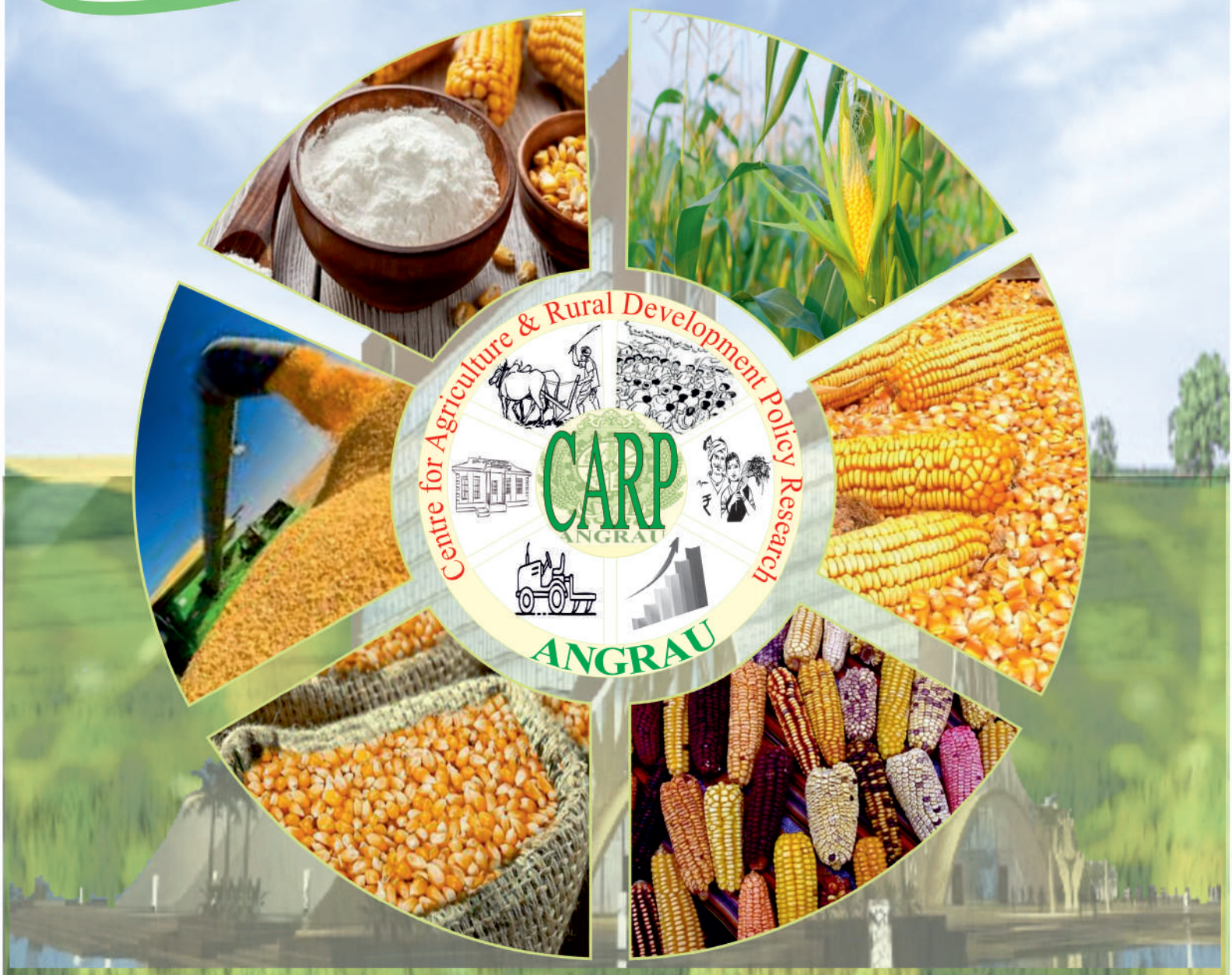
ACHRAYA N G RANGA AGRICULTURAL UNIVERSITY

Lam, GUNTUR - 522034.

Crop Outlook Reports of Andhra Pradesh

MAIZE

(June, 2023 to May, 2024)



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ANGRAU, Lam, Guntur - 522 034.

