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An analysis of trends, growth and B:C ratio in Surguja district of Chhattisgarh state with special reference to groundnut crop

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Abstract

In this study shows that analysis of trends, growth and B:C ratio in Surguja. The main objective of the study is to analyze, economics of groundnut production, price spread and constraints in production of groundnut. Economics of groundnut production is more profitable in small size farms as compared to medium size farms and large size farms. The compound growth rate of this crop in case of area is estimated as -4.23 per cent and -8.59 per cent in the Chhattisgarh state and Surguja district respectively of total period of 10 years. The compound growth rate for the production (-7.26) and productivity (1.64) is decreased in this district only for the period under study. The compound growth rate of area under groundnut is not increased during of total period of 10 years. The compound growth rate for productivity is estimated as positive in the district and state both. It is observed as 1.64 per cent and 2.95 per cent in Surguja district and state respectively during the period.

Keywords: trends, growth, production, productivity

Introduction

Chhattisgarh state consist 27 districts. Out of which Surguja district contributes 10.81 per cent in area and 9.97 per cent production of groundnut. Therefore Surguja district is selected purposively. The district has 7 blocks. Out of Sitapur block is selected purposively based on highest area under crop. Five villages are selected randomly in this block viz. Guturma, Beljora, Lalitpur Rajaute, and Kerju. The world groundnut (in shell) harvested area in 2007 was 23.4 million ha with a total production of 34.9 million metric tons (Mt). The total harvested area in 2007 increased by 3.7 million ha when compared to 1990, while production increased by 11.7 million Mt. The world's average productivity in 2007 was about 1490 kg/ha. It is cultivated in as many as 90 countries. Groundnut is therefore an oilseed crop on a global scale. Groundnut is one of the most important oilseed crops in India. It account for 25.25 per cent area and 32.35 per cent production of total oilseed in the country. Groundnut oil is primarily used in the manufacture of vegetable oil. The seed of groundnut contains about 45 per cent oil and 26 per cent protein. The oilcake obtained after the extraction of the oil is a valuable organic manure and animal feed. This crop is a good source of all B group vitamins except B₁₂. They are rich source of thiamin, riboflavin, nicotinic acid and vitamin E. The biological value of groundnut protein is highest among different vegetable proteins. In the state groundnuts area was 25.61 thousand ha production is 37.3 metric tones and productivity is 1456 kg/ha. Chhattisgarh state contributes 0.53 per cent area and 0.74 per cent production and 1379.4 kg/ha Productivity of groundnut in the country respectively.

Materials and Methods

Collection of data

The study is based on both primary and secondary data. The primary data was collected from the selected respondents with the help of pre-tested interview schedule by the personal interview method and secondary data was collected from Chhattisgarh agriculture statistics, land record office, annual districts statistics and other published and unpublished reports.

Methodology

Sampling technique in Sitapur block of Surguja district was purposively chosen as the study area because, it has the larger area under Groundnut cultivation in the district. A multistage simple random sampling technique (SRS) was adopted to select the block, villages and the

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respondents, market and different farmer involved in Groundnut production and marketing in Surguja district. The details of the sampling techniques at various stages are given as under:

Profitability concept

Gross income = (Quantity of main product X price of main product) + (Quantity of by product X price of by product.)

Net income = Gross income - Cost C₃

Family labour income = Gross income - Cost B₂

Family business income = Gross income - Cost A₁

$$\text{Benefit Cost Ratio} = \frac{\text{Gross income}}{\text{costc}_3}$$

Estimate of Trend and Growth Rate

To reveal the behavior of selected variables in the district over time, regression analysis was carried out. The following form of linear production function was fitted by least square technique to estimate the trend and growth rate of the selected variable for the study period.

Linear Equation

$$Y = a + bx$$

Where,

Y= Dependant variable i.e. Area, Production and Productivity

a = constant/ Intercept

b = regression Coefficient (Rate of Change)

x = Independent variable (Years)

$$\text{Simple Growth Rate (SGR)} = \frac{b}{\bar{y}} \times 100$$

$$\text{Compound Growth Rate (CGR)} = (\text{Antilog of } b - 1) \times 100$$

Results and Discussion

Area, production and productivity of groundnut in Surguja district: (2003-04-2012-13)

The area, production and productivity of groundnut in Surguja are presented in table 1. The area of groundnut decrease from 789 hectares in district 2003-04 to 277 hectares in 2012-13 sowing a tremendous decrease in the area. Actually the good growth in area of this crop may be observed only after 2008. The production of groundnut varied from about 4 metric tonnes to about 10 metric tonnes during this 10 years period. The highest productivity of this crop is estimated 1259 kg and 1343 kg per hectares during year 2011-13.

