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## Trend in price of Indian maize

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### Abstract

Maize is India's third most important cereal crop, after rice and wheat and it is the only cereal crop which can be cultivated throughout the seasons Geetha *et al.* (2019) [3]. The present study focuses on the export performance of maize from India and estimated trend in prices of maize by using secondary data for the period (1999-2019). To analyse the data (R) software were used. For determining the trend in domestic and international price of maize exponential or non-exponential function were used. The best fitted model was selected on the basis of R<sup>2</sup> values of domestic and international prices of maize. The results revealed that in price trend, the best fitted model for domestic price was exponential model with R<sup>2</sup> value of 0.90 at 1 per cent level of significance. And for international price quadratic model was best fitted with R<sup>2</sup> value of 0.91 which was statistically non-significant.

**Keywords:** price, trend, domestic, international, exponential & non- exponential

### Introduction

Agriculture plays an important role in the contribution of India's GDP (Gross Domestic Product) as it accounts to almost 18 per cent of GDP and also in the overall socio-economic fabric of India. In the Global market, there is a strong demand for cereals viz., Maize, rice, wheat, sorghum, pearl millet and barley, which generates a greater atmosphere for the export of Indian cereals. Maize is known as the "queen of cereals" and is India's third most important cereal crop. It is the only cereal crop which can be cultivated throughout the seasons. Geetha *et al.* (2019) [3]. India is not just the world's leading producer of cereals, but also the world's biggest exporter of cereal crops, Joshi Malvika (2013) [4]. Maize is a high yielding annual plant with great geographic adaptability, a key feature that has helped its spread over the world and less expensive than other cereals. Countries which imports maize form India are Nepal, Bangladesh, Myanmar, Pakistan, Bhutan, Saudi Arab and UAE (APEDA). India's export of cereals stood at Rs. 47,287.12 crore /6,611.09 USD Millions during the year 2019-20 (APEDA). During 2019-2020, India exported around 370066.11 MT of Maize for the worth of Rs. 101929.83 lakhs (APEDA).

The United States of America (USA) is the leading producer of maize. The China, Brazil, European Union, Argentina, Ukraine, India and Mexico are the top maize producers. The top maize producing states are Andhra Pradesh (20.9 per cent), Karnataka (16.5 per cent), Rajasthan (9.9 per cent), Maharashtra (9.1 per cent), Bihar (8.9 per cent), Uttar Pradesh (6.1 per cent), Madhya Pradesh (5.7 per cent) and Himachal Pradesh (4.4 per cent). Maize accounts around 9 per cent to the national food basket. Maize cobs are utilised as a source of biomass fuel. Maize is a basic raw component to thousands of industrial goods, including starch, oil, protein, alcoholic beverages, food sweeteners, pharmaceutical, cosmetic, film, textile, gum, package and paper industries etc. Maize will be used for various purposes in the coming years, mainly in businesses that are predictable to grow quickly in the future.

India's productivity itself stands around half of the world productivity. On an average, the productivity of Indian maize is same as that of many leading maize producing countries. In 2018-2019, maize average productivity increased to 9.2 million ha. (DACNET, 2020) [9]. In 1950-51, India used to produce 1.73 million MT maize which rose to 27.8 million MT by 2018-19, recording close to 16 times increase in production. During this time, average productivity increased by 5.42 times from 547 kg/ha to 2965 kg/ha, while area has increased nearly by three folds. We can conclude that the dynamic growth in agricultural sector is a boon for most sectors of the Indian Economy.

## Materials and Methods

The present study was based on secondary data. Required time series data for international price were assembled from Government website like Agricultural and Processed food products Export Development Authority (APEDA). Data for domestic price were collected from Agmarknet. The time series data has been divided into three periods for better comparison *viz.*, Period I (1999-2000 to 2008-2009), Period II (2009-2010 to 2018-2019), Overall period (1999-2000 to 2018-2019) (Anjum and Madhulika, 2019) <sup>[1]</sup>. Exponential and non-exponential functions were used to estimate the trend in domestic and international price of maize which was elaborated as under:

### Trend Analysis:

The trend in domestic and international prices of maize was calculated by using exponential or non-exponential function. The goodness of fit of trend line to the data tested by computing the coefficient of multiple determinations which is

denoted by  $R^2$ . (Aware *et al.* 2019) <sup>[2]</sup>.

