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An Analytical Study About Contribution of Maize Crop in India

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ABSTRACT

Maize is the second most important cereal crop in the world in terms of acreage and is called the 'Queen of Cereals' because it has the highest genetic yield potential among the cereals. Maize is a multi-faceted crop used as food, feed and industrial crop globally. Maize has a very prominent role to play in the Indian economy too. Maize is important to India as 15 million Indian farmers are engaged in Maize cultivation. Importantly, maize contributes more than 2 per cent to the total value of output from all agricultural crops. Total maize production in India is estimated at around 24.51 M Tones 2020-21 against total annual demand including exports of 25.2 M Tones. In the present paper, statistical analysis has been carried out on production trend and growth rate for Maize crop. State-wise comparative study has also been carried out for major Maize producing states in India. The future projection for production and productivity have also been worked out.

Keywords: Cereals, Maize, Growth Rate, Production, Productivity

Introduction

In India, maize is principally grown in two seasons, Kharif and Rabi. Kharif maize represents around 83% of maize area in India, while Rabi maize correspond to 17% maize area. Over 70% of kharif maize area is grown under the rainfed condition with a prevalence of many biotic and abiotic stresses. Therefore, in view of the changing farming scenario in the country, maize has been emerging as one of the potential crops that addresses several issues like food and nutritional security, climate change, water scarcity, farming systems, bio-fuel etc.

Methodology

The following formulae were used:

Growth Rate

The moving averages have been used to estimate growth rates.

$$R_t = \frac{Y_1 - Y_0}{Y_0} * 100$$

Where R_t is the simple growth rate during two periods

Y_t -> Value of the variable of the time t.

Y_0 -> Value of the variable of the initial period

Three Year Moving Average

$$Y_{t+1} = \frac{Y_t + Y_{t+1} + Y_{t+2}}{3}$$

Where Y_t is variable (area sown, production or productivity)
and t is time period, say, t = 0,1,2…..

Projection

Least Square Technique has been applied for the following linear model:

$Y = a + b X$

Where Y is Rice production
a is constant
b is regression of Y on X,

X is year (X=1 for 1994-95
=2 for 1999-2000 & so on)

Finding and Discussions

India rank 4th in area and 7th in production among the maize growing countries, representing around 4% of the world maize area and 2% of total production. During 2018-19 in India, the maize area has reached to 9.382 million ha. Table -1 presents the major Maize producing countries in the world. It is seen, that USA is the highest producing country with 36.29% share. USA and China produce together 58% of World's total. India's contribution is 2.48%.

Table 1: Major Maize Producing countries in the World

Country	Production M Tones	Production %age	Cumulative Production %age
USA	384.78	36.29	36.29
China	231.84	21.87	58.16
Brazil	64.14	6.05	64.21
Argentina	39.79	3.75	67.96
Mexico	28.25	2.66	70.62
Ukraine	28.07	2.65	73.27
India	26.26	2.48	75.75
Indonesia	20.37	1.92	77.67
Russian Federation	15.31	1.44	79.11
Canada	12.35	1.16	80.28
Others	209.09	19.72	100.00
WORLD	1060.25	100	