Table 1: Area, production and productivity of groundnut in Surguja:

| S. No. | Year | Area (%) | Production (%) | Productivity |
|--------|---------|--------------|----------------|--------------|
| 1. | 2003-04 | 7.89 (11.18) | 9.09 (11.01) | 1152 |
| 2. | 2004-05 | 7.73 (10.95) | 8.35 (10.11) | 1080 |
| 3. | 2005-06 | 8.35 (11.83) | 9.39 (11.37) | 1125 |
| 4. | 2006-07 | 8.08 (11.45) | 9.13 (11.05) | 1130 |
| 5. | 2007-08 | 8.17 (11.58) | 10.02 (12.13) | 1221 |
| 6. | 2008-09 | 7.96 (11.28) | 9.71 (11.76) | 1314 |
| 7. | 2009-10 | 7.91 (11.21) | 9.52 (11.53) | 1150 |
| 8. | 2010-11 | 7.94 (11.25) | 9.13 (11.05) | 1150 |
| 9. | 2011-12 | 3.75 (5.31) | 4.49 (5.43) | 1259 |
| 10. | 1012-13 | 2.77 (3.92) | 3.72 (4.50) | 1343 |
| | Total | 70.55 (100) | 82.55 (100) | |

Source: - Department of agriculture Govt. of Chhattisgarh.
(Area in "000 ha) (Production in "000 MT tone) (Productivity in kg/ha)

