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**Upasana Chandravanshi**  
M.Sc. Student, Department of  
Agricultural Economics, IGKV,  
Raipur, Chhattisgarh, India

**Dr. Sushila**  
Assistant Professor, Department  
of Agricultural Economics,  
College of Agriculture Patan,  
Durg, Chhattisgarh, India

**Dr. Dikeshwar Nishad**  
Assistant Professor, Department  
of Agricultural Statistics, Pt.  
S.K.S, COA&RS, Rajnandgaon,  
Chhattisgarh, India

**Deepak Patle**  
M.Sc. Student, Department of  
Agricultural Economics, IGKV,  
Raipur, Chhattisgarh, India

**Corresponding Author:**  
**Upasana Chandravanshi**  
M.Sc. Student, Department of  
Agricultural Economics, IGKV,  
Raipur, Chhattisgarh, India

## Compound growth rate, instability index and economic analysis of production of onion in Rajnandgaon district of Chhattisgarh

**Upasana Chandravanshi, Dr. Sushila, Dr. Dikeshwar Nishad and Deepak Patle**

### Abstract

The study is an attempt to examine “An Economic Analysis of Production of Onion in Rajnandgaon District of Chhattisgarh” with the help of some specific objective to examine the growth rate & instability in area, production and productivity of Onion in Rajnandgaon district as well as in Chhattisgarh State, to work out the cost and returns in Onion cultivation, etc.

The study is based on primary and secondary data. Primary data were collected from the selected onion growers through interview schedule and secondary data were collected from various published source from government offices. The average total operation area was observed to be 2.59 ha and the average cropping intensity was found to be 189.96 per cent. The study analyzed CGR and Instability of area, production and productivity of onion in Chhattisgarh and Rajnandgaon district, for the period 2006-07 to 2020-21 by using secondary data. Compound growth rates of area, production, and productivity in Chhattisgarh are 10.43 percent, 11.08 percent, and 0.58 percent, respectively and Rajnandgaon were found to be 4.66 percent, 7.48 percent, and 2.69 percent, respectively and instability index in Chhattisgarh area, production, and productivity were found to be 17.89 percent, 16.18 percent, and 5.62 percent, respectively and Rajnandgaon were found to be 31.43 percent, 43.32 percent, and 27.80 percent, respectively. The study revealed that, per hectare cost of cultivation at various farm size was observed as Rs. 54567.81/ha, Rs. 58707.80/ha, Rs. 61079.30/ha and Rs. 65499.10/ha for marginal, small, medium and large farmer's respectively. Per quintal cost of production of onion were Rs. 340.51, 360.72, and 359.58 respectively. Net profit cost for onion were Rs. 135328.40/ha, Rs. 134151/ha, Rs. 143238/ha and Rs. 150349/ha respectively. Benefit- cost Ratio of 1:2.48, 1:2.29, 1:2.35 and 1:2.30 on invest of one rupee, while input-output ratio of marginal, small, medium and large farmers were 1:3.48, 1: 3.29, 1:3.35 and 1:3.30 respectively.

**Keywords:** Onion, compound growth rate, instability index, cost of cultivation

### Introduction

Onion (*Allium cepa* L) is one of the important and popular condiments widely used in all households all the year around. Onion is one of the oldest crop cultivated worldwide, Onion is used almost daily in food preparation. It is not possible to make a fresh meal without onion. But the price of Onion varies very frequently from Rs. 20 to Rs. 100 per Kg within a year. It is commonly known as “Queen of the Kitchen” due to its highly valued flavor, aroma, and unique taste, & the medicinal properties of its flavor compounds India is a traditional exporter of Onion. There is a lot of demand of Indian Onion in the world, the country has exported 15, 78,016.59 MT of fresh onion to the world for the worth of Rs. 2,826.50crores / 378.49 USD Millions during the year (2020-21, APEDA). Due to India's position as the worlds second largest producer and exporter. Onion is a major item of agricultural exports, earning valuable foreign exchange to the country. Onion accounts about 67 per cent of total foreign exchange among fresh vegetables. In Chhattisgarh State monthly market arrivals price 4849.00 Tonnes and average wholesale prices of Onion 967.35 (Rs/Qtl.) for the month of June, 2020, May, 2020 (previous month) and June, 2019 (corresponding month of previous year) market arrivals price 3264.60 Tonnes and average wholesale prices 1264.89 (Rs/Qtl.). The arrivals were 51.60% less in June 2020 as compared to June 2019, but higher (8.42%) than May, 2020, indicating subdued demand this year due to COVID-19 pandemic. (Horticulture Statistics Division June-2020). The area under Onion cultivation in Chhattisgarh is 25,542 ha. With the production of 418,119 MT & Productivity is 16.36 MT/ha. While the area under Onion crop in Rajnandgaon district is 900 ha. With the production of 15030 MT & Productivity is 16.70 Mt/ha. During year, (2020-21).