ANGRAU - Crop Outlook Reports of Andhra Pradesh
Maize – June to May, 2023-24

Factsheet of Maize

- Maize is cultivated on nearly 190 million hectares in about 165 countries, which have a wide diversity of soil, climate, biodiversity, and management practices, contributing to 39% of global grain production.
- The United States of America (USA) is the largest producer of Maize, contributing nearly 30.99% of the total production in the world.
- Turkey has highest productivity of 13 metric ton per hectare followed by USA with 11 metric ton per hectare. India stands at 66th position in productivity with 3 metric ton per hectare.
- Maize is the third most important cereal crop in India after rice and wheat, accounts for around 10 percent of total food grain production in the country.
- It is predominantly a Kharif crop, with 85 percent of the area under cultivation during the season. The major Kharif Maize-growing states are Madhya Pradesh, Karnataka, Rajasthan, and Maharashtra.
- Among the Maize-producing states, Andhra Pradesh ranks 13th in cultivation area with 2.91 lakh hectares and is estimated to produce 19.04 lakh tonnes, contributing 5.34% to India's total production, with a productivity of 6543 kg/hectare.
- The country exported 1,442,671.48 metric tonnes of Maize, worth Rs. 366,009.57 lakhs, in 2023-24.
- Major export destinations for Indian Maize are Bangladesh, Vietnam, Nepal, Malaysia, and Sri Lanka.
- Maize MSP for 2024-25 is 2225 Rs./qtl, with an increase of 135 Rs./qtl compared to the previous year.
- In Andhra Pradesh cost of cultivation for the maize crop was Rs.1,18,156/ha, with BCR ratio is 1.10.

Maize or corn (*Zea mays*) is cultivated globally and is one of the most important cereal crops worldwide. It is known as the "*queen of cereals*" because of its highest genetic yield potential among the cereals. Every part of the Maize plant has economic value (the grain, leaves, stalk, tassel, and cob) and all are used to produce a large variety of food and non-food products. It is the most versatile crop and is grown in more than 166 countries across the globe. During 2022-23, Maize was cultivated on nearly 205 million hectares with an estimated production of 1163 million tonnes worldwide and USA continues to be the largest producer of Maize with a share of 31.3 percent in world production, followed by China (22.9%), Brazil (8.8%), EU (5.9%) and Argentina (4.5%) (Chart 4.5). India ranks seventh in the global Maize production and has a modest share of 2.7 percent in global Maize production.

The U.S. corn outlook for 2024/2025 anticipates larger supplies, increased domestic use and exports, and higher ending stocks. The projected corn crop is estimated at 1220 million tonnes, representing a 3% decrease from the previous year's record. This decline in area is partly offset by an increase in yield, with a projected yield of 32.3 ton/acer. This projection is based on a weather-adjusted trend, assuming normal planting progress and favourable summer growing conditions. Total corn supplies are forecasted at 1505.8 million tonnes, the highest since 2017/2018, owing to higher beginning stocks.

