A study on growth of major Cropsand socio-economic status of the farmers in Janjigir-Champa district of Chhattisgarh

Meenakshi Chandra, Sumit B Wasnik, Sneha Pandey and Mamta Patel

Abstract
An attempt has been made in this study with the specific objective to determine the economic analysis of growth in area, production and productivity of major crops in in Janjigir-Champa district of Chhattisgarh. The major crop under this study was paddy, wheat and mustard. For the study a sample of hundred and fifty farmers from different categories of land holdings were selected randomly from five villages namely Chikhalraunda, Malni, Bhothia, Dngia And Salni. The primary data was collected by interviewing the crop growers of the sampled household with the help of well prepared questionnaire for growth rate analysis for the year 2017-18. Secondary data for area, production and productivity was collected from Directorate, Land Record, Raipur, Directorate of Economics and Statistics. Exponential method is used to analyse the growth rate. Per farm total cultivated area at marginal, small, medium and large farms is observed about 1.99 hectares, 2.63 hectares, 2.97 hectares 4.6 hectares respectively along with 3.04 hectares as an overall average. The findings of this study revealed that the area covered under different crops in kharif is more than that from rabi in the study area which is observed as an overall area of 53.60 per cent in kharif and 46.39 per cent area in rabi. The results on compound growth rate of paddy, wheat and mustard was obtained in detail under the study.

Keywords: Cropsand socio-economic, Janjigir-Champa, farmers

Introduction
Agriculture is considered as the principal occupation of the human population in Chhattisgarh state. Chhattisgarh State is also known for the Rice bowl of India and produces 19116 varieties of rice. As per the estimate done by the government, net sown area of the state is about 4.828 million hectares and the gross sown area is about 5.788 million hectares. About 80 per cent of the population of the state is the rural one, and the main livelihood of the villagers is agriculture and agriculture based small industries.

Rice is the widely consumed staple cereal grain for a large part of the human population in the world and belongs to the grass species Oryza sativa (Asian rice) or Oryza glaberrima (African rice). There are three different types of rice namely japonica, javanica, and indica which have specific characteristics. Wheat is the most widely grown seed and is considered as staple cereal food grain around the world belonging to species Triticum. It is used to prepare chapattis, bread, pasta, biscuits, noodles, semolina, etc. and also to prepare ethanol, beer, wheat based raw material for cosmetics, polymers, adhesives, resins etc. In Chhattisgarh, mustard is being grown in an area of about 49.17 thousand hectares, with average production around 21.82 thousand tons annually. Mustard plant belongs to family Brassicaceae. Rapeseed (Brassica campestris) commonly called is Sarson or Toria is herbaceous annual plant shorter than mustard between 45-150 cm whereas the common name of Mustard (Brassica juncea) is rai. Apart from the several domestic uses, recent researches have studied several mustard varieties with high oil contents which is used for the production of biodiesel, a renewable liquid fuel, similar to diesel fuel. The oil content of these seeds is 25-45% which is used as a cooking medium, preservative for pickles, lubricants, etc.

Globally, European Union is the leading producer of mustard seed with contribution of 36 percent followed by China, Canada and India with contributions of 22 per cent, 24 per cent and 13 per cent respectively in the world.

Materials and Methods
Sampling procedure
By taking the Triennium Ending (TE) averages of area, production as well as productivity of major crops grown in Janjigir-Champa, top three major crops viz, paddy, wheat and mustard are selected.
The district consists of 9 blocks and 10 tehsils, out of these 9 blocks, Jaijaipurblock constitutes about 12.84 per cent area of the total area under paddy crop which is highest among the areas of other blocks under paddy, so this block is selected purposively. The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

Jaijaipur block consists of 72 villages out of which Chikhalraunda, Malni, Bhothia, Dongia, Salni are selected for the study purpose. Primary data is collected by using separate specifically designed questionnaires and having direct contact to the farmers. It includes the basic questions regarding social groups of the sampled households along with their land holdings. A proportionate number of respondents are selected from each village and from each category to make a sample of 150. About 38.66 per cent of respondents are under marginal category, 30.66 per cent under small, 26 per cent under medium and 4.66 per cent under large category.