**Methodology**

The present study pertains to Rajnandgaon district of Chhattisgarh. Data for this study were gathered from two blocks of Rajnandgaon district viz., Rajnandgaon and Khairagarh. These blocks were selected purposively according to area under onion cultivation. In all six villages, three villages from each block were selected randomly and from six villages, 80 onion farmers were selected on the basis of the actual area under onion. All the 80 onion farmers were categorized into Four different groups, i.e. Marginal (less than 1ha), small (1-2 ha), medium (2-4 ha) and large (more than 4 ha). Under these classes 32, 24, 15, and 9 farmers came to marginal, small, medium and large categories. The primary data were collected for the year 2020-21. Primary data were collected from the stratified sample respondents by conducting personal interview and pretested questionnaires schedule. Collected data were tabulated according to need and purpose of the study.

**Analytical tools compound growth rates**

To analyze the pattern of growth in area, production and productivity of major crops in study area, Compound Growth Rate (CGR) was used. The details of the formulae given as under:

Taking log on both sides

Where,

$$Y = A B^t$$

$$\log Y = \log A + t \log B$$

$$Y = \text{Area (ha)} / \text{Production (tones)} / \text{Productivity (tones)} \quad A = \text{Constant}$$

$$B = \text{Regression coefficient} \quad T = \text{Time in year}$$

$$\text{Compound growth rate} = (\text{Anti-log of } b-1)100$$

**Instability Index**

For estimating the instability in Onion Area, production and Productivity, Cuddy-Della Valle Instability index (CDVI) was used:

The Cuddy - Della Valle Index (1978) de-trends and shows the exact direction of the instability, which is as follows:

$$I_x = CV \sqrt{(1 - R^2)}$$

Where,

IX = Instability index

CV = Coefficient of variation (in percent)

R2= Coefficient of determination from a time- trend regression adjusted by the no. of degrees of freedom.

The ranges of CDVI are given as follows: Low instability = between 0 and 15.

Medium instability = greater than 15 and lower than 30.

High instability= greater than 30.

**Cost and returns**

For estimation of cost and returns of major crops given by the Commission of Agricultural Costs and Prices (CACP) was used and given below-

Cost A1= All actual expenses in cash and kind incurred in production.

$$\text{Cost A2} = \text{Cost A1} + \text{rent paid for leased-in land.}$$

$$\text{Cost B1} = \text{A2} + \text{interest on value of owned capital (excluding land).}$$

$$\text{Cost B2} = \text{B1} + \text{Rental value of owned land \& rent paid for leased land.}$$

$$\text{Cost C1} = \text{B1} + \text{Imputed value of family labour.}$$

$$\text{Cost C2} = \text{B2} + \text{Imputed value of family labour (human labour at market rate or statutory minimum wage rate whichever is higher).}$$

$$\text{Cost C3} = \text{C2} + \text{managerial cost of 10\% of cost C2.}$$

**Income measures**

$$1. \text{ Gross income} = \text{Net income} + \text{Gross cost}$$

$$2. \text{ Net income} = \text{Gross income} - \text{Gross cost}$$

$$3. \text{ Input - Output ratio} = \text{Gross income} / \text{Gross cost}$$

$$4. \text{ B-C ratio} = \text{Net returns} / \text{Total cost of Cultivation}$$

$$5. \text{ Family labour income} = \text{Gross Income} - \text{Cost B2}$$

$$6. \text{ Farm investment Income} = \text{Farm business income} - \text{Imputed value of the family labour}$$