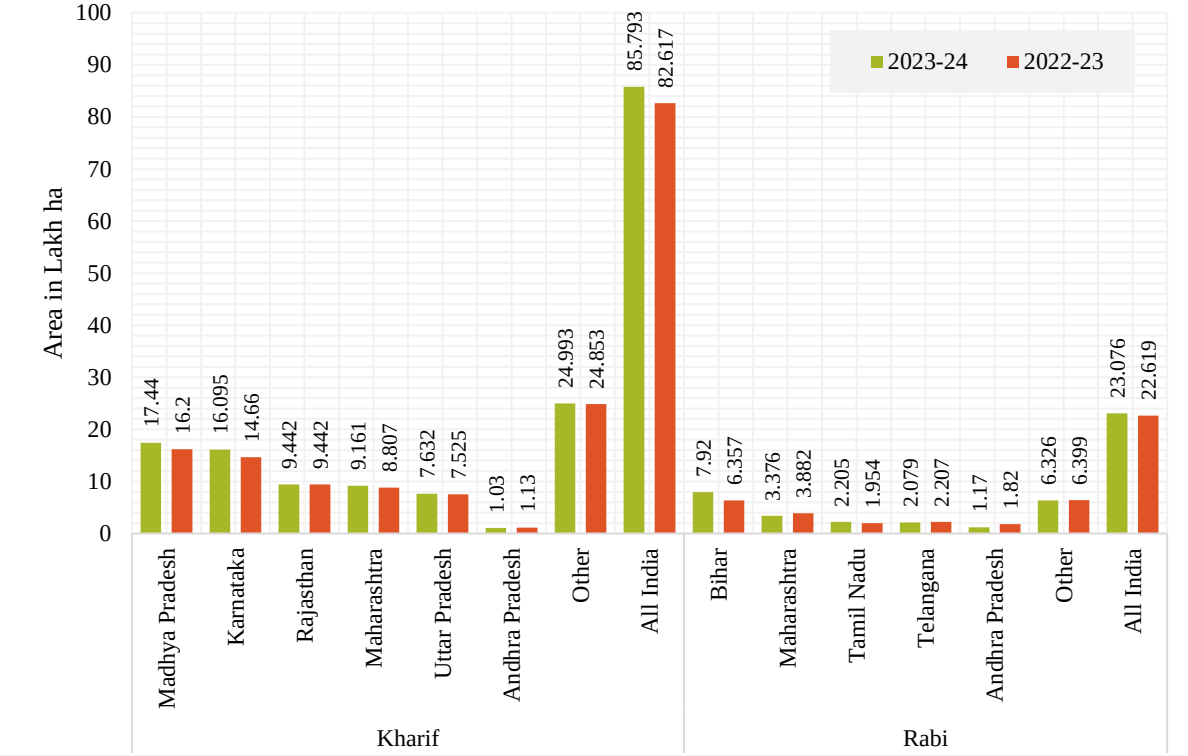
Table 1. Global Maize Projections (in million tonnes)

Particulars	2022-23 (Estimated)	2023-24 (Forecast)	2024-25 (Projected)
Supply			
Opening Stocks	297.8	279.5	285.8
Production	1163.2	1224.8	1220.0
Imports	178.3	186.5	175.4
Total Availability	1461.1	1504.3	1505.8
Demand			
Food	137.2	139.0	134.2
Feed	702.6	727.0	734.8
Industrial	304.1	315.1	317.1
Others	37.7	37.5	38.7
Total Consumption	**1181.6**	**1218.5**	**1224.8**
Exports	178.3	186.5	175.4
Ending Stocks	279.5	285.8	281.0

In India, Maize was sown on approximately 108.87 lakh hectares during 2023-24, an increase from 105.24 lakh hectares in the previous year. Over 78.8 percent (85.79 lakh hectares) of the Maize crop was cultivated during the Kharif season, with 23.08 lakh hectares grown during Rabi. There was a 3.8% increase in the Kharif Maize area and a 2.1% increase in the Rabi Maize area compared to the previous year (Figure 1). The major Kharif Maize-growing states are Madhya Pradesh (17.44 lakh hectares), Karnataka (16.09 lakh hectares), Rajasthan (9.44 lakh hectares), and Maharashtra (9.16 lakh hectares). During the Rabi season, Bihar (7.92 lakh hectares), Maharashtra (3.37 lakh hectares), and Tamil Nadu (2.20 lakh hectares) are the major growers.