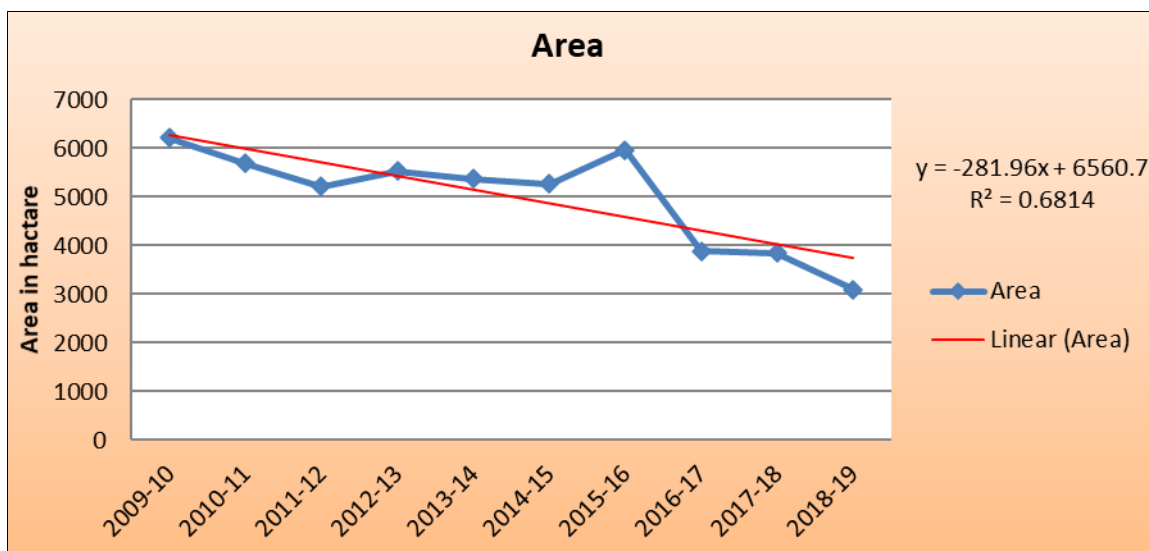


Fig 1: Trend of area of groundnut in surguja district

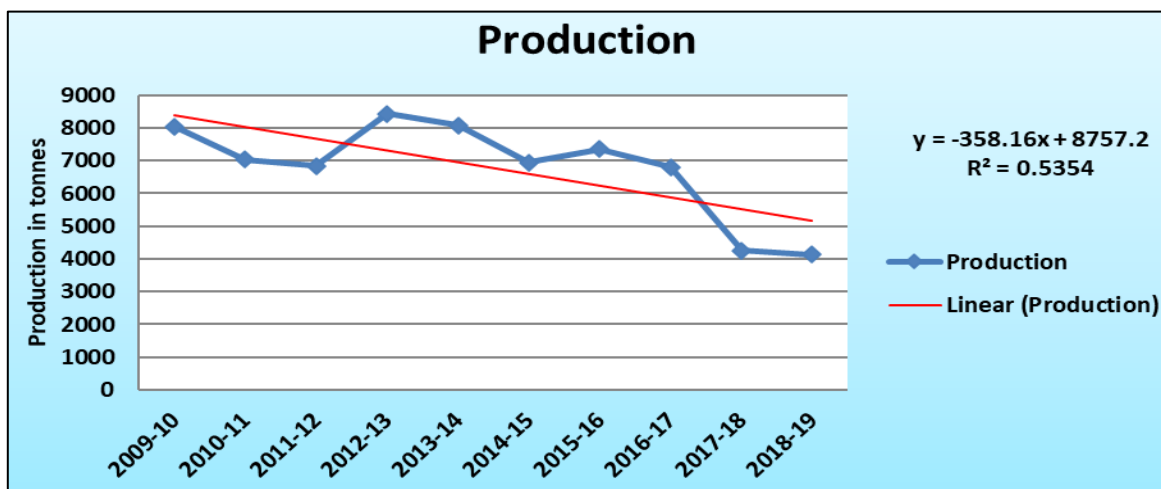


Fig 2: Trend of production of groundnut in surguja district



Fig 3: Trend of productivity of area of groundnut in surguja district

Compound growth rate of area, production and productivity of groundnut:

The compound growth rate of groundnut during period (2003-04 to 2012-13) is presented in table 2. It is clear from figures of growth rate that though, the growth rate of productivity (2.95 per cent) in period (2003-04 to 2012-13) is significantly increase, the significant and negative growth rate of production (-1.5 per cent) is observed mainly due to negative and significant growth rate (-4.23 per cent) in area of this crop during period (2003-04 to 2012-13) in the state of Chhattisgarh in this 10 year.

The compound growth rate of area over the period of 10 years is estimated as -8.59 per cent in the Surguja district which get success to increase the productivity of crop in the district in early due to positive and significant growth rate (1.64 per cent) in productivity of this crop. The district experienced negative and significant growth rate (-7.26 per cent) in production of this crop. It is observed that the productivity of this crop was increasing during period (2003-04 to 2012-13). During this period, the compound growth rate of productivity is estimated positive most and significant in the district (1.64 per cent) and state (2.95 per cent) as well.

Table 2: Compound growth rate of area, production and productivity of groundnut crop in Chhattisgarh state and Surguja district:

| Particular | Chhattisgarh | Surguja |
|--------------|--------------|---------|
| Area | -4.23 | -8.59 |
| Production | -1.5 | -7.26 |
| Productivity | 2.95 | 1.64 |