Table 1: Number of households under different categories in Jaijaipur block

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Category</th>
<th>Number of households</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Marginal (Below 1.0 ha.)</td>
<td>58 (38.66)</td>
</tr>
<tr>
<td>2.</td>
<td>Small (1.0-2.0 ha.)</td>
<td>46(30.66)</td>
</tr>
<tr>
<td>3.</td>
<td>Medium (2.0-4.0 ha.)</td>
<td>39(26)</td>
</tr>
<tr>
<td>4.</td>
<td>Large (Above 4.0 ha.)</td>
<td>7(4.66)</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>150(100)</td>
</tr>
</tbody>
</table>

The secondary data on study area is collected from the office of Deputy Director of Agriculture of Janjig-Champa district and Commissioner of Land Record and Settlement, Chhattisgarh which includes information about demography and the year wise agricultural statistics of the district.

Analytical tool

The simple average and percentage statistical tools will be applied to represent the results of study to examine the pattern of growth in area, production as well as productivity of major crops in study area, Compound Growth Rate (CGR) will be computed. The details of the formulae are given as under:

**Compound Growth Rate (CGR)**

\[ Y = AB^t \]

Taking logarithms on both sides

\[ \log Y = \log A + t \log B \]

Assuming,

\[ \log Y = y \]
\[ \log A = a \]
\[ \log B = b \]

We get, \( y = a + bt \)

Where

\( t = 1, 2, 3 \ldots \ldots n \)
\( y = \text{area/production/productivity of crops.} \)

After regression between \( y \) and \( t \)

We have value for \( a \) and \( b \)

Where

\( a = \text{Constant} \)
\( b = \text{regression coefficient} \)

As, \( b = 1 + r \)

Hence,

\[ r = b - 1 \]

Therefore,

\[ r = (\text{Anti} – \log b - 1) \times 100 \]

Where,

\( r = \text{Compound growth rate} \)

Results and Discussion

General characteristics of sampled households

The demographic characteristics of the sampled farmers in the study area shows that out of the total selected households, 38 per cent comes under marginal category, 30.66 per cent under small category, 26 per cent under medium and 4.66 per cent under large farms respectively.

The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

Jaijaipur block constitutes about 12.84 per cent area of the total area under paddy crop which is highest among the areas of other blocks under paddy, so this block is selected purposively. The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

The crop area under paddy crop shows an increasing trend in the year 2007-08 to 834225 metric tons in the year 2016-17 whereas production shows an increasing trend of about 423290 metric tons in the year 2007-08 to 50.90 per cent area respectively. Tube well is another source of irrigation in the study area which accounts for about 76.70 per cent of the area covered by marginal, small, medium and large farms respectively. About 70.85 per cent and 40.68 per cent of the land at sampled farm is leased out by the marginal and small farmers respectively whereas 17.50 and 33.47 per cent of the land is leased out by the marginal and large farmers respectively.

The secondary data on study area is collected from the office of Deputy Director of Agriculture of Janjig-Champa district and Commissioner of Land Record and Settlement, Chhattisgarh which includes information about demography and the year wise agricultural statistics of the district.

Analytical tool

The simple average and percentage statistical tools will be applied to represent the results of study to examine the pattern of growth in area, production as well as productivity of major crops in study area, Compound Growth Rate (CGR) will be computed. The details of the formulae are given as under:

**Compound Growth Rate (CGR)**

\[ Y = AB^t \]

Taking logarithms on both sides

\[ \log Y = \log A + t \log B \]

Assuming,

\[ \log Y = y \]
\[ \log A = a \]
\[ \log B = b \]

We get, \( y = a + bt \)

Where

\( t = 1, 2, 3 \ldots \ldots n \)
\( y = \text{area/production/productivity of crops.} \)

After regression between \( y \) and \( t \)

We have value for \( a \) and \( b \)

Where

\( a = \text{Constant} \)
\( b = \text{regression coefficient} \)

As, \( b = 1 + r \)

Hence,

\[ r = b - 1 \]

Therefore,

\[ r = (\text{Anti} – \log b - 1) \times 100 \]

Where,

\( r = \text{Compound growth rate} \)

Results and Discussion

General characteristics of sampled households

The demographic characteristics of the sampled farmers in the study area shows that out of the total selected households, 38 per cent comes under marginal category, 30.66 per cent under small category, 26 per cent under medium and 4.66 per cent under large farms respectively.