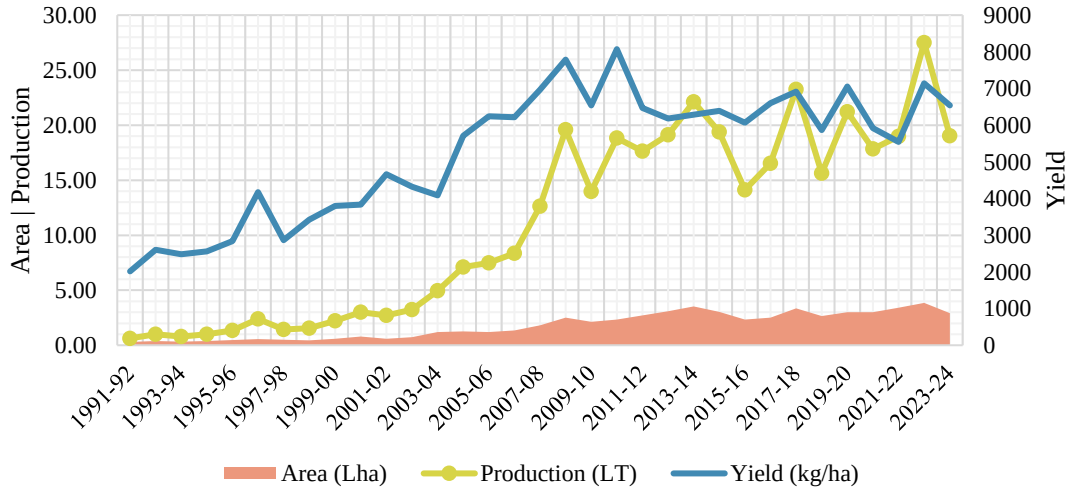
According to the 3rd advance estimates for 2023-24 by the Government of India, the Maize crop is estimated at 356.73 lakh tonnes, compared to 380.85 lakh tonnes in 2022-23. The leading states in the 3rd advance estimates for 2023-24 are Karnataka with 54.90 lakh tonnes, followed by Bihar with 46.13 lakh tonnes, Madhya Pradesh with 43.29 lakh tonnes, Tamil Nadu with 30.57 lakh tonnes, West Bengal with 26.78 lakh tonnes, Telangana with 26.68 lakh tonnes, and Maharashtra with 23.98 lakh tonnes.

Figure 1. Season wise major Maize growing states in India



Among the Maize producing states, Andhra Pradesh ranks 13th in cultivation area with 2.91 lakh hectares and is estimated to produce 19.04 lakh tonnes, contributing 5.34% to India's total production, with a productivity of 6543 kg/hectare in 2023-24 (3rd AE, DESAP). Over the last three decades, the Maize cultivation area in Andhra Pradesh increased by 838.71 percent, with a Compound Annual Growth Rate (CAGR) of 8.68% (Figure 2), and production increased by 2922.2 % (CAGR of 12.35%). The annual average productivity increased with a CAGR of 3.39%.

Figure 2. Maize Area, Production and Yield Statistics in Andhra Pradesh



Source: Author's estimation from DES data.

The major Maize growing districts in Andhra Pradesh, namely Bapatla, Eluru, Nandyal and Vizianagaram, hold 82.7 percent of the cultivation area and contribute 75.1 percent to the state's total Maize production (Table 2). However, Eluru (11844 kg/ha) ranks first in productivity, followed by Bapatla (11424 kg/ha) and Vizianagaram (7030 kg/ha). The average productivity of the state during 2022–23 was 7138 kg/ha.

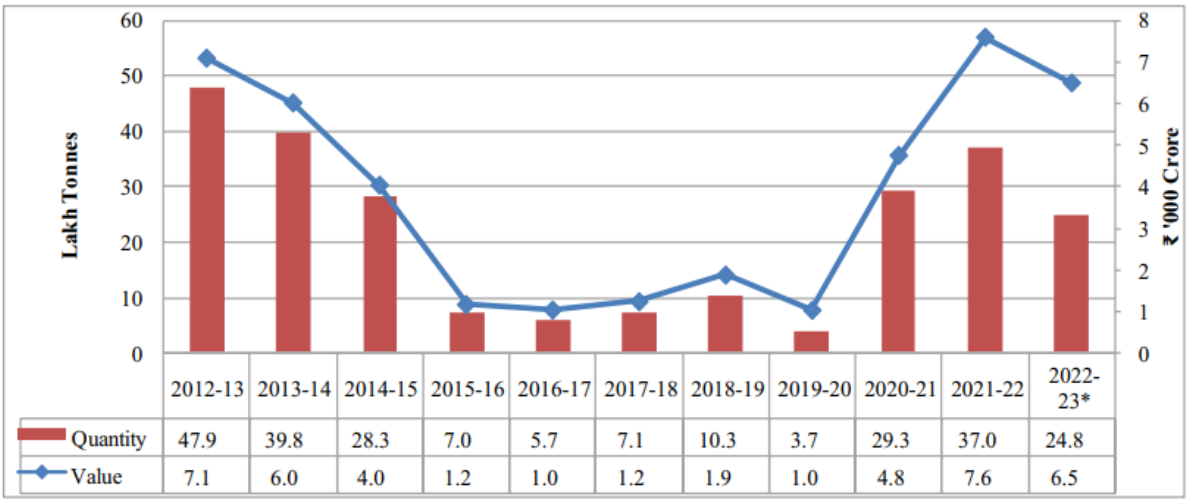
Table 2. Inter-District Comparison of Maize production in Andhra Pradesh (2022-23)