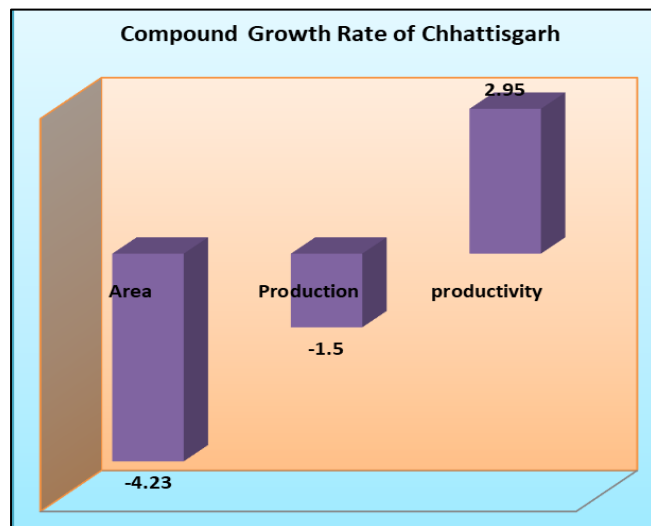


Fig 4: Compound Growth Rate of Chhattisgarh

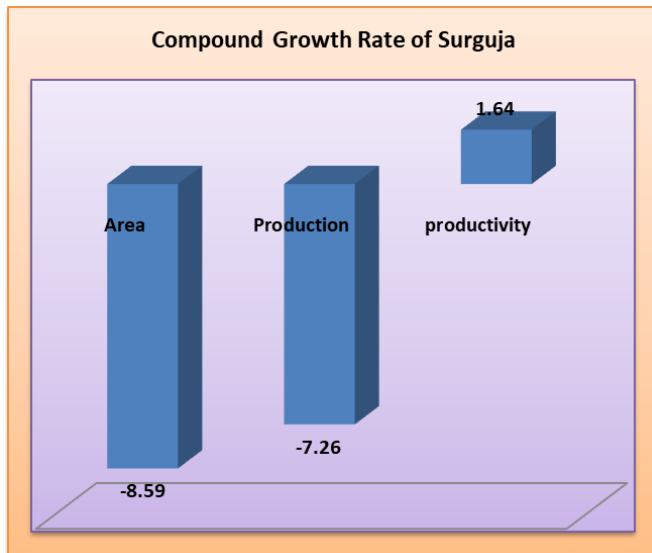


Fig 5: Compound Growth Rate of Surguja district

Cost of cultivation

Resource use and Cost of cultivation of Groundnut crop per hectare in different size of farms groups:

The cost of cultivation of groundnut production is presented in Table 3. Though, all the operations are necessary in the groundnut production the cost incurred on these operations is relatively less as compared to paddy production. It is clear from the figures that manure and fertilizer, sowing, inter-cultural operation, harvesting, threshing and winnowing are some labour intensive operations. The average cost of cultivation in groundnut production is about Rs. 29673.10 the average cost of purchase of seed is about 3524.44 for a hectare which is about 11.88 per cartage of total cost of cultivation. Manure and fertilizer applications are also costly operation in the groundnut production. The expenditure incurred on this operation is about Rs. 3514.56 per hectare (11.84). The expenditure on groundnut cultivation is about Rs. 30,305.18 cost incurred in small farms. Similarly medium farms and large farms the cost of cultivations incurred about Rs. 29,329.60 and 28,924.20 respectively.

Table 3: Resource use and Cost of cultivation of Groundnut crop per hectare in different size of farms groups Number of Respondent = 90 (Rs./ha)

| S. No. | Particular | Size of Farms Groups | | | Sample Average |
|--------|----------------------------|----------------------|--------------------|--------------------|--------------------|
| | | Small | Medium | Large | |
| (A) | Variable Cost | | | | |
| 1. | Hired Labour | 1345.00 (4.44) | 2075.00 (7.07) | 3350.00 (11.58) | 2033.89 (6.90) |
| 2. | Bullock power | 1075.00 (3.55) | 1050.00 (3.58) | 1060 3.66 | 1063.33 (3.58) |
| 3. | Machine power | 4500.00 (14.85) | 4450.00 (15.17) | 4450.00 (15.39) | 4472.22 (15.07) |
| 4. | Seed | 3540.00 (11.68) | 3520.00 (12.00) | 3500.00 (12.10) | 3524.44 (11.88) |
| 6. | Manure & fertilizer | 3574.00 (11.79) | 3525.00 (12.02) | 3380.00 (11.69) | 3514.56 (11.84) |
| 7. | Plant protection | 1350.00 (4.45) | 1260.00 (4.30) | 1175.00 (4.06) | 1281.11 (4.31) |
| 8. | Irrigation | 1580.00 (5.21) | 1500.00 (5.11) | 1020.00 (3.53) | 1428.89 (4.80) |
| 9. | Interest on W.C. @ 2% | 428.68 (1.41) | 400.60 (1.37) | 383.70 (1.33) | 409.32 (1.38) |
| (B) | Fixed Cost | | | | |
| 1. | Depreciation on fixed cost | 620.00 (2.05) | 1035.00 (3.53) | 1450.00 (5.01) | 942.78 (3.20) |
| 2. | Land revenue | 55.00 (0.18) | 55.00 (0.19) | 55.00 (0.19) | 55.00 (0.19) |
| 3. | Rental value of Land | 7000.00 (23.10) | 7000.00 (23.87) | 7000.00 (24.20) | 7000.00 (23.60) |
| 4. | Interest on F.C. @ 10% | 767.50 (2.53) | 809.00 (2.76) | 850.50 (2.94) | 799.78 (2.69) |
| (C) | Family labour | 4470 (14.75) | 2650 (9.04) | 1250 (4.32) | 3147.78 (10.53) |
| | Total (A+B+C) | 30305.18 (100) | 29329.60 (100) | 28924.20 (100) | 29673.10 (100) |

Note: Figures in the parentheses indicate the percentages to the total cost of cultivation.

