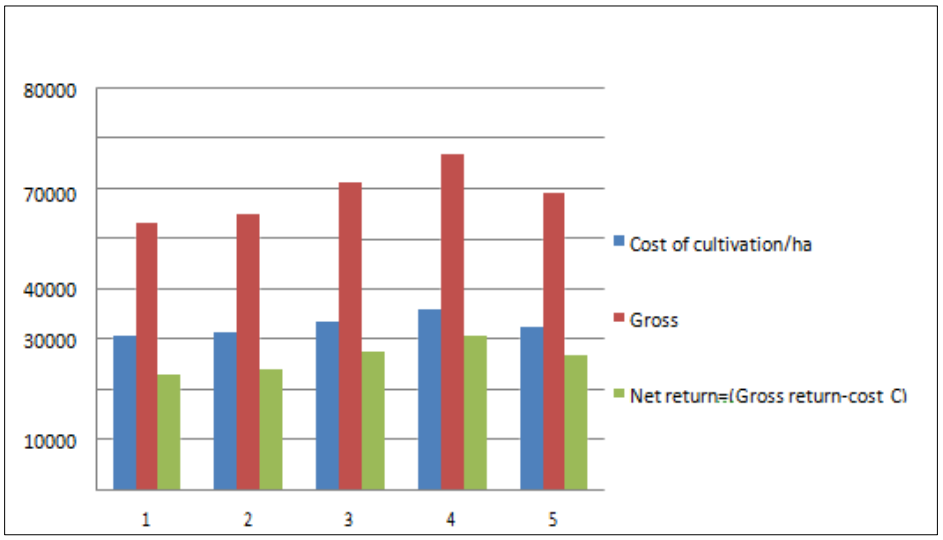

Fig. 3. Cost of cultivation, gross return and net returns at samplefarms

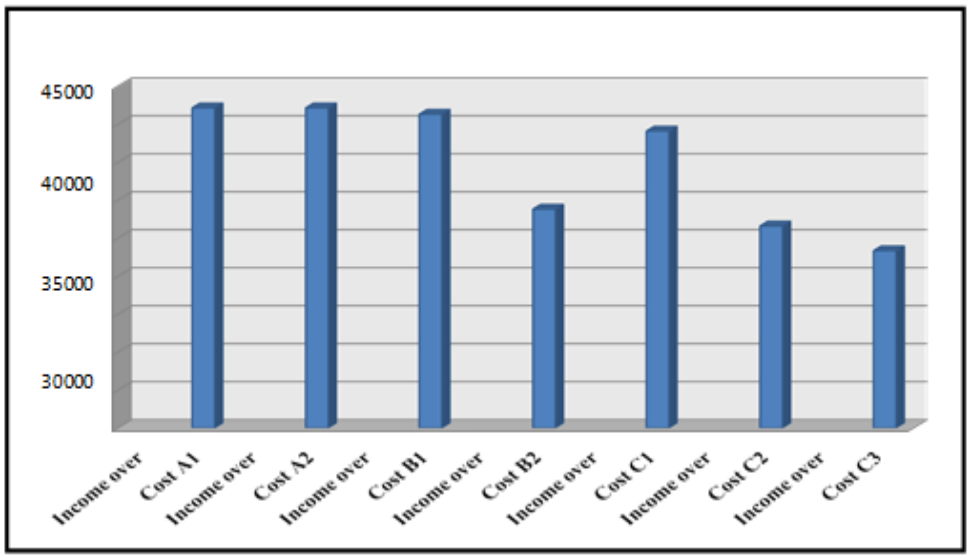

Fig. 4. Income over different cost

27589.1), again followed by small farms (Rs. 23847.10) and minimum in marginal farms (Rs. 22777.02) . Family labor income which equals to gross income after subtracting Cost B is maximum in large farms as compared to medium, small and marginal farms which accounts for Rs. 32343.9, Rs. 29926.6, Rs. 26727.27and Rs. 26253.35 respectively. Farm business income which includes gross income excluding Cost A1 is also maximum in large farms (Rs. 45685.58) followed by medium farms (Rs. 43267.24),followed by small farms (Rs. 40063.35), and minimum in large farms (Rs. 39587.49). Farm investment income which includes net income along with rental value of owned land and Interest on fixed capital is maximum in large farms (Rs. 44017.67) followed by medium (Rs. 40930.64) followed by small(Rs.37183.08) and minimum in marginal farms (Rs. 36111.16). The input output ratio is maximum for large farms 1:1.85, followed by medium farms 1:1.82 followed by small farms, 1: 1.76 and minimum in marginal farms with ratio of 1: 1.74. Increased return from input in farms is maximum due to increased productivity aroused due to minimum cost incurred. The finding were supported by Sengar et al. [6] and Sharna et al. [7].