$$\text{Cost of production (Rs./qt.)} = \text{Total Cost} / \text{Yield}$$

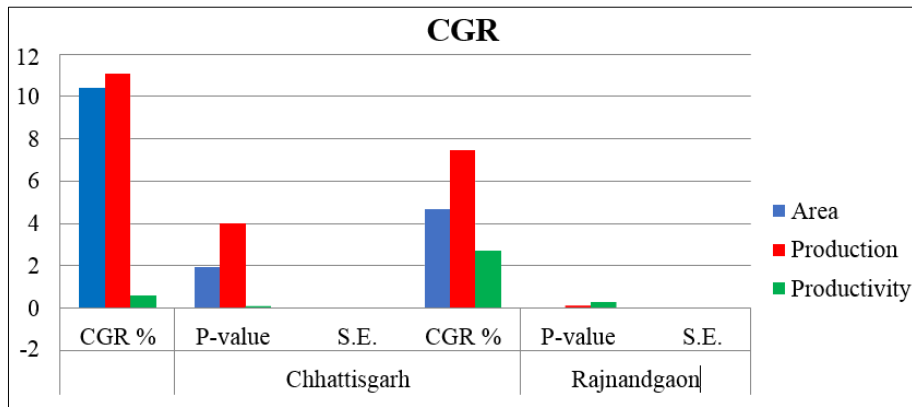
**Result and Discussions**

**Compound growth rate in area, production and productivity of onion**

Table.1. represent the compound growth rate of onion in Chhattisgarh state as well as Rajnandgaon district. The compound growth rate (CGR) in Chhattisgarh for the area (10.43%), production (11.08%), and productivity (0.58%) of onion were increasing non- significant at 95% confidence interval, while the compound growth rate (CGR) in Rajnandgaon district for the area (4.66%) of 5% level of significant & production (7.48%), and productivity (2.69%) of Onion were increasing non-significant at 95% confidence interval.

**Table 1:** Compound growth rate of area, production and productivity of Onion Crop in Rajnandgaon district and Chhattisgarh state

| S. No. | Particulars  | Items   | Area     | Production | Productivity |
|--------|--------------|---------|----------|------------|--------------|
| 1.     | Chhattisgarh | CGR%    | 10.43    | 11.08      | 0.58         |
|        |              | P-value | 1.9215   | 4.0164     | 0.0905       |
|        |              | S.E.    | (0.0099) | (0.0092)   | (0.0032)     |
| 2.     | Rajnandgaon  | CGR%    | 4.66     | 7.48       | 2.69         |
|        |              | P-value | 0.0540** | 0.1100     | 0.2809       |
|        |              | S.E.    | (0.0215) | (0.0420)   | (0.0236)     |



**Fig 1:** CGR of area, production and productivity in Rajnandgaon district and Chhattisgarh state

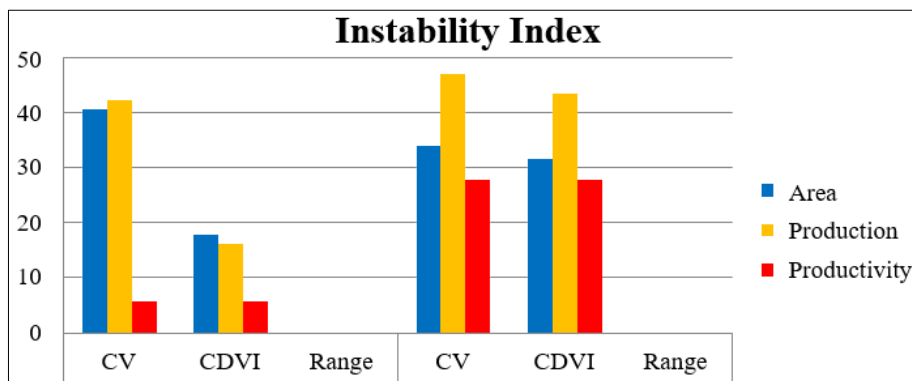
**Instability Index of area, production and productivity of Onion crops in Rajnandgaon district and Chhattisgarh state**

