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

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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,
3163 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,
Latkoni, Kotmi-Kalan and Amarpur for Pendra block. Thus in all 50 farmers was selected
randomly. After that chilli growers were categorized into small ($1 \leq 2$ ha), medium ($2 \leq 4$ 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

$$\text{Log } Y = \log A + t \log B$$

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Assuming as

log Y = Y
log A = a
log B = b

We get,

Y = a + b t (t = 1, 2, 3……..n)

After regression analysis we got value of a and b

a = Constant
b = Coefficient

As,

b = 1+ r

Hence,

r = b – 1
r = Compound growth rate
 = (antilog of b-1) * 100
t = Time variable (t = 1, 2, 3..........n)
b= coefficient of Regression.
Y= 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: Consist 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.
14. Interest on the working capital.
15. Miscellaneous expenses (wages of artisans, and repairs to small farm implements)

Cost A2 = Cost A1+Rent paid for Leased in Land.
Cost B1 = Cost A1 + Interest on Cost B1 = Cost A1 + Interest on value of Owned Capital assets (excluding land)
Cost B2 = Cost B1 + rental value of owned land (land revenue) and rent paid for leased-in land.
Cost C1 = Cost B1 + Imputed value of family labour.
Cost C2 = Cost B2 + Imputed value of family labour.
Cost C3 = Cost C2 + Value of management input at 10% of Cost C2.
Income over cost A_1 = Output Value – Cost A_1
Income over cost A_2 = Output Value – CostA_2
Income over cost B_2 = Output Value – Cost B_1
Income over cost B_2 = Output Value – Cost B_2
Income over cost C_1 = Output Value – Cost C_1
Income over cost C_2 = Output Value – Cost C_2
Income over cost C_3 = Output Value – Cost C_3

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

S.N.	Region	Compound growth rate %		
		Area	Production	Productivity
1	Bilaspur district	14.38	31.79	15.20
2	Chhattisgarh state	15.98*	20.84*	4.19*

Note: 5% probability level of t-distribution.

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

S. No.	Particulars	Farm size			
		Small	Medium	Large	Overall
I.		Variable cost			
A	Input Materials Cost	10320.60 (27.80)	13632.28 (32.93)	18159.54 (37.33)	15314.80 (34.56)
B	Human labour Cost	11019.23 (29.68)	11997.07 (28.98)	13348.66 (27.44)	12501.71 (28.21)
C.	Bullock Power	1250.24 (3.36)	780.23 (1.88)	450.44 (0.93)	707.01 (1.59
D.	Machine Power	890.03 (2.39)	1080.84 (2.61)	1480.48 (3.04)	1251.25 (2.83)
E.	Interest on working capital	226.19 (0.61)	306.19 (0.74)	395.50 (0.82)	336.22 (0.76)
	Total variable Cost	23706.30 (63.86)	27796.61 (67.14)	33834.62 (69.56)	30110.98 (67.95

II.	Fixed Cost				
1	Depreciation	185.53 (0.49)	355.16 (0.87)	1450.87 (2.98)	898.65 (2.03)
2	Land Revenue	12 (0.03)	12 (0.03)	12 (0.03)	12 (0.03)
3	Rental Value of Owned Land	12000 (32.33)	12000 (28.98)	12000 (24.67)	12000 (27.08)
4	Interest on Fixed Capital	1219.75 (3.28)	1236.71 (2.98)	1346.28 2.76)	1291.06 (2.91)
	Total Fixed Cost	13417.28 (36.14)	13603.87 (32.86)	14809.15 (30.44)	14201.71 (32.05)
	Total Cost	37123.57 (100)	41400.48 (100)	48643.77 (100)	44312.69

Overall, gross return obtained by sample farmers was Rs/ha 154930.50. The share on gross return of green chilli was 96.75 percent and red chilli was 3.25 percent. Gross return from sample farms was increasing with increase in the farm size, which was the maximum at large farms Rs/ha175964.75 followed by medium farms (Rs/ha 141773.77) and small farms (Rs/ha 118849.86), respectively.

Table 3: Yield and profitability in chilli cultivation

S. No.	Particulars	Farm Size			
		Small	Medium	Large	Overall
1.	Average yield (q/ha)				
	Green chilli	78.52	92.68	112.11	99.91
	Red chilli	0.25	0.65	1.85	1.20
2.	Returns from green chilli	117799.63	139043.17	168193.03	149893.51
	Returns from red chilli	1050.2325	2730.6045	7771.7205	5037.00
3.	Gross returns (Rs/ha)	118849.86	141773.77	175964.75	154930.50
4.	Cost of cultivation(Rs/ha)	37123.57	41400.48	48643.77	44312.69
5.	Net returns (Rs/ha)	81726.29	100373.29	127320.98	110617.81
6.	Cost of production (Rs/qtl)	472.79	446.70	433.89	445.55
7.	Input output ratio	1:3.20	1:3.42	1:3.62	1:3.48
8.	Benefit cost ratio	2.20	2.42	2.62	2.48

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

References
1. Anonymous, Database of Directorate of Economics and Statistics Chhattisgarh, 2014-15.
2. Anonymous, Database of Deputy Directorate of Horticulture Bilaspur Chhattisgarh, 2013-14.
3. Anonymous, Database of District statistical booklet 2014-15. District statistical office Bilaspur.
4. Bera BK, Moktan MW. Economics of ginger cultivation in the Hill Region of West Bengal. Journal of crop and weed. 2006; 2(2):11-13.
5. Bhullar AS. Estimating, exports competitiveness of chillies from Punjab state Agri. Marketing. 2005; 36:43.
6. Dass, Devi. Economics of production and marketing of chillies in India with special reference to Haryana, M.Sc. (Agri.) Thesis submitted to Chaudhary Charan Singh Haryana Agricultural University, 2005.
7. Dewangan, Omprakash. An economic analysis of production and marketing of major spices in Bilaspur district of chhattisgarh, M.Sc. (Agri) Thesis submitted to, Indira Gandhi Agricultural University Raipur, 2010.
8. Goudra VG, Havaldar YN, Megri SN, Hosamani SB, Banakar B. Growth rate scenario of chilli in North Karnataka, Karnataka journal of Agri. Science. 2011; 24(3):412.
9. Hanumanaikar RH, Rajeshwari N, Nimbal MF. Socio-economic status, constraints Faced and suggestions expressed by Chilli growers in optimum use of pesticide in Tunga Bhadra project area of Bellary district. Mysore Journal of Agricultural Science. 2006; 40(2):261-266.
10. Jagtap PP, Shingane US, Kulkarni KP. Economics of chilli production in India, African Journal of Basic and Applied Sciences. 2012; 4(5):161-164.