Income over different cost at sample farms: Income over different cost was also calculated for the sample farms (Table 4). Income over cost

A1 was maximum in large farms (Rs. 45685.58) followed by medium farms (Rs. 43267.24), small farms (Rs. 40,063.35) and minimum in marginal farms (Rs. 13659.51). Income over cost A2 was also same as income over cost A1 following similar trend. Income over Cost B1 was Rs. 38753.35, Rs. 39227.37, Rs. 42426.6 and Rs. 44843.9 for marginal, small, medium and large farms respectively. Income over Cost B2 was Rs. 26253.35, Rs. 26727.37, Rs. 29926.60 and 32343.90 for marginal, small, medium and large farms respectively. Income over Cost C1 was maximum in large farms followed by medium, small and minimum in marginal farms with Rs. 43673.99, Rs.40089.10,Rs. 36347.10 and Rs. 35277.02 respectively. Income over Cost C2 was maximum in large farms followed by medium, small and minimum in marginal farms with Rs. 31173.99, Rs. 27589.1, Rs. 23846.5 and Rs. 22,777.02 respectively. Income over Cost C3 also follows similar trend with Rs. 27590.09, Rs. 24230.31, Rs. 20722.85 and Rs. 19730.03 in large, medium, small and marginal farms respectively. The overall income over Cost A1, A2, B1, B2, C1, C2 and C3 was Rs.42129.9, Rs.42129.9, Rs.41291.58, Rs.28791.58, Rs.39074.79, Rs. 26574.79 and Rs. 23326.169 respectively.

4. CONCLUSION

On an overall basis input-output ratio in chick-pea cultivation was 1:81. On an overall basis net return in chick-pea cultivation was ₹ 26574.80 per ha. The average yield of chick-pea in the study area was 13.03 qt/ha which shows very satisfactory result in respect to average yield of Chhattisgarh i.e. about 1.01 qt/ha. The cost on the basis of cost concept in the production of chick-pea on the sample farm of different size groups have been overall Cost A1, Cost A2, Cost B1, Cost B2, Cost C1 Cost C2, and Cost C3 were worked out to ₹16931.30, ₹16931.30, ₹17769.42, ₹30269.42, ₹19986.21, ₹32486.21 and ₹35734.83 per ha respectively on the sample farms. The income over different cost were also worked out .the average income over cost A1, Cost A2 ,cost B1, cost B2, Cost C1 Cost C2, and Cost C3 were calculated as ₹42129.90, ₹42129.90, ₹41291.58, ₹28791.58, ₹39074.79, ₹, ₹26574.79 and ₹23326.16 respectively.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Reddy AA, Mathur VC, Yadav M, Yadav SS. Commercial Cultivation and Profitability. SSRN Electronic Journal; 2007.
   Available:https://www.research.net/publication/256004876.
2. Sharma S, Zechariah Z. An economic analysis of production of chickpea in Bilaspur district of Chhattisgarh. Journal of Pharmacognosy and Phytochemistry. 2018;7(5): 889-891.
3. Hegde D, Rao DV, Supriya K. An economic analysis of black gram in Gulbarga district of Karnataka. J. Res. ANGRAU. 2012;41(1):70-73.
4. Chandan RV, Shelke RD, More SS. Analysis od Cost and Return structure of Chickpea Cultivation. International Journal of Current Microbiogy and Applied Sciences. 2020;9(5).
   ISSN: 2319-7706
   Available:http://doi.org/10.20546/ijcmas.2020.905.357
5. Amutha D. Analysis of cost and return structure of cowpea cultivation. International Journal of Retailing Rural Business Perspectives. 2013;2(3):496-498.
6. Sengar VS, Verma RR, Ahmad R, Singh KK, Kumar N, Singh RA, Singh AP, Singh GP. Chickpea: Study on cost of cultivation and profit measures in Auriya Dist.of western UP. Journal of Pharmacognosy and Phytochemistry. 2018;7(6):627-631.
7. Sharna SC, Kamruzzaman M, Siddique ST. Impact of improved chickpea chickpea cultivation on profitability and livelihood of farmers in drought-prone areas of Bangladesh. SAARC Journal of Agriculture. 2020;18(1):129-142.

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The peer review history for this paper can be accessed here:
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