District	Area ('000 hectares)			Rank	Production ('000 tonnes)			Rank	Yield (Kg/ha)
	Kharif	Rabi	Total		Kharif	Rabi	Total		
Nandyal	49	22	71	1	222	105	327	3	4622
Bapatla	1	40	41	2	6	468	474	1	11424
Vizianagaram	13	24	37	3	53	206	259	4	7030
Eluru	1	29	30	4	2	350	352	2	11844
Srikakulam	10	18	28	5	44	148	192	5	6713
Sri Sathyasai	21	7	28	6	53	30	83	7	2954
Ananthapuramu	15	12	27	7	60	101	161	6	5856
Other	28	95	123		118	785	903		
Andhra Pradesh	**138**	**247**	**385**		**558**	**2193**	**2751**		**7138**

Source: Andhra Pradesh Agricultural statistics at a glance, 2022-23.

Maize is the third most important cereal crop in India after rice and wheat. It is a staple for human consumption and a quality feed for animals. In addition, Maize serves as a basic raw material for the manufacture of various industrial products like food sweeteners, starch, pharmaceuticals, cosmetics, textiles, etc. Exports of Maize from India were valued at ₹7.1 thousand crore in 2012-13 but thereafter steeply declined for four consecutive years, recording a mere one thousand crore rupees in 2016-17. After a brief recovery in 2018-19, Maize exports from India again decreased to one thousand crore rupees in 2019-20, owing to relatively higher domestic prices compared to international prices. This kept Indian Maize uncompetitive in the international market. However, in 2020-21, Maize exports increased significantly to 29.3 lakh tonnes due to a dip in Maize production in major producing countries like Argentina, Ukraine, and the United States. Subsequently, global Maize prices also rose. In 2021-22, Maize exports further increased to 37 lakh tonnes, and India recorded an all-time high value of ₹7.6 thousand crore. Major destinations for exports of Indian Maize during 2021-22 were Bangladesh, Vietnam, Nepal, and Malaysia. In 2022-23 (till December 2022), India's Maize exports were registered marginally lower at 24.8 lakh tonnes compared to 26.8 lakh tonnes during the same period the previous year. In contrast, export earnings were higher at ₹6.5 thousand crore in 2022-23 (till December 2022) compared to ₹5.3 thousand crore during the same period the previous year.

Figure 3. India's Exports of Maize, 2012-13 to 2022-23



	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23*
Quantity	47.9	39.8	28.3	7.0	5.7	7.1	10.3	3.7	29.3	37.0	24.8
Value	7.1	6.0	4.0	1.2	1.0	1.2	1.9	1.0	4.8	7.6	6.5

*Note: * For 2022-23 (April- December)*

Source: Directorate General of Commercial Intelligence & Statistics, Ministry of Commerce and Industry

The balance sheet in Table 3 explains that the demand for Maize in 2023-24 was projected at 30.12 million tonnes, with decreased exports of 2.68 million tonnes. Imports increased by 0.14 million tonnes compared to 2022-23. The total supply was 30.46 million tonnes, and the domestic consumption of Maize was 29.6 million tonnes in 2023-24.