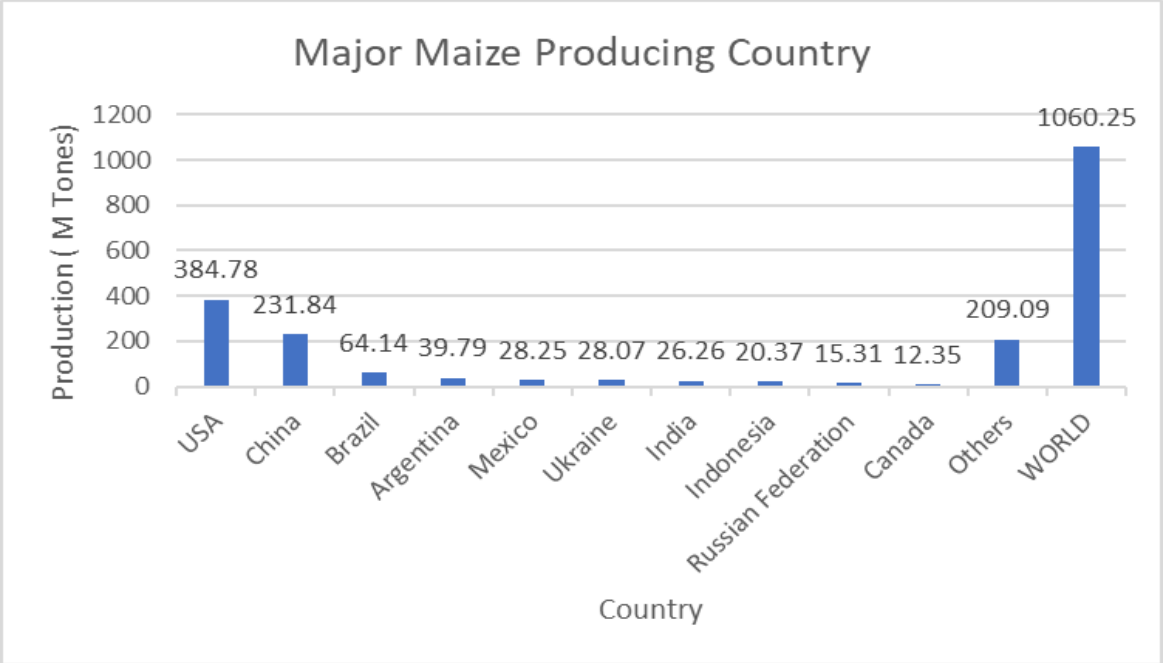


Table -2 Three years moving average of area, production and yield of the Maize

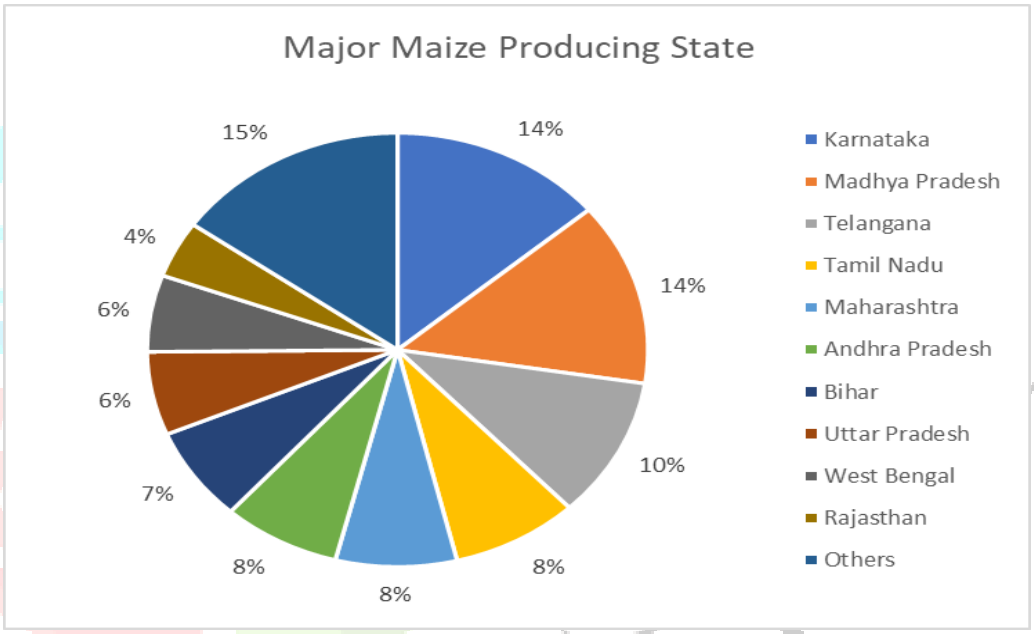
Year.	Area Sown M ha	Growth rate per annum	Production M Tones	Growth rate per annum	Productivity Kg per ha	Growth rate per annum
1958-59	4.23		3.56		841	
1968-69	5.71	3.50	5.88	6.52	1029	2.24
1978-79	5.72	0.02	5.92	0.07	1035	0.06
1988-89	5.79	0.12	7.87	3.29	1352	3.06
1998-99	6.31	0.90	11.16	4.18	1767	3.07
2008-09	8.18	2.96	18.47	6.55	2258	2.78
2018-19	9.38	1.47	28.37	5.36	3027	3.41