The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

Jaijaipur block constitutes about 12.84 per cent area of the total area under paddy crop which is highest among the areas of other blocks under paddy, so this block is selected purposively. The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

The secondary data on study area is collected from the office of Deputy Director of Agriculture of Janjig-Champa district and Commissioner of Land Record and Settlement, Chhattisgarh which includes information about demography and the year wise agricultural statistics of the district.

Analytical tool

The simple average and percentage statistical tools will be applied to represent the results of study to examine the pattern of growth in area, production as well as productivity of major crops in study area, Compound Growth Rate (CGR) will be computed. The details of the formulae are given as under:

**Compound Growth Rate (CGR)**

\[ Y = AB^t \]

Taking logarithms on both sides

\[ \log Y = \log A + t \log B \]

Assuming,

\[ \log Y = y \]
\[ \log A = a \]
\[ \log B = b \]

We get, \( y = a + bt \)

Where

\( t = 1, 2, 3 \ldots \ldots n \)
\( y = \text{area/production/productivity of crops.} \)

After regression between \( y \) and \( t \)

We have value for \( a \) and \( b \)

Where

\( a = \text{Constant} \)
\( b = \text{regression coefficient} \)

As, \( b = 1 + r \)

Hence,

\[ r = b - 1 \]

Therefore,

\[ r = (\text{Anti} – \log b - 1) \times 100 \]

Where,

\( r = \text{Compound growth rate} \)

Results and Discussion

General characteristics of sampled households

The demographic characteristics of the sampled farmers in the study area shows that out of the total selected households, 38 per cent comes under marginal category, 30.66 per cent under small category, 26 per cent under medium and 4.66 per cent under large farms respectively.

The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

Jaijaipur block constitutes about 12.84 per cent area of the total area under paddy crop which is highest among the areas of other blocks under paddy, so this block is selected purposively. The area under wheat and mustard in the selected block constitutes about 12.29 per cent and 9.26 per cent area of the total area under wheat and mustard in the district respectively.

The secondary data on study area is collected from the office of Deputy Director of Agriculture of Janjig-Champa district and Commissioner of Land Record and Settlement, Chhattisgarh which includes information about demography and the year wise agricultural statistics of the district.

Analytical tool

The simple average and percentage statistical tools will be applied to represent the results of study to examine the pattern of growth in area, production as well as productivity of major crops in study area, Compound Growth Rate (CGR) will be computed. The details of the formulae are given as under:

**Compound Growth Rate (CGR)**

\[ Y = AB^t \]

Taking logarithms on both sides

\[ \log Y = \log A + t \log B \]

Assuming,

\[ \log Y = y \]
\[ \log A = a \]
\[ \log B = b \]

We get, \( y = a + bt \)

Where

\( t = 1, 2, 3 \ldots \ldots n \)
\( y = \text{area/production/productivity of crops.} \)

After regression between \( y \) and \( t \)

We have value for \( a \) and \( b \)

Where

\( a = \text{Constant} \)
\( b = \text{regression coefficient} \)
Similarly, the area, production and productivity of wheat and mustard respectively. It is observed from the table that area under both the crops decreased in the year 2016-17 than the year 2007-08 i.e. to 1765 ha. from 2780 ha. in case of wheat whereas to 909 ha. from 1600 ha. in case of mustard. The production of wheat in the year 2007-08 was 3660 metric tons which came down to 3334 metric tons in year 2016-17 while the production of mustard also decreased from 610 metric tons to 402 metric tons in the respective years.