Instability was explain the irregular fluctuations in area, production and productivity during the study period. In Chhattisgarh Coefficient of Variation of onion area was found to be 40.64 per cent and Cuddy-Della Valle instability Index was 17.89 per cent. Coefficient of variation of onion production and productivity was 42.22 percent which was highest and 5.67 per cent respectively. Cuddy-Della Valle instability index for production and productivity was 16.18 per cent and 5.62 per cent respectively And Rajnandgaon district Coefficient of Variation of onion area was found to be 33.80 per cent and Cuddy- Della Valle instability Index was 31.43 per cent. Coefficient of variation of onion production and productivity was 46.90 percent which was highest and 27.85 per cent respectively. Cuddy- Della Valle instability index for production and productivity were 43.32 per cent and 27.80 per cent respectively. From the above results it can be concluded that, highest instability was observed in production

of onion followed by area and productivity was Medium instability observed. The data observed in instability index, with respect to Rajnandgaon district variation was much observed in case of area which is mainly due to volatile market price and lack of adequate storage and market infrastructure and Non availability of onion seed on time caused high instability in production through preventing the farmers in taking the optimal decision on allocation of area and raising farm productivity.

**Table 2:** Instability Index of area, production and productivity of Onion crop in Rajnandgaon district and Chhattisgarh state (2006-07 to 2020-21)

|              | Particulars | Area   | Production | Productivity |
|--------------|-------------|--------|------------|--------------|
| Chhattisgarh | CV          | 40.64  | 42.22      | 5.67         |
|              | CDVI        | 17.89  | 16.18      | 5.62         |
|              | Range       | Medium | Medium     | Low          |
| Rajnandgaon  | CV          | 33.80  | 46.90      | 27.85        |
|              | CDVI        | 31.43  | 43.32      | 27.80        |
|              | Range       | High   | High       | Medium       |



**Fig 2:** Instability Index of area, production and productivity in Rajnandgaon district and Chhattisgarh state

**Cost and returns of Onion  
Input use for Onion cultivation**

In agricultural production, inputs such as seeds, fertilizer, manures, plant protection chemicals, and water are transformed into grains. The two main cost categories involved in this manufacturing process are fixed costs, or overhead costs, and variable costs, or operating costs, or

labour costs. These labour costs vary depending on the volume of production and include both labour and material costs such as seed, fertilizer, manures, plant protection chemicals, bullock labour, human labour, and machine labour. Overhead costs include depreciation on machinery, rental values of land, and other expenses. inputs for agricultural production, including seeds, fertilizer, and manures so on.

**Table 3:** Inputs used for cultivation of Onion (Lit./Kg/ha) Inputs used for cultivation of onion

| S. No | Particulars                              | Farm size |       |        |       | Overall |
|-------|--|-----------|-------|--------|-------|---------|
|       |  | Marginal  | Small | Medium | Large |         |
| 1     | Seed (kg/ha)                             | 8.25      | 8.50  | 9.16   | 9.50  | 8.91    |
| 2     | <b>Manure (ton/ha)</b>                   |           |       |        |       |         |
|       | FYM                                      | 8         | 9.6   | 10.7   | 12.6  | 10.22   |
|       | Compost                                  | 0         | 4.5   | 6.5    | 8.5   | 4.87    |
| 3     | <b>Fertilizer (kg/ha)</b>                |           |       |        |       |         |
| i)    | Urea                                     | 20        | 22.5  | 23.16  | 24.22 | 22.47   |
| ii)   | DAP                                      | 10        | 12.6  | 13.6   | 15.2  | 12.85   |
| iii)  | MOP                                      | 15.74     | 15.95 | 15.74  | 18    | 16.35   |
| iv)   | Ammonium sulphate                        | 10.6      | 12.7  | 12.20  | 15.06 | 12.64   |
| v)    | Bio-fertilizer                           | 0         | 0     | 0      | 0     | 0       |
| 4     | <b>Herbicide</b>                         |           |       |        |       |         |
| i)    | 2-4D                                     | 1         | 1     | 1      | 1     | 1       |
| ii)   | Other                                    | 0.65      | 0.63  | 0.75   | 0.80  | 0.77    |
| 5     | <b>Insecticide/ Pesticide (lit/farm)</b> |           |       |        |       |         |
| i)    | Thiamethoxam (Spike FS+)                 | 0.10      | 0.10  | 0.10   | 0.10  | 0.10    |
| ii)   | Imidachloropid                           | 0.22      | 0.22  | 0.22   | 0.22  | 0.22    |
| iii)  | Acephate                                 | 0.15      | 0.15  | 0.15   | 0.15  | 0.15    |
| v)    | Other                                    | 0.25      | 0.25  | 0.25   | 0.25  | 0.25    |
| B.    | Human labour used (day/ha)               | 79        | 80    | 86     | 96    | 85.25   |
| i)    | Family human labour                      | 50.25     | 38.33 | 29.69  | 23.99 | 35.56   |
| ii)   | Hired human labour                       | 28.75     | 41.67 | 56.31  | 72.01 | 49.68   |
| C.    | Machine power (hrs./ha)                  | 6.17      | 8.86  | 9.02   | 9.52  | 8.39    |