Cost of cultivation in Groundnut crop per hectare in different Size of Farms Group:

Table 4 reveals that cost concepts on different size of Farm grower per hectare. Cost A was highest in large size Farm (Rs. 18318.70/ha) followed by medium size Farm (Rs. 17780.60/ha) and lowest in small size Farm (Rs. 17392.68/ha) respectively. Cost B was highest in large size Farm (Rs. 27674.2/ha) as compared to medium size Farm (Rs.

26679.6/ha) and lowest in small size of Farm (Rs. 25835.18/ha) respectively. Cost C was lowest in large size Farm (Rs. 28924.20 /ha) and highest in small size Farm (Rs. 30305.18/ha). Sample average for Cost A, Cost B and Cost C was Rs. 17727.77/ha, Rs. 26525.32/ha and Rs. 29673.10/ha in different size of Farm grower.

Table 4: Cost of cultivation in Groundnut crop per hectare in different Size of Farms Group Number of Respondents = 90 (Rs./ha)

| Cost Concepts | Size of Farms Groups | | | Sample Average |
|---------------|----------------------|----------|----------|----------------|
| | Small | Medium | Large | |
| Cost A | 17392.68 | 17780.60 | 18318.70 | 17727.77 |
| Cost B | 25835.18 | 26679.6 | 27674.2 | 26525.32 |
| Cost C | 30305.18 | 29329.60 | 28924.20 | 29673.10 |

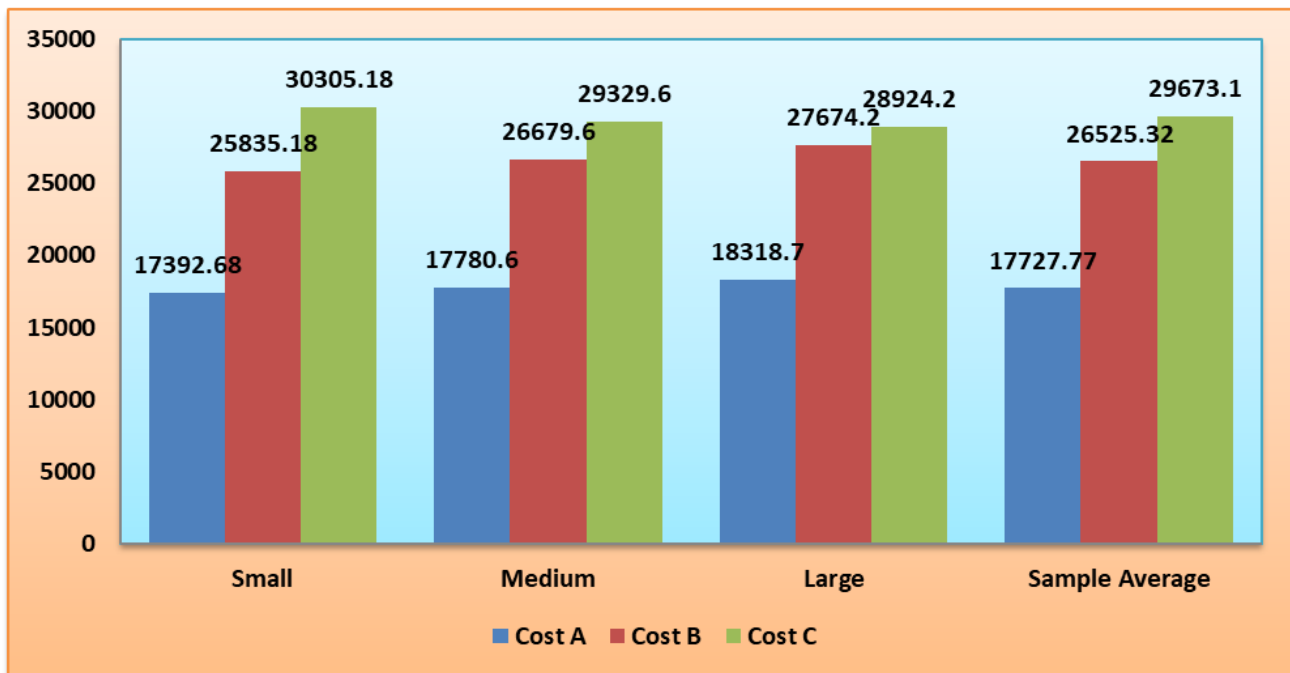


Fig 6: Cost of cultivation in Groundnut crop per hectare in different Size of Farms Group