Table 2: Area, production and productivity of paddy, wheat and mustard in Janjigar-Champa district (2007-08 to 2016-17)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Year</th>
<th>Area (ha.)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
<th>Area (ha.)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
<th>Area (ha.)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007-08</td>
<td>254050</td>
<td>423290</td>
<td>1666.16</td>
<td>2780</td>
<td>3660</td>
<td>1316.54</td>
<td>1600</td>
<td>610</td>
<td>381.25</td>
</tr>
<tr>
<td>2</td>
<td>2008-09</td>
<td>249780</td>
<td>547910</td>
<td>2193.57</td>
<td>2480</td>
<td>3030</td>
<td>1221.77</td>
<td>1330</td>
<td>460</td>
<td>345.86</td>
</tr>
<tr>
<td>3</td>
<td>2009-10</td>
<td>250200</td>
<td>633420</td>
<td>2531.65</td>
<td>2810</td>
<td>4200</td>
<td>1494.66</td>
<td>1570</td>
<td>680</td>
<td>433.1</td>
</tr>
<tr>
<td>4</td>
<td>2010-11</td>
<td>248550</td>
<td>654500</td>
<td>2633.27</td>
<td>2710</td>
<td>4030</td>
<td>1487.08</td>
<td>1480</td>
<td>530</td>
<td>358.1</td>
</tr>
<tr>
<td>5</td>
<td>2011-12</td>
<td>248730</td>
<td>710930</td>
<td>2858.23</td>
<td>2600</td>
<td>4200</td>
<td>1615.38</td>
<td>1680</td>
<td>710</td>
<td>422.61</td>
</tr>
<tr>
<td>6</td>
<td>2012-13</td>
<td>249147</td>
<td>761543</td>
<td>3056.6</td>
<td>2210</td>
<td>3610</td>
<td>1633.48</td>
<td>1680</td>
<td>500</td>
<td>297.61</td>
</tr>
<tr>
<td>7</td>
<td>2013-14</td>
<td>257816</td>
<td>798017</td>
<td>3095.29</td>
<td>2135</td>
<td>3840</td>
<td>1798.59</td>
<td>1050</td>
<td>590</td>
<td>561.9</td>
</tr>
<tr>
<td>8</td>
<td>2014-15</td>
<td>253667</td>
<td>802349</td>
<td>3163</td>
<td>2074</td>
<td>3540</td>
<td>1706.84</td>
<td>1169</td>
<td>516</td>
<td>441.4</td>
</tr>
<tr>
<td>9</td>
<td>2015-16</td>
<td>253832</td>
<td>716366</td>
<td>2822.2</td>
<td>1826</td>
<td>3349</td>
<td>1834.06</td>
<td>1185</td>
<td>665</td>
<td>561.18</td>
</tr>
<tr>
<td>10</td>
<td>2016-17</td>
<td>254371</td>
<td>834223</td>
<td>3279.55</td>
<td>1765</td>
<td>3334</td>
<td>1888.95</td>
<td>909</td>
<td>402</td>
<td>442.24</td>
</tr>
</tbody>
</table>


Table 3: Area, production and productivity of paddy, wheat and mustard in Chhattisgarh (2007-08 to 2016-17).