Table 3. Balance sheet of Indian Maize (million tonnes)

Particulars	2022-23	2023-24
Supply		
Opening Stocks	1.72	2.58
Production	33.19	27.72
Imports	0.01	0.15
Total Supply	**34.92**	**30.46**
Demand		
Export	3.20	0.52
Domestic Consumption	29.14	29.60
Total Demand	**32.34**	**30.12**
Ending Stocks	2.58	0.34

Source: www.agriwatch.com

Maize consumption in India can be broadly categorized into three areas: feed, food, and industrial non-food products (mainly starch). The primary driver of Maize demand is its use as poultry and cattle feed, which accounts for 62 percent of total Maize consumption, while approximately 8 percent is used for human consumption. The major Maize-consuming states in India are Karnataka, Andhra Pradesh, Punjab, Gujarat, Haryana, Telangana, Tamil Nadu, Bihar, and West Bengal. Several factors drive Maize demand in India, including, Growing demand from the poultry sector, which consumes more than half of

the domestic production and increasing urbanization, leading to higher demand for processed foods like corn flakes and bakery products. The expanding organized dairy sector, which requires more fine cereals or Maize-based concentrates and rising international prices due to the diversion of Maize grain towards biofuel production.

Table 4. Cost-return structure of Maize in Andhra Pradesh 2023-24 (Rs. /ha)

S.No.	Particulars	Cost (Rs.)
1	Labour costs (Rs/ha)	42,246.07 (35.75%)
2	Material costs (Rs/ha)	31,741.65 (26.86%)
3	Variable costs (Rs/ha)	75,406.05 (63.82%)
4	Fixed costs (Rs/ha)	42,750.94 (36.18%)
5	**Total cost (Rs/ha) | Cost C2**	1,18,156.99 (100%)
6	Yield (Qtl/ha)	62.54
7	Price (Rs./qtl)	2,066.09
8	**Gross returns (Rs/ha)**	1,29,625.63
9	Net returns (Rs/ha)	11,468.64
10	Gross Margin (Rs/ha)	54,219.58
11	Return on rupee BCR	1.10
12	Return on VC	1.72
13	COP [C2] (Rs./qtl)	1,889.30

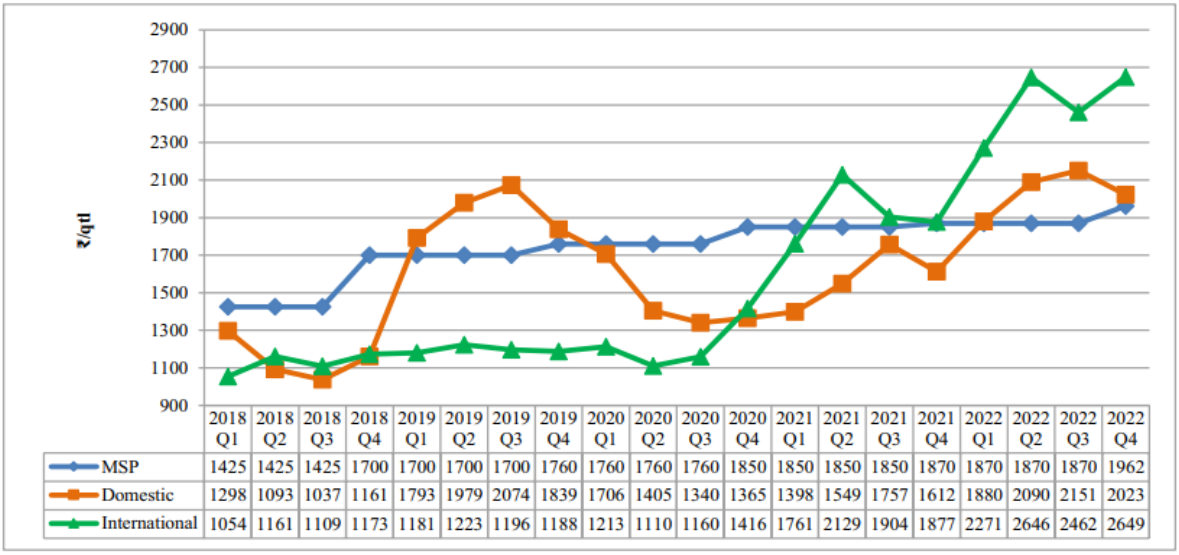
Source: Survey Data, BCR-Benefit Cost Ratio, VC – Variable Costs

The cost-return structure of Maize in Andhra Pradesh for the year 2023–24 is presented in Table 4. Cultivation of Maize costs Rs. 1,18,156.99 per hectare, among which labor costs have a lion share of 35.75 percent of the total cost. In total, the working capital share is 63.82 percent, and the fixed capital share is 36.18 percent. The cost of production for Maize was Rs. 1,889.3 per quintal. Gross margin refers to returns over variable costs, which pertain to owner farmers, while net returns refer to returns over total costs, which pertain to tenant farmers. The gross margin and net returns were Rs. 54,219.58 per hectare and Rs. 11,468.64 per hectare, respectively. The return on rupee investment was 1.10, which concerns tenant farmers, and the return on variable costs was 1.72, which mostly relates to owner farmers.