Table-2 presents the three yearly moving averages of area sown, production and productivity for Maize. Growth rates have also been estimated. It is observed that area sown has shown positive trend from 1958-59 to 2018-19. It has been increased from 4.23 M ha in 1958-59 to 9.38 M ha in 2018-19. The highest rate (3.50%) was observed during 1958-59 to 1968-69 and lowest (0.02%) during 1968-69 to 1978-79. The production also had positive trends. The production has been increased from 3.56 M tones in 1958-59 to 28.37 M tones in 2018-19. The growth rate has been highest at the level of 6.55 % per annum during 1998-99 to 2008-09 and lowest 0.07% during 1968-69 to 1978-79. The productivity level has been increased to 3027 kg per ha during 2018-19 from 841 Kg per ha in 1958-59. In case of productivity, the highest growth rate (3.07%) was observed during 1988-89 to 1998-99.

Table - 3 depicts the State-wise analysis for Maize. It is seen that Karnataka is the highest Maize producing state (13.83%) of the total Maize production in the country. Karnataka along with Madhya Pradesh (13.65%), Telangana (10.47%), Tamil Nadu (8.21%) and Maharashtra (7.82%) produce about 54% production in the country. The highest productivity has been observed of the order of 7036 kg per ha in Tamil Nadu followed by Andhra Pradesh (6764 Kg per ha), West Bengal (5476 Kg per ha), Telangana (5347 Kg per ha) and lowest 1357 Kg per ha in Rajasthan.

Table –3 Area, Production and Productivity of Maize (2019-20)

	Area M Ha	Area %age	Cumulative Area %age	Production M Tones	Production %age	Cumulative Production %age	Productivity Kg per ha.
Karnataka	1.4	14.40	14.40	3.96	13.83	13.83	2839
Madhya Pradesh	1.34	13.79	28.19	3.91	13.65	27.48	2921
Telangana	0.56	5.76	33.95	3	10.47	37.95	5347
Tamil Nadu	0.33	3.40	37.35	2.35	8.21	46.16	7036
Maharashtra	1.27	13.07	50.41	2.24	7.82	53.98	1767
Andhra Pradesh	0.32	3.29	53.70	2.18	7.61	61.59	6764
Bihar	0.65	6.69	60.39	2.01	7.02	68.61	3083
Uttar Pradesh	0.73	7.51	67.90	1.78	6.22	74.83	2448
West Bengal	0.3	3.09	70.99	1.64	5.73	80.55	5476
Rajasthan	0.89	9.16	80.14	1.21	4.22	84.78	1355
Others	1.93	19.86	100.00	4.35	15.19	100.	2249
ALL INDIA	9.72	100.00	84.06	28.64	100.00	86.12	2945



.**Table –4 Projected Production, Area and Productivity for Maize**

	2024-25	2029-30
Area M Hectare	10.51	11.27
Production M Tones	31.28	35.26
Productivity Kg per ha	3096	3368

Table -4 presents the projected area sown, production and for Maize for 2024-25 and 2029-30. It is seen that the estimated production has been estimated of the order of 10.51 M Tones and 11.27 M Tones in 2024-25 and 2029-30 respectively. The area will be 10.51 M ha in 2024-25 and 11.27 M ha in 2029-30.The productivity will be 3096 Kg per ha in 2024-25 and 3368 Kg per ha 2029-30.

Concluding Note

There is a tremendous potential of growth of the Maize value chain in the country. The question however is- "Can the Maize supply chain, in its current form, cater to the rapidly increasing demand"? The Government on its part has been providing price support mechanism to push up Maize production; the pressure however, is on the value chain to be streamlined as an immediate measure to enhance the performance of the sector. While constraints can be found at every stage of the chain, from research to consumption, all stakeholders will have to act together with scale

and speed to create a "Brand India for Maize" which demonstrates India's advantages and capabilities to become a world leader.

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