**Table 4:** Human labour used for cultivation of Onion (Day/ha) Human labour used for cultivation of Onion

| S. No. | Particulars              | Marginal |    | Small |    | Medium |    | Large |    | Overall |      |
|--------|--------------------------|----------|----|-------|----|--------|----|-------|----|---------|------|
|        |                          | M        | F  | M     | F  | M      | F  | M     | F  | M       | F    |
|        | Family labour            |          |    |       |    |        |    |       |    |         |      |
| 1      | Field preparation        | 4        | -  | 6     | -  | 6      | -  | 7     | -  | 5.75    | -    |
| 2      | Sowing/<br>Transplanting | 7        | 9  | 7     | 11 | 8      | 12 | 8     | 13 | 8       | 11.5 |
| 3      | Manure and fertilizers   | 2        | 4  | 2     | 5  | 3      | 6  | 5     | 7  | 3       | 5.50 |
| 4      | Plant protection         | 3        | -  | 3     | -  | 3      | -  | 3     | -  | 2       | -    |
| 5      | Interculture             | -        | -  | -     | -  | -      | -  | -     | -  | -       | -    |
| 6      | Irrigation               | 2        | -  | 2     | -  | 2      | -  | 2     | -  | 2       | -    |
| 7      | Weeding                  | 3        | 7  | 3     | 8  | 3      | 8  | 4     | 9  | 3.25    | 8    |
| 8      | Harvesting               | 12       | 26 | 5     | 28 | 1      | 25 | 1     | 27 | 9.5     | 26.5 |
|        |                          |          |    |       |    | 0      |    | 1     |    |         |      |
|        | Total                    | 28       | 46 | 2     | 52 | 3      | 51 | 4     | 56 | 33.2    | 52   |
|        |                          |          |    | 8     |    | 5      |    | 0     |    | 5       |      |

**Note:** The wage rate of human labour is 150 Rs. Per day. (M- Male, F- Female)

### Cost of cultivation

According to the table 5, the total cost of cultivation in Onion was Rs. 59968.80/ha. The Variable Cost and Fixed Cost were determined to be Rs. 45992.40/ha and Rs. 13976.40/ha, respectively, representing 76.69 percent and 23.30 percent of the total cost of cultivation. It was also found that the total cost of cultivation in Onion for marginal, small, medium and large farmers was Rs. 54567.81 /ha, Rs. 58707.80 /ha, Rs.

61079.30/ha and Rs. 65499.10

/ha, respectively. For marginal, small and medium and large farmers the variable costs account for 74.88 percent, 76.23 percent, 77.00 percent and 78.31 percent respectively. Marginal, small, medium and large farmers, are, fixed cost spend 25.11 percent, 23.76 percent, 22.99 percent and 21.68 percent on overhead costs respectively.