Cost and returns in Groundnut crop per hectare in different size of farm groups:

The economics of groundnut production is presented in Table 5. It is clear from the fig 7 that the average cost of cultivation is worked out as Rs. 29673.10 per hectare which ranges from about Rs.30305.18 per hectare at small farms, Rs. 29329.60 Medium farms, Rs 28924.20 per hectare at large farms. The per quintal cost of production varied from Rs. 1900.45 at large farms, Rs. 2014.39 at medium farms to Rs. 2191.26 at small farms. It is interesting to note here that whereas the cost of cultivation is increasing as the size of holding increased, the per quintal cost of production showing just reverse trend

mainly due to relatively less yield at smaller farms. The average yield of groundnut is observed as 14.38 quintals in the study area while the price of main product is Rs. 4500.00 per quintal. The per hectare net return depends on the per hectare yield of this crop as the price realized by farmers is not much varying across different categories. The net returns varied from Rs. 34284.82 per hectare at small farms, Rs. 38515.40 per hectare at medium farms to Rs. 42115.80 per hectare at large farms along with an average of Rs. 37435.23 per hectare. The input-output ratio is observed as 1:1.13 at small farms to 1:1.45 at large farms.

Table 5: Cost and returns of Groundnut production at farms group: (Rs./ha) Number of Respondent = 90

| S. No. | Particulars | Size of Farms Groups | | | Sample Average |
|--------|------------------------------|----------------------|----------|----------|----------------|
| | | Small | Medium | Large | |
| 1. | Cost of cultivation (Rs./ha) | 30305.18 | 29329.6 | 28924.2 | 29673.10 |
| 2. | Production (Qtl/ha) | | | | |
| a. | Main-product | 13.83 | 14.56 | 15.22 | 14.38 |
| b. | By-product | 15.7 | 16.5 | 17 | 16.26 |
| 3. | Cost of production (Rs./qtl) | | | | |
| a. | Main-product Price (Rs./qtl) | 2191.26 | 2014.39 | 1900.45 | 2067.78 |
| 4. | Return (Rs./qtl) | | | | |
| a. | Main-product | 4500.00 | 4500.00 | 4500.00 | 4500.00 |
| b. | By-product | 150.00 | 150.00 | 150.00 | 150.00 |
| 5. | Return (Rs./ha) | | | | |
| a. | Main-product | 62235.00 | 65520.00 | 68490.00 | 64720.00 |
| b. | By-product | 2355.00 | 2325.00 | 2550.00 | 2388.33 |
| 6. | Gross return (Rs./ha) | 64590.00 | 67845.00 | 71040.00 | 67108.33 |
| 7. | Net return (Rs./ha) | 34284.82 | 38515.40 | 42115.80 | 37435.23 |
| 8. | Net return (Rs./qtl) | 2308.74 | 2485.61 | 2599.55 | 2432.32 |
| | Input-output ratio | 1:1.13 | 1:1.31 | 1:1.45 | 1:1.26 |
| | B:C ratio | 1:1.13 | 1:1.31 | 1:1.46 | 1:1.26 |