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>Year</th>
<th>Area (ha.)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
<th>Area (ha)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
<th>Area (ha.)</th>
<th>Production (metric tons)</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2007-08</td>
<td>3788210</td>
<td>4506390</td>
<td>1189.58</td>
<td>95040</td>
<td>104560</td>
<td>1100.16</td>
<td>51390</td>
<td>20660</td>
<td>402.02</td>
</tr>
<tr>
<td>2</td>
<td>2008-09</td>
<td>3752340</td>
<td>4229820</td>
<td>1127.24</td>
<td>94850</td>
<td>97410</td>
<td>1026.98</td>
<td>52020</td>
<td>19730</td>
<td>379.27</td>
</tr>
<tr>
<td>3</td>
<td>2009-10</td>
<td>3787730</td>
<td>6159020</td>
<td>1626.04</td>
<td>109190</td>
<td>118930</td>
<td>1089.2</td>
<td>53380</td>
<td>21690</td>
<td>406.36</td>
</tr>
<tr>
<td>4</td>
<td>2010-11</td>
<td>3793020</td>
<td>6028300</td>
<td>1589.31</td>
<td>103710</td>
<td>121760</td>
<td>1174.04</td>
<td>50270</td>
<td>20790</td>
<td>413.56</td>
</tr>
<tr>
<td>5</td>
<td>2011-12</td>
<td>3810100</td>
<td>6176360</td>
<td>1762.75</td>
<td>104830</td>
<td>135130</td>
<td>1289.03</td>
<td>49170</td>
<td>21820</td>
<td>443.76</td>
</tr>
<tr>
<td>6</td>
<td>2012-13</td>
<td>3871004</td>
<td>6962115</td>
<td>1798.52</td>
<td>102230</td>
<td>143230</td>
<td>1401.05</td>
<td>49170</td>
<td>23870</td>
<td>485.45</td>
</tr>
<tr>
<td>7</td>
<td>2013-14</td>
<td>3987721</td>
<td>6725746</td>
<td>1686.61</td>
<td>105033</td>
<td>140750</td>
<td>1340.05</td>
<td>47540</td>
<td>26990</td>
<td>567.73</td>
</tr>
<tr>
<td>8</td>
<td>2014-15</td>
<td>4035700</td>
<td>7977746</td>
<td>1977.79</td>
<td>103195</td>
<td>153321</td>
<td>1485.74</td>
<td>46564</td>
<td>24586</td>
<td>528</td>
</tr>
<tr>
<td>9</td>
<td>2015-16</td>
<td>3959746</td>
<td>5154328</td>
<td>1301.68</td>
<td>105785</td>
<td>142529</td>
<td>1345.45</td>
<td>46280</td>
<td>25963</td>
<td>560.99</td>
</tr>
<tr>
<td>10</td>
<td>2016-17</td>
<td>4052587</td>
<td>8793273</td>
<td>2169.79</td>
<td>102114</td>
<td>151078</td>
<td>1479.5</td>
<td>42918</td>
<td>18433</td>
<td>429.49</td>
</tr>
</tbody>
</table>


Compound growth in area, production and productivity of major crops in Chhattisgarh state and Janjigar-Champa district

It is clear from table 4 that the compound growth rate of production and productivity of paddy crop in Janjigar-Champa district in last ten years is highly significant than area which is estimated as 6.13 per cent and 5.94 per cent respectively. In Chhattisgarh, area is significant under paddy crop. In case of wheat crop the compound growth rate of production and productivity in Chhattisgarh state is significant whereas area under mustard in both Chhattisgarh and the selected district is significant which is computed as -1.97 and -4.96 respectively.

Table 4: Compound growth rates of area, production and productivity of major crops in Janjigar-Champa district and Chhattisgarh state. (2007-08 to 2016-17).

<table>
<thead>
<tr>
<th>Crops</th>
<th>Janjigar-Champa</th>
<th>Chhattisgarh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area</td>
<td>Production</td>
</tr>
<tr>
<td>Paddy</td>
<td>0.18</td>
<td>6.13**</td>
</tr>
<tr>
<td>Wheat</td>
<td>-5.09**</td>
<td>-0.78</td>
</tr>
<tr>
<td>Mustard</td>
<td>-4.96**</td>
<td>-1.55</td>
</tr>
</tbody>
</table>

(** Significant at 1% level and * Significant at 5% level).
Fig 1: Showing CGR of area, production and productivity of paddy, wheat and mustard in Janjgir-Champa district and Chhattisgarh state

Conclusions
The education level of the sampled population up to higher secondary school. Agriculture is the main occupation of the sampled farmers. The per farm total cultivated area at marginal, small, medium and large farms is observed about 3.04ha as an overall average. Canal is the major source of irrigation followed by tube well. The area covered under different crops in kharif is more than that from rabi in the study area. The cropping intensity in the study area is computed as 171.35 per cent, 183.27 per cent, 189.56 per cent and 193.04 per cent at the respective farms in study area. The growth rate in production and productivity of paddy crop in Janjgir-Champa district in last ten years is highly significant while in the state area is significant by 0.89 per cent. The production and productivity of wheat is significant at 4.79 per cent and 4.07 per cent rate in the state while the area under mustard is negatively significant.

References
2. currentaffairs.gktoday.in/tags/agriculture © GK Today, 2019