**Table 5:** Cost of cultivation in Onion (Rs./ha.)

| S. No. | Particulars                | Farm Size Group |                 |                 |                 | Overall         |
|--------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|        |                            | Marginal        | Small           | Medium          | Large           |                 |
| A.     | <b>Material input Cost</b> |                 |                 |                 |                 |                 |
| 1      | Seed                       | 6481.30 (11.87) | 6499.80 (11.07) | 6661.90 (10.90) | 6669.00 (10.18) | 6583.07 (10.97) |
| 2      | Manure FYM/Compost         | 5275.11 (9.66)  | 5562.98 (9.47)  | 5940.25 (9.72)  | 6522.75 (9.95)  | 5825.27 (9.71)  |
| 3      | <b>Fertilizer</b>          |                 |                 |                 |                 |                 |
|        | Urea                       | 611.25 (1.12)   | 596.70 (1.01)   | 691.50 (1.13)   | 705.50 (1.07)   | 651.23 (1.08)   |
|        | DAP                        | 3208.75 (5.88)  | 3240.62 (5.51)  | 3314.14 (5.42)  | 3355.03 (5.12)  | 3279.64 (5.46)  |
|        | MOP                        | 2207.50 (4.04)  | 2141.25 (3.64)  | 2263.35 (3.70)  | 2349.06 (3.58)  | 2240.29 (3.73)  |
|        | Ammonium sulphate          | 1193.75 (2.18)  | 1224.37 (2.08)  | 1128.35 (1.84)  | 1250.63 (1.90)  | 1199.28 (1.99)  |
|        | Total                      | 7221.25 (13.23) | 7202.94 (12.26) | 7397.34 (12.11) | 7660.22 (11.69) | 7370.44 (12.29) |
| 4      | plant protection chemicals | 3360.25 (6.15)  | 3425.20 (5.83)  | 3675.34 (6.01)  | 3890.33 (5.93)  | 3587.78 (5.98)  |
| 5      | Irrigation Charge          | 565.03 (1.03)   | 584.12 (0.99)   | 695.32 (1.13)   | 700.25 (1.06)   | 636.18 (1.06)   |

|    |  |                  |                  |                   |                  |                  |
|----|--|------------------|------------------|-------------------|------------------|------------------|
| B. | Human Labour (day/Rs./ha)                          | 11100.00 (20.34) | 12000.00 (20.44) | 12900.00 ((21.12) | 15450.00 (23.58) | 12862.50 (21.44) |
| 1  | Family human labour                                | 6937.50 (12.71)  | 5749.50 (9.79)   | 4453.50 (7.29)    | 3598.50 (5.49)   | 5184.75 (8.64)   |
| 2  | Hired human labour                                 | 4162.50 (7.62)   | 6250.50 (10.64)  | 8446.50 (13.82)   | 11851.50 (18.09) | 7677.75 (12.80)  |
| C. | <b>Machine power used</b>                          |                  |                  |                   |                  |                  |
|    | Machine power used Charge (Rs./ha)                 | 5556.36 (10.18)  | 7980.25 (13.59)  | 8125.36 (13.30)   | 8568.38 (13.08)  | 7557.59 (12.60)  |
| D. | Interest on Working Capital (IOWC) @ 4%            | 1304.87 (2.39)   | 1500.23 (2.55)   | 1637.68 (2.68)    | 1834.50 (2.80)   | 1569.52 (2.61)   |
|    | Total Variable costs                               | 40864.17 (74.88) | 44755.50 (76.23) | 47033.20 (77.00)  | 51295.40 (78.31) | 45992.40 (76.69) |
| 2. | <b>Fixed Costs</b>                                 |                  |                  |                   |                  |                  |
| 1  | Depreciation                                       | 116.22 (0.21)    | 226.14 (0.38)    | 272.65 (0.44)     | 349.25 (0.53)    | 241.06 (0.40)    |
| 2  | Land Revenue                                       | 12 (0.00)        | 12 (0.00)        | 12 (0.00)         | 12 (0.00)        | 12 (0.00)        |
| 3  | Rental Value of Owned Land for one cropping period | 12560.33 (23.01) | 12680.70 (21.59) | 12721.00 (20.82)  | 12790.30 (19.52) | 12688.10 (21.15) |
| 4  | Interest on Fixed Capital (IOFC)@ 8%               | 1015.08 (1.86)   | 1033.50 (1.76)   | 1040.45 (1.70)    | 1052.13 (1.60)   | 1035.29 (1.72)   |
| 5  | Total Fixed Cost                                   | 13703.63 (25.11) | 13952.30 (23.76) | 14046.10 (22.99)  | 14203.70 (21.68) | 13976.40 (23.30) |
|    | Total Operational Cost                             | 54567.81 (100)   | 58707.80 (100)   | 61079.30 (100)    | 65499.10 (100)   | 59968.80 (100)   |