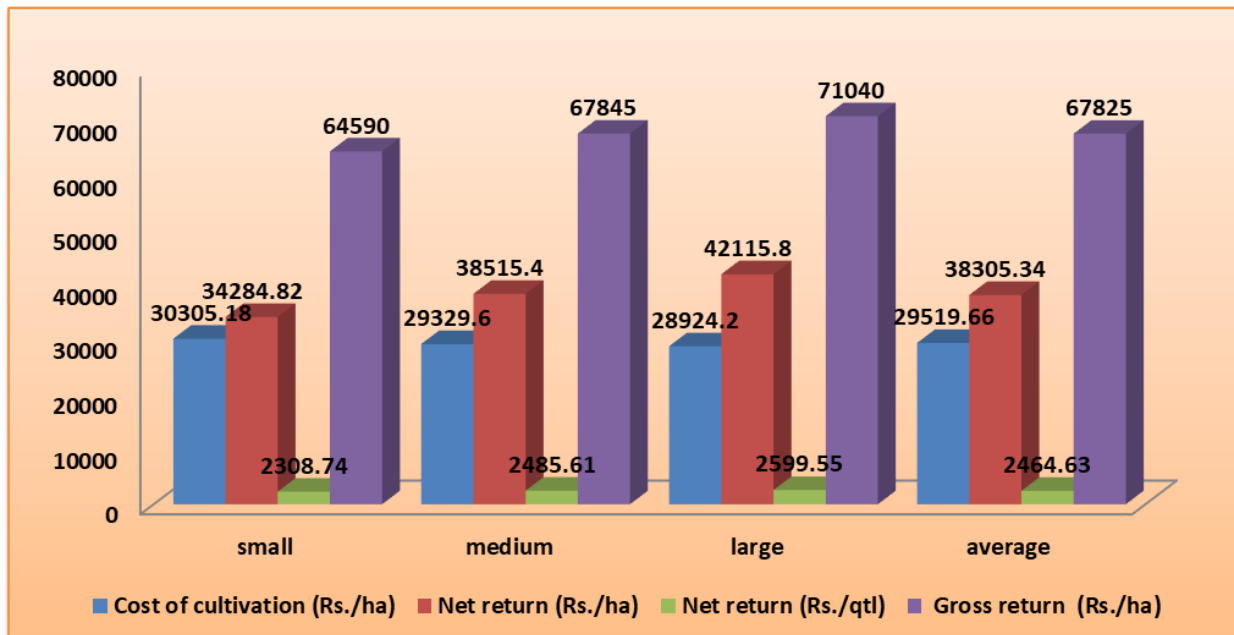


Fig 7: Cost and return of groundnut cultivation.

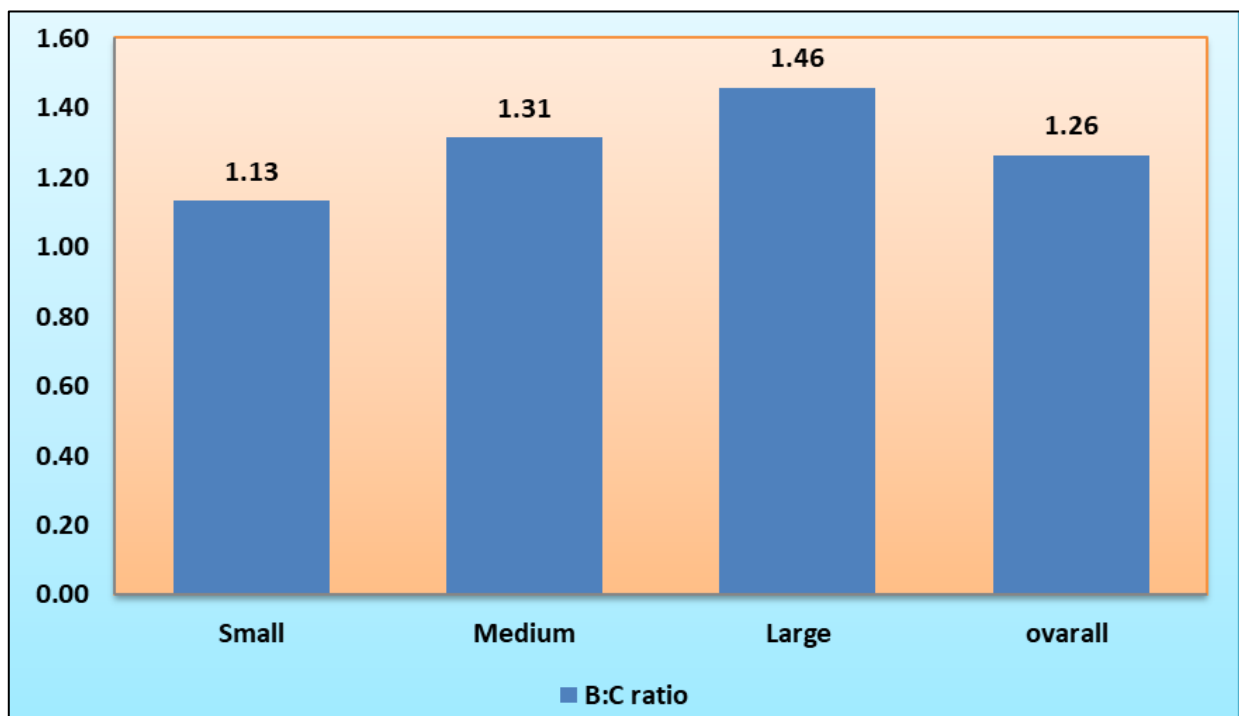


Fig 8: B:C ratio of groundnut cultivation.

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