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Analysis of Arrivals and Prices of Red Chillies in Guntur Market of Andhra Pradesh

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ABSTRACT

Chilli is considered as one of the most important commercial crops of India. Guntur chilli market in the Andhra Pradesh is the Asia's largest chilli market. In this paper, an attempt was made to study arrivals and prices of chilli in Guntur market of Andhra Pradesh based on month wise secondary data during the period 2000-2019. The seasonal variations in arrivals and prices are studied by seasonal indices with the help of ratio to moving average method. It is reveals that the seasonal indices of both arrivals and prices of chillies in Guntur market are recorded maximum during the month of March. From the correlation studies, it is confirmed that significant positive relationship (r=0.267) exists between arrivals and prices, but from the comparisons of entire seasonal indices, there is no evidence that the arrivals of chillies not influencing the prices. The Simple Linear Regression Analysis identified that there would be a positive trend in prices and arrivals of chillies in Guntur market for the year 2020, which was estimated the average prices and arrivals are as Rs. 10,468.7 per Quintal, 535.8 '000 tonnes respectively.

Key Words: *Arrival, Chilli, Price, Trend and Seasonal.*

Chilli is the most extensively used universal spice, hence named as *wonder spice* due to its pungency, colour, flavour and taste to the dishes. In general, different varieties of chilli, are cultivated for various uses like vegetable, pickles, spice and condiments (Post Harvest Profile of Chilli, 2010). India is the largest producer as well as consumer of chilli among other major producers in the world. India contributes 36 percent to total world's production and remained in first position in terms of international trade by exporting nearly 30 percent from its total production.

India is the world frontrunner in chilli production followed by China, Thailand, Ethiopia and Indonesia. Indian chilli is particularly exported to Asian countries like Vietnam, Sri Lanka, Thailand, Bangladesh and U.A.E. (Chilli Outlook, 2020). As per statistics, India exported 44.9 Thousand MT of chilli to the world with value of 22074.05 lakh rupees for the year 2017-18 (Horticultural statistics at a glance-2018).

Major chilli producing states in India are Andhra Pradesh, Telangana, Tamil Nadu, Karnataka and Madhya Pradesh respectively. In Andhra Pradesh, about 116,578 hectares was reported under red chilli in 2018 and acreage in Guntur, Kurnool and Krishna regions is reported as 65,259 hectares, 15,584 hectares and 12,816 hectares respectively (Chilli Outlook, 2018). Velayutham and Damodaran (2015) reported that the maximum production of red chillies in India also comes from the same state Andhra Pradesh, which accounted nearly 57.80 percent of the total chilli production of India. Guntur is the Asia's largest chilli market; hence the arrivals reach to the market from various principal producing regions of Andhra Pradesh (Devi *et. al.,* 2016). Generally, stable marketing prices play a vital role to determine the farm income. One of the major constraints for this price fluctuations are seasonal nature of agricultural production itself. Prices are usually at the lowest when arrivals are at topmost and improve with the decline of arrivals the end of crop season. Wider fluctuations in the prices of chilli always rise to the uncertainty of income to their growers. Always an analysis of price and arrivals over time is very important for formulating a comprehensive agricultural price policy, there to find possible ways and means for reducing price oscillations of agricultural commodities, there is a need to have a thorough understanding of price behaviour over time and over space. Such kind of studies are always useful for farmers in order to decide the optimum time for disposing of their produce to their best advantage. (Devi *et. al.,* 2016). Based on economic importance, present study is focussed on arrival and market prices of chilli in Guntur market of Andhra Pradesh. In this, how the seasonality influences the prices and arrivals, are studied with help seasonal indices and also applied, regression model to determine the linear trends of arrivals and prices of chilli in Guntur market of Andhra Pradesh.