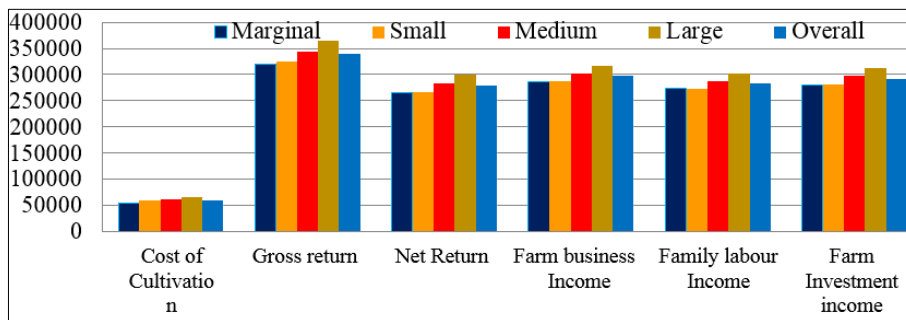
**Yield and Income from Onion Cultivation**

The Onion average gross profits from Onion cultivation at per hectare were computed using the market price of Rs.1185 per quintal and total gross return from Onion was found to be Rs.200730/ha, The total farm business earnings, family labour

income, and farm investment income were estimated to be Rs. 141656/ha, Rs. 127933/ha, and Rs. 136471/ha. The table 6, below shows the productivity, cost of cultivation and cost of production of Onion for different types of farmers.

**Table 6:** Yield and Income from Onion Cultivation (Qtl/Rs/ha)

| Yield and Income       | Marginal | Small    | Medium   | Large    | Overall  |
|------------------------|----------|----------|----------|----------|----------|
| Cost of cultivation    | 54567.81 | 58707.80 | 61079.30 | 65499.10 | 59968.80 |
| Yield                  | 160.25   | 162.75   | 172.42   | 182.15   | 169.39   |
| Price                  | 1185     | 1185     | 1185     | 1185     | 1185     |
| Gross return           | 189896   | 192859   | 204318   | 215848   | 200730   |
| Net Return             | 135328   | 134151   | 143238   | 150349   | 140761   |
| Farm business income   | 134819   | 134598   | 144238   | 152990   | 141656   |
| Family labour income   | 121243   | 120884   | 130477   | 139148   | 127933   |
| Farm investment income | 127881   | 128849   | 139784   | 149392   | 136471   |
| Cost of production     | 340.51   | 360.72   | 354.24   | 359.58   | 354.02   |
| B.C. ratio             | 2.48     | 2.29     | 2.35     | 2.30     | 2.35     |
| Input - Output ratio   | 3.48     | 3.29     | 3.35     | 3.30     | 3.35     |



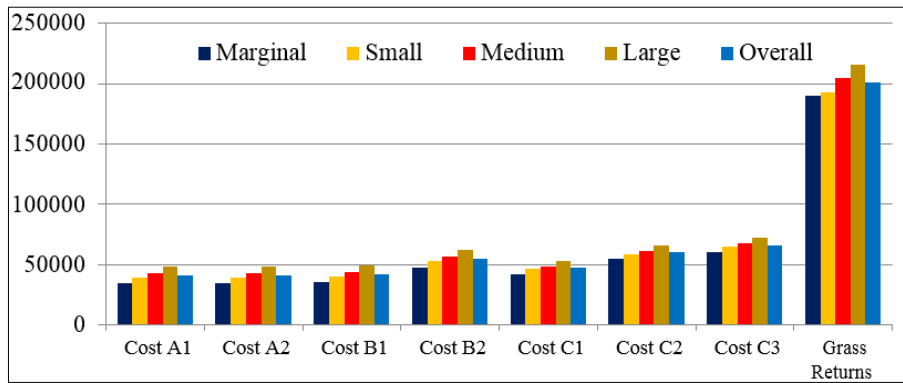
**Fig 3:** Graph depicting Yield and income of Onion in the study area of different farmers

**Break-up of total cost obtained over different cost Concepts: (Rs./ha)**

Table no. 7, express the results of an evaluation of the various cost concepts used in Onion economic analysis. The overall cost for cost A1 and A2 is Rs. 41060.66/ha, as shown in the table. Cost B1 and B2 were Rs. 42095.95/ha and Rs. 54784.02/ha respectively. Cost C1, C2 and C3 costs per hectare are anticipated to be Rs. 47280.70/ha, Rs. 59968.80/ha and 65965.65/ha respectively. Onion costs per hectare on various farms revealed erratic patterns.

