An economic analysis of production of Chilli in Bilaspur District of Chhattisgarh

Dilip Kumar Sonwani, Dr. AK Koshta and Birendra Tigga

Abstract
This study seeks to examine (i) the growth rate in area, production and productivity of chilli in Bilaspur district and Chhattisgarh State, (ii) costs and returns of chilli. The study was conducted in Gaurella and Pendra blocks of Bilaspur district of Chhattisgarh state. Total 50 farmers were considered for the study, which comprised of small (25), medium (20) and large (5). The Primary data were collected from the sample farmers through personal interview method. The data were pertaining for agricultural year 2014-2015. The study envisaged that family size of sample farmers was 5.8 members. The average farm size was found to be 2.21 hectares. Overall cropping intensity was observed to be 184 percent. The average cost of cultivation of chilli was Rs/ha. 44312.69 and estimated gross return was Rs/ha 154930.50. The cost per quintal production of chilli was noticed to be Rs 445.55. The average yield of green chilli and red chilli was 100 and 1.20 q/ha. The benefit cost ratio of chilli was registered to 1:2.48.

Keywords: chilli, growth rate, cost and returns yield, input output ratio

Introduction
There are 107 spices with 20 countries being involved in the production and Export (India 50 spices). During 2013-14 India produced 5908.00 metric tons of spices. (Indian Horticulture Database-2014). Indian spices flavor foods in over 134 countries, spice exports touched Rs 11,800 Million during the last year. India is the largest producer of chilli in the world. It accounts for 50-60 percent of the world production of chilli. India contribution 86 percent of global spices production followed by China (4%), Bangladesh (3%), Pakistan (2%), Turkey (2%) and Nepal (1%). (Spices Board of India 2013-14). In 2013-14 the total spices area was 3,316 ha and chilli occupied 4.25% area to the area of total spices. Chhattisgarh is an agricultural chief land and due to large production of rice, it is known as the ‘rice bowl’. The total area under spice in Chhattisgarh state was 91115 hectares. Chilli is being cultivated in 35499 hectares and their production is 250817 metric tons. Bilaspur district is in second position with report to the production of 119133 metric tons.

Materials and Methods
The present study is conducted in Gaurella and Pendra blocks of Bilaspur district of Chhattisgarh state. Accordingly ten villages are selected. From these noticed villages of chilli cultivation, 5 villages from each sampled blocks were taken randomly viz; Tendumuda, Dhanauli, Lalpur, Pakariya and Korja villages for Gaurella block and Patgawa, Bacharwar, Latkon, Kotmi-Kalan and Amarpur for Pendra block. Thus in all 50 farmers was selected randomly. After that chilli growers were categorized into small (1 ≤ 2 ha), medium (2 ≤ 4 ha), and large (≥ 4 ha). The study comprised of small (25), medium (20) and large (5). The Primary data are collected from the farmers through personal interview with the help of well prepared schedule and questionnaire.

Analytical tools
Computation of compound growth rate
To compute the growth rate of area, production and productivity major spices of state and district the exponential function was used, which is as follows:

\[ Y = A B^t \]

The estimated form of function as under

\[ \log Y = \log A + t \log B \]
Assuming as
\[
\log Y = Y \\
\log A = a \\
\log B = b
\]
We get,
\[
Y = a + b \cdot t \quad (t = 1, 2, 3, \ldots, n)
\]

After regression analysis we got value of a and b
\[
a = \text{Constant} \\
b = \text{Coefficient}
\]
As,
\[
b = 1 + r
\]
Hence,
\[
r = b - 1 \\
r = \text{Compound growth rate} \\
= (\text{antilog of } b - 1) \times 100 \\
t = \text{Time variable (t = 1, 2, 3, \ldots, n)} \\
b = \text{coefficient of Regression} \\
Y = \text{Index number of area/production/productivity of spices.}
\]

Cost of cultivation of Chilli
To estimate the cost of cultivation of chilli crop whole cost is divided in to two heads i.e. variable cost and fixed cost. The various cost components like human labour, bullock and machine power, manure and fertilizer, seed, irrigation, plant protection material and chemicals are taken in to consideration in order to work out the per hectare variable cost of cultivation. The interest on working capital involved in the cultivation is also computed at the prevailing rate of interest. The cost of cultivation is estimated by using simple mathematical analysis.

To work out the cost of cultivation standard method of will be adopted. This includes cost – A, cost - B and cost - C.