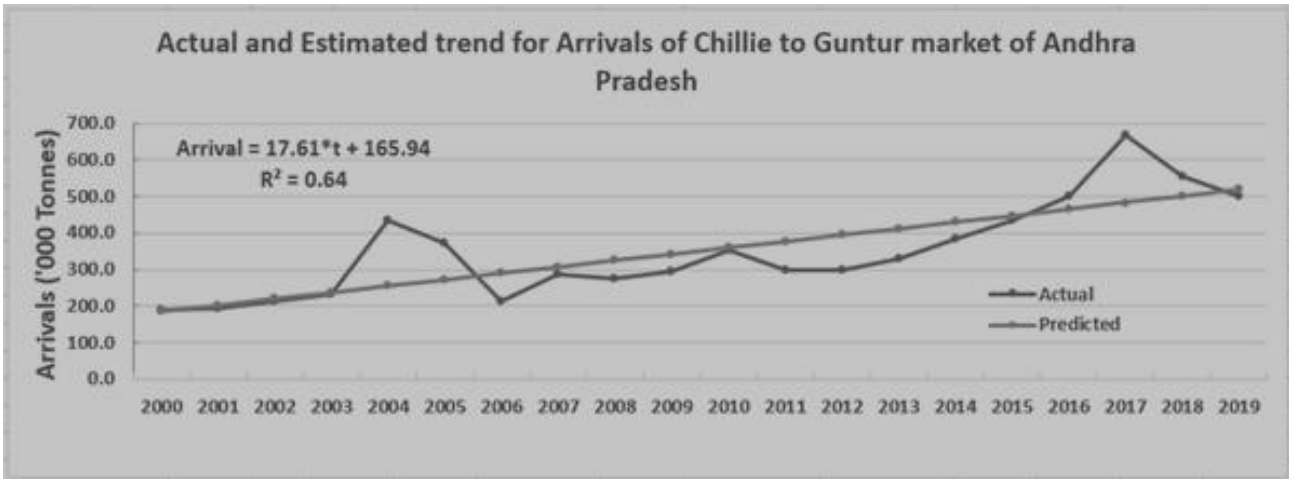

Fig. 1 Actual and Estimated trend in arrival of Chilli to Guntur market of Andhra Pradesh

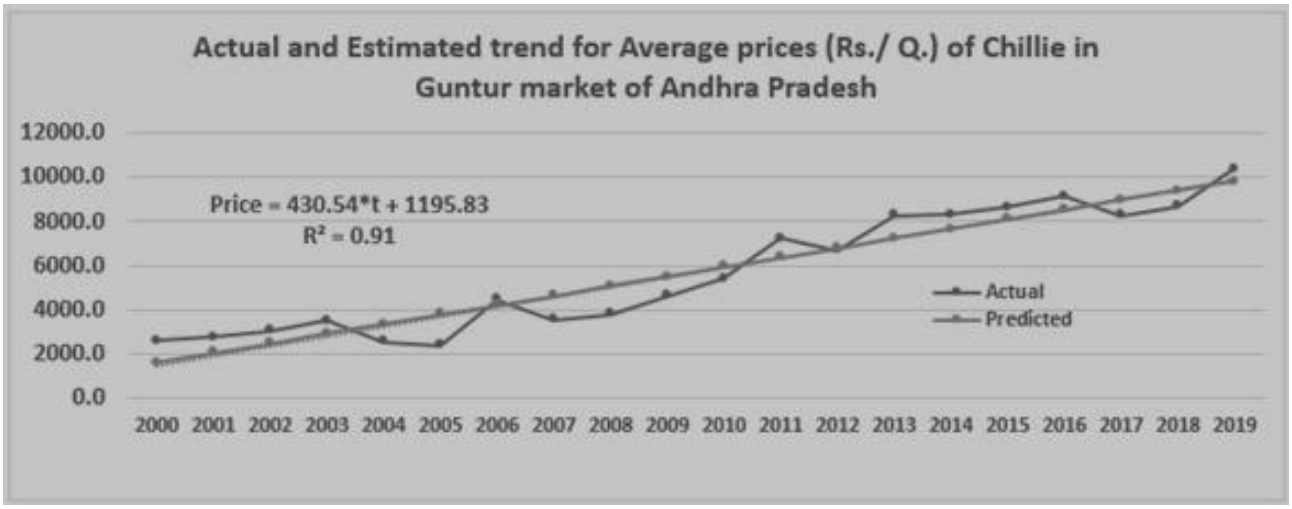

Fig. 2 Actual and Estimated trend in prices of Chillies in Guntur market of Andhra Pradesh

Table 1. Averages of price and arrivals for Chilli in Guntur market of Andhra Pradesh from 2000-2019

Month	Prices (Rs. /Quintal)		Arrivals ('000 Tonne)	
	Average	CV%	Average	CV%
January	5890.0	53.0	26.7	60.1
February	6050.0	56.0	48.1	48.1
March	5940.0	53.8	62.6	35.4
April	5350.0	52.1	53.6	41.3
May	5115.0	55.0	17.9	69.6
June	5382.5	54.6	18.4	52.5
July	5487.5	53.6	23.1	44.5
August	5732.5	54.1	21.6	44.5
September	5645.0	54.7	18.9	44.8
October	6050.0	54.9	17.4	49.5
November	6315.0	56.1	20.7	51.0
December	6240.0	56.4	21.9	56.9

Table 2. Seasonal indices of prices and arrivals of Chillie in Guntur market of Andhra Pradesh.