**Table 7:** Break-up of total cost obtained over different cost Concepts (Rs/ha)

| Items   | Marginal | Small    | Medium   | Large    | Overall  |
|---------|----------|----------|----------|----------|----------|
| Cost A1 | 34054.89 | 39244.16 | 42864.34 | 48058.17 | 41060.66 |
| Cost A2 | 34054.89 | 39244.16 | 42864.34 | 48058.17 | 41060.66 |
| Cost B1 | 35069.97 | 40277.66 | 43904.79 | 49110.29 | 42095.95 |
| Cost B2 | 47630.30 | 52958.31 | 56625.78 | 61900.62 | 54784.02 |
| Cost C1 | 42007.47 | 46027.16 | 48358.29 | 52708.79 | 47280.70 |
| Cost C2 | 54567.80 | 58707.80 | 61079.30 | 65499.10 | 59968.80 |
| Cost C3 | 60024.58 | 64578.59 | 67187.20 | 72049.03 | 65965.65 |



**Fig 4:** Break-up of total cost obtained over different cost Concepts

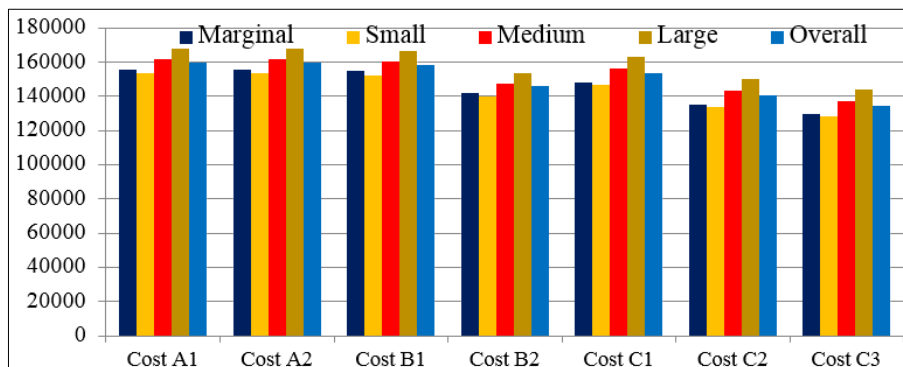
**Returns over different costs on Sample farms:**

The table below 8, shows that income over Cost A1 & Cost A2, B1, B2, C1, C2 and C3 at overall level were 159669.33,

158634.04, 145945.97, 153449.29, 140761.22, and 134764.34 respectively.

**Table 8:** Returns over Onion Cultivation (Rs/ha)

| Items               | Marginal  | Small     | Medium    | Large     | Overall   |
|---------------------|-----------|-----------|-----------|-----------|-----------|
| Return over Cost A1 | 155841.10 | 153614.83 | 161453.65 | 167789.82 | 159669.33 |
| Return over Cost A2 | 155841.11 | 153614.84 | 161453.66 | 167789.83 | 159669.34 |
| Return over Cost B1 | 154826.02 | 152581.33 | 160413.20 | 166737.70 | 158634.04 |
| Return over Cost B2 | 142265.69 | 139900.68 | 147692.21 | 153947.37 | 145945.97 |
| Return over Cost C1 | 147888.52 | 146831.83 | 155959.70 | 163139.26 | 153449.29 |
| Return over Cost C2 | 135328.19 | 134151.18 | 143238.71 | 150348.87 | 140761.22 |
| Return over Cost C3 | 129871.41 | 128280.40 | 137130.79 | 143798.96 | 134764.34 |



**Fig 5:** Return over different cost of Onion

**Conclusion**

The current research study on the economic analysis of onion production in the study area was carried out to ascertain the overall total cost per hectare of onion cultivation, which was discovered to be 59968.80Rs/ha, the overall cost of production, which was discovered to be 354.02Rs/qt, and the yield of onion, which was found to be 169.39qt/ha. The overall input- output ratio was 3.35 and the B-C ratio was 2.35, and there was statistically positive growth in the area, production, and productivity of onions. However, there was a high degree of variation in Rajnandgaon district's area and production, which was only caused by the use of different varieties for cultivation, the volatility of the market price, and a lack of adequate storage facilities, among other factors.

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