

## AN ECONOMIC ANALYSIS OF CHILLIES PRODUCTION IN GUNTUR DISTRICT OF ANDHRA PRADESH

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### Abstract

The present paper examines the economic analysis of chilly production in Andhra Pradesh. Chillies are one of the most valuable crops grown all over India. It is also known as 'hot pepper' which is used as vegetable, spice, condiment, sauce and pickle. From the analysis, it is evident that the use of organic manure would increase the yield of agriculture. Therefore, it is pertinent to mention that use of organic manure has to be encouraged among the farmers. Organic farming alone can assure the sustainable yield and it must not be delayed under any cause. Thus, the government has to come forward to provide some price assurance to the organic crops and credit to the farmer's thereby organic farming can be encouraged in the country.

**Keywords:** cost of cultivation, labour, yield, organic farming

### Introduction

India is famous for its spices that are widely used in industries like pharmaceutical, nutraceuticals, perfumery, toiletry and cosmetics. The Indian spice market has shown remarkable growth in spice and culinary herbs exports. Indian spices manufacturers are making substantial efforts to improve the quality of spices backed up by technological advancement in order to tap the international market. India is also leading in the field of spice derivatives, meeting almost 70% of the total demand of spice oils and oleoresins. The country is providing value added products and thus achieved repute in the international community. With a focus on strong R&D, the Indian manufacturers are developing new products, implementing organic method of production for providing organic spices and herbs, which command a 10-30% premium.

Area under spices cultivation in India has increased from 20.05 lakh hectares during 1991-92 to 26.29 lakh hectares during the period 2008-09. Production of spices during 2008-09 was about 41.45 lakh metric tonnes with the average productivity of 1.6 tonnes per hectare. Pepper, cardamom, chillies, turmeric, garlic, ginger are some important spice crops grown in India. Value of

Indian spice exports to the rest of the countries had increased steadily from Rs.1,721 crore during 1999-00 to Rs.6,338 crore during 2008-09 (CSO estimates).

### **Importance of Chillies**

Chillies are one of the most valuable crops grown all over India. It is also known as 'hot pepper' which is used as vegetable, spice, condiment, sauce and pickle. The Portuguese brought capsicum from Brazil to India during the year 1584. Chillies is a fruit of the plants *Capsicum annum* and *Capsicum frutescens* that has come from the genus 'Capsicum', belonging to the family 'Solanaceae'. These fruits are small in size and known for their sharp acidic flavour and colour.

Currently, Chillies is used throughout the world as a spice and also in the making of beverages and medicines. Some varieties of Chillies are famous for red color because of the pigment 'capsanthin,' others are known for biting pungency attributed to 'capsian.' India is the only country which is rich in many varieties with different quality factors. Chillies is said to have originated in the Latin American regions of the New Mexico and Guatemala as a wild crop around 7500 BC. The people of these places domesticated this crop in 5000 BC, as per the remains of the pre-historic peru. Chillies is said to be the first ever domesticated crop in America. At that time, Chillies was cultivated by the farmers together with a primary crop to protect the primary crop from any damage that the birds could do. Chillies gained popularity in the American continent for flavouring and have been largely cultivated since then. When America was discovered and the Spaniards & the Portuguese explored the South American continent, this pungent-flavoured fruit gained much more recognition.

### **Scenario in Andhra Pradesh**

Chillies is grown in almost all the districts in Andhra Pradesh .Among all spice crops grown in the state, chillies occupies comparatively higher area than any other spice crop. on an average, about 30.87 per cent of the area under spices cultivation was occupied by chillies,

During the period 2011-12, chillies was cultivated to the extent of 2,48,264 hectares with the production of 8,04,204 tonnes. The average productivity of chillies during the period was 3239 Kg/ha. The average area under chillies cultivation from the period 2003-04 to 2011-12 in Andhra Pradesh was around 2,16,599 hectares and average production was 7,41,591 tonnes. The average productivity during the period was 3,430 Kg/ha. In Andhra Pradesh, chillies is cultivated mainly in irrigated conditions. Guntur, Khammam, and Prakasam are some major chillies producing districts in Andhra Pradesh. During the period 2011-12, the area under chillies cultivation in Guntur district was 76,124 hectares and in Khammam district, it was 32,778 hectares, which was 30.66 per cent and 13.20 per cent of area under chillies cultivation in the state respectively. These two districts jointly account for 44.20 per cent of total area under chillies in the state. During the same period, the production level in Guntur district was 3,26,833 tonnes and in khammam district, it was 1,13,186 tonnes and these two districts had contributed 54.71 per cent of total chillies production of the state.