Following equations was used to work out the trend *viz.*

$$Y_t = a + bt$$

$$Y_t = a + bt + ct^2$$

$$Y_t = ab^t$$

Where,

$Y_t$  = Domestic / International Price

A = intercept

T = Time

b & c = Partial Regression Coefficient

## Results and Discussion

### Trend in Domestic and International price of Maize

Linear, quadratic and exponential functions were used to estimate the trend of Domestic and international price of maize (Saqib Shakeel Abbasi *et al.* 2015) <sup>[6]</sup>. The results of the trend analysis are presented in Table 1.

**Table 1:** Trend in Domestic and International Price of Maize (1999-2019)

Sr. No	Particulars	Function	Intercept (a)	X(b)	X <sup>2</sup> (c)	R <sup>2</sup>	Adjusted R <sup>2</sup>
1.	Domestic Price	Linear	3.30	0.70		0.83***	0.82
		Quadratic	3.52	0.64	0.00	0.83*	0.81
		Exponential	1.55	0.07		0.90***	0.89
2.	International Price	Linear	3.91	0.81		0.80***	0.79
		Quadratic	8.30	-0.38	0.06	0.91	0.89
		Exponential	1.78	0.06		0.87***	0.86

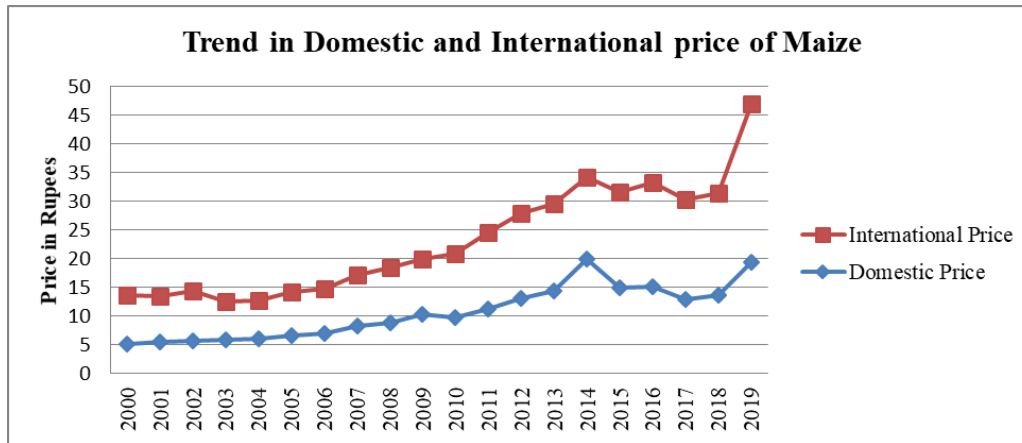
The results in table 1 revealed that the best fitted model based on  $R^2$  values for domestic prices of maize was exponential model with the  $R^2$  value of 0.90 at one per cent level of significance and for the international price of maize quadratic

model was best fitted with the  $R^2$  value of 0.91 which was statistically non-significant. The results are in close association with the findings of Mittal *et al.* (2018) <sup>[5]</sup>.

**Table 2:** Domestic and international price of maize

Year	Domestic Price (Rs./ Kg)	International Price (Rs./kg)
2000	5.19814	8.405269
2001	5.48732	8.028077
2002	5.72495	8.664519
2003	5.935682	6.524408
2004	6.02778	6.652059
2005	6.617609	7.524833
2006	6.986235	7.826281
2007	8.237609	8.957817
2008	8.82556	9.541147
2009	10.23129	9.699537
2010	9.715526	11.15944
2011	11.22644	13.37629
2012	13.08519	14.82008
2013	14.43364	15.13227
2014	19.84	14.28898
2015	14.93807	16.64898
2016	15.035	18.18892
2017	12.96174	17.41228
2018	13.56356	17.80195
2019	19.3847	27.54368

(Source: Agmarknet, APEDA)



**Fig 1:** Trend in domestic and international price of Maize

From figure 1. The Domestic price of maize has shown normal upward trend in the initial year. Domestic price of the maize was highest in the year of 2014 at 19.84 Rs/kg and after 2014 domestic price of maize showed steep decline. As for, International price of maize showed an increasing trend in the initial year of the study. In the international market highest price of maize was observed in the year of 2019 at 27.54 Rs/kg.

### Conclusions

The analysis of the study showed fluctuations in both domestic and international prices of maize. For trend analysis in domestic and international prices of maize, linear, quadratic and exponential model were used. The present study concluded that the best fitted model for trend in domestic price of maize was exponential model at one per cent level of significance while for international price of maize, quadratic model was best fitted which was statistically non-significant.

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