Month	Prices (Rs. /Quintal)	Arrivals ('000 Tonne)
January	102.7	89.6
February	106.5	159.4
March	106.7	217
April	91.9	193.9
May	87.4	57.3
June	98.5	58.7
July	98.2	75.2
August	98.9	71.5
September	98.5	65.2
October	102.5	65.2
November	103.8	76.8
December	104.6	70.1

MATERIAL AND METHODS

In this present study, data pertaining to monthly prices and arrivals of red Chillies from Guntur market of Andhra Pradesh are collected for a period of twenty years from 2000 to 2019 from Agricultural Market Committee- Guntur, with a view to identify the trend as well as seasonal variations of prices and arrivals. Further, correlation study also done to understand the directional relation between these variables.

To examine the trends of arrival and prices of red Chilli in Guntur market, linear parametric regression analysis is applied with a functional form: $Z_t = a + b*t+e_t$; where, Z_t = Annual time series data of arrivals or prices; a = Intercept; b = Regression coefficient; t = Time period in years 1,2 …...20; e_t = Random error; (Dasyam *et al.* 2015).

Similarly, to study the seasonal variations of prices and arrivals of chillies, ratio to moving average method is selected as it is the most satisfactory, flexible and widely used over other methods (Gupta and Kapoor, 2007).

Table 3. Trend for Annual arrival and prices of Chillies to Guntur market of Andhra Pradesh.

Year	Arrival ('000 Tonne)			Prices (Rs./Q)		
	Actual	Predicted	Absolute Forecast Error (%)	Actual	Predicted	Absolute Forecast Error (%)
2014	382.4	430.2	12.5	8308.3	7781.7	6.3
2015	433.0	447.8	3.4	8641.7	8229.5	4.8
2016	499.3	465.4	6.8	9116.7	8677.3	4.8
2017	666.4	483.0	27.5	8275.0	9125.2	10.3
2018	556.2	500.6	10.0	8691.7	9573.0	10.1
2019	500.7	518.2	3.5	10375.0	10020.8	3.4
2020		535.8			10468.7	

RESULTS AND DISCUSSION

Average monthly arrivals (in '000 tonne) and prices (Rs. /Quintal) of red chilli for the study period of twenty years i.e. 2000-19 were depicted in Table 1. From this, it was revealed that the highest market arrivals of Chilli to Guntur market were recorded for the months, *March*, *April*, *February* and *January* with average of 62.6, 53.6 , 48.1 and 26.7 (in '000 tonne) respectively, while lowest was recorded for *October* with average of 17.4 (in '000 tonne). Harvesting of fresh chilli crop starts from December and ends with March. Hence, Significant arrivals start from January and continue upto March in India (Karvy, 2011).

Similarly, from Table-1, the average highest market prices (Rs. /Quintal) of Chilli in Guntur market were recorded during the months, *November* and *December* with average of 6315 and 6240 (Rs./Quintal) respectively, where lowest was recorded for *May* with average of 5115 (Rs./Quintal).

To understand the variation (dispersion) of prices and arrivals of chilli, Coefficient of variation (CV%) was calculated and also represented in same Table-1. For prices, CV% was almost non-consistent with slight deviation over months which ranges (52-56%); but the month May arrivals were highly dispersed (69.6%) than others, which indicated that the arrivals and prices are inconsistent and more volatile.

Seasonal fluctuation in prices and arrivals of Chillies

Seasonal indices for prices and arrivals of chilli for entire study period was calculated by selected method i.e., ratio to moving average method and their indices were depicted in Table-2. It was revealed that

indices of chillies arrivals to Guntur market was recorded maximum during the months of March (217), April (193.9) and minimum in the month of May (57.3). Generally, In Andhra Pradesh, chilli crop nursery is raised in 2nd fortnight of July, transplanting done in 2nd fortnight of August and harvesting from January to March. Peak arrivals of chilli take place in the months of March and April, medium transactions during May to November and lean arrivals in the months of December and January (Raghuram, 2013).