Considering the productivity levels, Guntur district had an average productivity of 4439 Kg/ha in the period between 2002-03 and 2011-12 and, it was 3453 Kg/ha in Khammam district. The states average productivity level was 3239 Kg/ha. It could be observed that the productivity of chillies in Guntur district was 1.27 per cent Higher than the state's average. Khammam district

where, the productivity was 0.22 per cent, that was higher than the state's average. During 2011-12, the productivity in Guntur district was 4293 Kg/ha and in Khammam district, it was 3453Kg/ha. The average productivity of Andhra Pradesh during that period was 3239 Kg/ha, which was less than both the districts.

Out of 57 mandals in the district, Sattenapalle, Veldurthi, Medikonduru and Machavaram were major chillies producers. During 2013-14, area under chillies cultivation was in 4053 hectares in Sattenapalle, followed by 3940 hectares in Veldurthi, 3361 hectares in medikonduru and 3049 hectares in machavaram, and the total area under chillies cultivation in that period was about 60,879 hectares. The areas under chillies cultivation in these mandal were 6.65 per cent, 6.47 per cent, 5.52 per cent and 5.00 per cent respectively.

### **Problem Focus**

The control and management on production aspects using that in available resources may sometimes be more feasible for the farmers compared to the next stage. ie, marketing. The market for chillies is affected by seasonal price fluctuations, overall production in the country, world demand, and stocks available in storages and hedging among the various varieties of chillies. The production level of chillies and factors influencing like available resources, vary within the state. Studying about the production aspects and available resources with the following objectives is the focus of the study.

An appropriate research design in terms of selection of study area, sampling methodology and choice of analytical tools is essential to obtain findings and to draw meaningful conclusions from a research study. The present study was designed based on objectives, concepts and methodologies reviewed in the previous chapters. More specifically, this chapter deals with the sampling design, method of data collection and mathematical tools used for analysis.

### **Selection of Study Area**

Chilly crop is grown almost in all the districts of Andhra Pradesh. Among the 23 districts of Andhra Pradesh, Guntur and Khammam districts are two major chilly producers. The area, production and productivity of chillies in Guntur district during the period 2011-12, average area under chillies cultivation in Guntur district was 76,124 hectares and in Khammam district was 32,778 hectares. Statistical records showed that, Guntur districts occupied about 31 per cent of the total area under Chillies in Andhra Pradesh and only 69 per cent of the total area was occupied by the remaining districts. The average productivity in Guntur district was 4439 Kg/ha, and it was higher than the average productivity of the state, i.e.3430 Kg/ha. The average productivity in Khammam district was 3453 Kg/ha. The average production of chillies in Guntur district was 2, 75,182.9 tonnes and it was 11,318.6 tonnes in Khammam. Considering area, production and productivity indicators, Guntur district was purposely selected for the study.

### **Sampling Design**

There are 57 mandals in Guntur district, Out of 57 Mandals 40 mandals having area among chillies cultivation. During 2013-14, Sattenapalle had maximum area of 4053 hectare in chillies cultivation. Considering the above sattenapalle mandal were selected for study. Four villages from sattenapalle mandal namely Phanidam, Gudipadi, Kattamuru, Bhatluru, were randomly selected.

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The details of sample villages and numbers of chillies growing farmers selected in the study area are given in Table 1.

**Table 1 Sample Farmers in Selected Villages in Sattenapalle Mandals**

S.No	Name of the village	Number of samples
1.	Phanidam	30
2.	Gudipudi	30
3.	Kattamuru	30
4.	Bhatluru	30

Thirty farmers from each village were selected at random and totally 120 farmers were selected from four villages. The farmers were contacted individually for collection of details on production of chillies with the help of well structured and pre-tested interview schedule. The primary data were collected from the sample respondents during the months of February-March, 2015 and the data collected were relating to the agriculture year of 2014-15.