Cost A1: Consists of following 16 items of costs
1. Value of hired human labour (permanent & casual)
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Hired machinery charged
5. Value of fertilizers
6. Value of manure (produced on farm and purchased)
7. Value of seed (both farm-produced and purchased)
8. Value of insecticides and fungicides
9. Irrigation charges (both of the owned & owned and hired tube wells, pumping sets etc.)
10. canal-water charges
11. Land revenue, cesses and other taxes
12. Depreciation on farm implements (both bullock drawn & worked with human labour)
13. Depreciation on farm building, farm machinery.
15. Miscellaneous expenses (wages of artisans, and repairs to small farm implements)
16. Cost C

<table>
<thead>
<tr>
<th>Region</th>
<th>Area Productivity</th>
<th>Cost of cultivation chilli (Rs/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilaspur district</td>
<td>14.38</td>
<td>1480.48</td>
</tr>
<tr>
<td>Chhattisgarh state</td>
<td>15.98*</td>
<td>15314.80</td>
</tr>
</tbody>
</table>

Note: 5% probability level of t-distribution.

Results and Discussion
Growth in area and productivity of chilli in Bilaspur was found non-significant. The reason might be the chilli crop is highly susceptible to yellow mosaic and leaf curl. The growth in area production and productivity of chilli at Bilaspur noticed 14.38, 31.79 and 15.20 percent in Bilaspur district, respectively. However, growth in area, production and productivity of chilli at Chhattisgarh state was 15.98, 20.84 and 4.19 percent and it was found to be significant at 5 percent probability level of t distribution. Thus it could be concluded that growth of growth of production in chilli at Chhattisgarh was 20.84 percent which was attributed with significant growth in area and productivity of chilli

The total cost of cultivation of per hectare of chilli was higher on large farms as compared to small and medium farms. That indicates the overall per hectare cost of cultivation of chilli worked out to 44312.70. The cost of cultivation in case of large farms was higher Rs. 48643.77 and Rs. 41400.48 at medium farms. Dewangan (2010) (7) was found in his work the overall cost of cultivation of chilli Rs/ha 23365.39 (Table 2).

Table 1: Growth rate in area, production and productivity of chilli

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Region</th>
<th>Compound growth rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bilaspur district</td>
<td>14.38</td>
</tr>
<tr>
<td>2</td>
<td>Chhattisgarh state</td>
<td>15.98*</td>
</tr>
</tbody>
</table>

Table 2: Summarization of cost of cultivation chilli (Rs/ha)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Variable cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Input Materials Cost</td>
<td>10320.60 (27.80)</td>
<td>13632.28 (32.93)</td>
<td>18159.54 (37.33)</td>
<td>15314.80 (34.56)</td>
</tr>
<tr>
<td>B. Human Labour Cost</td>
<td>11019.23 (29.68)</td>
<td>11997.07 (28.98)</td>
<td>13348.66 (27.44)</td>
<td>12501.71 (28.21)</td>
</tr>
<tr>
<td>C. Bullock Power</td>
<td>1250.24 (3.56)</td>
<td>780.23 (1.88)</td>
<td>450.44 (0.93)</td>
<td>707.01 (1.59)</td>
</tr>
<tr>
<td>D. Machine Power</td>
<td>890.03 (2.39)</td>
<td>1080.84 (2.61)</td>
<td>1480.48 (3.04)</td>
<td>1251.25 (2.83)</td>
</tr>
<tr>
<td>E. Interest on working capital</td>
<td>226.19 (0.61)</td>
<td>306.19 (0.74)</td>
<td>395.50 (0.82)</td>
<td>336.22 (0.76)</td>
</tr>
<tr>
<td>Total variable Cost</td>
<td>23706.30 (63.86)</td>
<td>27796.61 (67.14)</td>
<td>33834.62 (69.56)</td>
<td>30110.98 (67.95)</td>
</tr>
</tbody>
</table>

Note: Percentage of t-distribution.
### Table 3: Yield and profitability in chilli cultivation

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Particulars</th>
<th>Farm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small</td>
</tr>
<tr>
<td>1.</td>
<td>Average yield (q/ha)</td>
<td>78.52</td>
</tr>
<tr>
<td></td>
<td>Green chilli</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Red chilli</td>
<td>0.25</td>
</tr>
<tr>
<td>2.</td>
<td>Returns from green chilli</td>
<td>117799.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Gross returns (Rs/ha)</td>
<td>118849.86</td>
</tr>
<tr>
<td>4.</td>
<td>Cost of cultivation (Rs/ha)</td>
<td>37123.57</td>
</tr>
<tr>
<td>5.</td>
<td>Net returns (Rs/ha)</td>
<td>81726.29</td>
</tr>
<tr>
<td>6.</td>
<td>Cost of production (Rs/qtl)</td>
<td>472.79</td>
</tr>
<tr>
<td>7.</td>
<td>Benefit cost ratio</td>
<td>2.20</td>
</tr>
</tbody>
</table>

Note: The prevailing market rate of green chilli was Rs/q 1500.25 and red chilli Rs/q 4200.93.

### References