The seasonal index for prices being lowest in the month of May (87.4) and the highest during March (106.7) followed by February (106.5), December (104.6), November (103.8) and January (102.7) in an order. Similar kind of report was given by Devi *et. al.*, 2016 for the study of Price behaviour of chillies in Guntur market of Andhra Pradesh for the period 1997 to 2014, as the maximum seasonal indices to the chilli prices were recorded for the same months December, November and January only.

Trend Analysis

Trend is the tendency, used to describe the basic behaviour and pattern of the data series by using recorded data of past (Ali *et al.* 2018). To identify the Trend in the arrival of chillie in the Guntur market for the period 2000 to 2019, the linear regression equation had been fitted and the estimated trend function as,

$$\text{Arrivals } (Z_t) = 165.94 + 17.61^{*}(t)$$
$$(37.42)^{*} \quad (3.12)^{*}$$

Figures in parenthesis denote Standard Errors.
**Significant@5%LOS.*

Based on this linear regression equation, Co-efficient of Determination (R^2) was obtained 0.63, which had indicated that about 63 per cent of the variations in the arrivals of chillies had been explained by the independent Variable time (t). It was resulted that the trend of chilli arrivals had increased significant trend over the period under study. Similar kind of findings were reported by Ponnaluru, 2018 for study of Price determinants of dry Chilies in Karnataka. From the above fitted model, it was revealed as the arrivals of chillies had increased at the amount of 17.61 Quintals per year. The Actual arrivals series with the estimated trend values are presented in Table-3 and also been plotted in the Figure-1. Based on fitted simple linear regression model, chilli market arrival for the year 2020 was estimated as 535.75 '000 tonnes.

Similarly, Trend for the prices of chilli in the Guntur Market for the period 2000-19 was also studied by fitting the simple linear regression equation, the estimated form was:

$$\text{Prices } (Z_t) = 1195.83 + 430.54^{*}t$$
$$(392.17)^{*} \quad (32.73)^{*}$$

Figures in parenthesis denote Standard Errors.
**Significant@5%LOS.*

Coefficient of determination (R^2) was recorded as 0.91 for the above model, therefore 91per cent of the variations in the prices of chilli could be explained by the independent variable time (t). It was resulted as the prices of red chilli would increase at the rate of 430.54 per annum with significant trend over the period. The Actual price series with the estimated trend was presented in same Table-3 and plotted in the Figure-2. Based on fitted linear regression model, chilli market price for the year 2020 was estimated as Rs. 10468.7 per Quintal. As per recent reports of Chilli Outlook- April 2020, from 1st January to 20th March, red chilli supply in Guntur market was incremented by 0.55% as compared to previous year, therefore farmers may expect higher prices in future. Normal Export demand is reported in the Guntur spot market from countries like Vietnam, Malaysia, Bangladesh, Sri Lanka *etc*. Red Chilli stocks in cold storage are increasing day by day, and as of now at Guntur region around 38 – 40 lakh bags are stored. Farmers may get good price for Red Chilli (good quality) as cold storage stocks reported lower than the last year and buyers will be active during current marketing period.

Pearson coefficient (r) was measured as 0.278 (prob. value=<0.01) between variables arrivals and prices of chilli, which indicated about directional relation between those variables were positively significant. Similar result was obtained by Venkataviswateja *et al.* 2018, in study on Arrivals and Prices of Red Chillies in Guntur market yard.

CONCLUSION

In the present study, for the arrivals of red chillies in Guntur market, seasonal indices are recorded maximum during the month of March (217) and minimum in the month of May (57.3) and for the prices its being lowest in the month of May (87.4) and the highest in March (106.7). Generally, the peak season for the harvesting of chilli are in the months of March and April, hence seasonal Index is maximum in these periods. The correlation analysis also revealed that there would be positive relation existing (r=0.26) between the arrival and prices of chillies in Guntur market of Andhra Pradesh. It was discovered from the trend analysis as there would be positive trend in both prices and arrivals of chillies in Guntur market of Andhra Pradesh. From the linear regression, the prices and arrivals were anticipated to increase at the rate of 430.54 per quintal per annum, which is 17.61 ('000 quintals) of chilli arrivals per year. By this, chilli market price and arrivals for the year 2020 was estimated as

Rs. 10468.7 per Quintal and 535.8 ('000 quintals) respectively.

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