### Functional Analysis

Production function analysis was used to evaluate the factors influencing the chillies cultivation and also to examine their relative efficiencies. The average product is a simple measure between output and input. But to know the efficiency of resources used in production, it is necessary to know marginal product rather than average product. Marginal product could be known only if the technical relationships between outputs and inputs are estimated. The production functions were estimated using Ordinary Least Square (OLS) method. The estimated values of the regression co-efficient and  $R^2$  were tested for statistical significance. The Cobb-Douglas production function of the following form was finally specified based on the a priori expectations.

### Cobb-Douglas production function for Chillies

$$Y = a X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} X_6^{b_6} X_7^{b_7} U_t$$

Where,

Y	=	Yield of Chillies (Kg/ac)
$X_1$	=	Seed cost (Rs/ac)
$X_2$	=	Labour (Man days/ac)
$X_3$	=	Organic manures (Tonnes/ac)
$X_4$	=	Inorganic fertilizers (Rs/ac)
$X_5$	=	Cost of weeding (Rs/ac)
$X_6$	=	Plant Protection Chemicals (Rs/ac)
$X_7$	=	Number of Irrigation
$U_t$	=	Error term

$a, b_1, b_2, \dots, b_7$  = Parameters to be estimated

### Production Function Analysis

To evaluate the factors influencing chillies cultivation and also to examine their relative influence, production function was fitted.

**Table 2 Results of Cobb-Douglas Production Function Analysis for Chillies**

S.No	Explanatory variables	Parametric Values	Standard Error	t-ratio
1.	Constant	4.6212	0.6378	7.2622
2.	Seed (Rs/ac)	-0.0026	0.0633	0.0416
3.	Labour (Man days/ac)	0.4066	0.1089	3.7306
4.	Manures (tonnes/ac)	0.0777**	0.0423	1.8355
5.	Fertilizers (Rs/ac)	0.3678	0.1157	3.1772
6.	Cost of weeding(Rs/ac)	0.0689	0.0570	1.2096
7.	Plant Protection Chemicals(Rs/ac)	0.2508**	0.1319	1.9008
8.	No of Irrigations(No/ac)	0.0375	0.0452	0.8315
9.	R <sup>2</sup>	0.8953		
10.	Adjusted R <sup>2</sup>	0.8492		
11.	F	26.285		

\*\*\* Significant at one per cent level

\*\* Significant at five per cent level

The Cobb-Douglas production function was used and the production elasticities were estimated accordingly. The production function was estimated for using Ordinary Least Square (OLS) method. The estimated values of the regression coefficients were tested for statistical significance with the help of 't' test and the significance of the equation was tested by 'F' test for R<sup>2</sup>. The independent variables used in crop production were seed cost (Rs/ac), labour (Man days/ac), organic manures (Tonnes/ac), inorganic fertilizers (Kg/ac), cost of weeding (Rs/ac) and cost of plant protection chemicals (Rs/ac). Number of irrigation per acre was added as variable with all other independent variables used for Chilli crop.

The results of production function analysis relating yield of chillies and factors influencing the yield are shown in Table 2. The co-efficient of multiple determination ( $R^2$ ) was 0.8953 would indicate that approximately 89 per cent of the variation in the dependent variable was explained by the relevant independent variables selected for the study. The calculated F value at 26.285 was significant at one per cent level of probability and indicated the goodness of fit.

The co-efficient of the variable namely organic manure and plant protection chemicals was significant at five per cent level of probability, Indicating high chances of increasing the yield i.e one per cent increase in use of organic manures would increase the yield of 0.07 per cent and one per cent increase in use of plant protection chemicals would increase the yield of 0.25 per cent.

## Conclusion

From the analysis, it is evident that the use of organic manure would increase the yield of agriculture. Therefore, it is pertinent to mention that use of organic manure has to be encouraged among the farmers. Organic farming alone can assure the sustainable yield and it must not be delayed under any cause. Thus, the government has to come forward to provide some price assurance to the organic crops and credit to the farmer's thereby organic farming can be encouraged in the country.

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