Maize Production and Price Outlook:

Figure 4 shows the comparative trends in domestic market prices, MSP, and international prices of Maize during the period 2018 to 2022. It can be seen that the domestic prices of Maize were higher than the international prices until Q3 of 2020, except for being marginally lower in Q2, Q3, and Q4 of 2018 and Q4 of 2020. This made Indian Maize less competitive in the international market. However, since Q4 of 2020, both domestic and international Maize prices have surged steadily, with international prices surpassing domestic prices. The domestic prices of Maize remained below MSP during the period 2018 to 2021, except in 2019, and have hovered above the MSP since the beginning of 2022 due to the global spike in Maize prices. MSP, Domestic and International Prices of Maize, 2018 to 2022.

Figure 4. MSP, Domestic and International Prices of Maize, 2018 to 2022



	2018 Q1	2018 Q2	2018 Q3	2018 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4
MSP	1425	1425	1425	1700	1700	1700	1700	1760	1760	1760	1760	1850	1850	1850	1850	1870	1870	1870	1870	1962
Domestic	1298	1093	1037	1161	1793	1979	2074	1839	1706	1405	1340	1365	1398	1549	1757	1612	1880	2090	2151	2023
International	1054	1161	1109	1173	1181	1223	1196	1188	1213	1110	1160	1416	1761	2129	1904	1877	2271	2646	2462	2649

Notes: *1. Maize (US), No. 2, yellow, f.o.b. US Gulf ports for international price of maize.*

Source: *1. Directorate of Economics & Statistics, Ministry of Agriculture and Farmers Welfare for MSP*

2. AGMARKNET, Ministry of Agriculture and Farmers Welfare, for computing weighted average domestic wholesale prices

3. World Bank for international prices

Percent deviations from yearly average prices were calculated for Maize for the year 2023–24 using monthly modal prices from Kurnool AMCs of Andhra Pradesh (Table 5). The results depict deviations (SD- 77.3 %) in monthly arrivals of Maize, with more than 52.42 percent of annual Maize arrivals reported in October, November and March months. The prices show less variation (9.5%) from an annual average price of Rs. 1,032 per quintal, where maximum prices reported in the month of May (Rs. 2,268 per quintal).

Table 5. Seasonal Variations of Maize arrivals and prices in major markets of A.P.

Months	**Arrivals**		**Price**	
	Quantal	**% deviation**	**Rs. /Qtl**	**% deviation**
Jun-23	726.00	70.33	1541.32	78.70
Jul-23	89.00	8.62	1972.75	100.73
Aug-23	50.00	4.84	1819.60	92.91
Sep-23	197.00	19.08	1876.50	95.82
Oct-23	2089.00	202.37	1917.60	97.92
Nov-23	1762.00	170.70	1796.09	91.71
Dec-23	852.00	82.54	2035.30	103.93
Jan-24	893.00	86.51	2071.42	105.77
Feb-24	1127.00	109.18	2021.00	103.20
Mar-24	2642.00	255.95	2098.35	107.15
Apr-24	1147.00	111.12	2082.43	106.33
May-24	813.00	78.76	2268.67	115.84
Average	1032.25	100.00	1958.42	100.00

Source: Data obtained from Kurnool AMC

Table 6: Minimum Support Price for the Maize from 1980-81 to 2023-24.

Years	MSP	Difference in amount increase over preceding year
1980-81	105	75
1990-91	180	
2000-01	445	435
2010-11	880	
2015-16	1325	
2016-17	1365	40
2017-18	1425	60
2018-19	1700	275
2019-20	1760	60
2020-21	1850	90
2021-22	1870	20
2022-23	1962	92
2023-24	2090	128
2024-25	2225	135

From the table 6, it shows the MSP prices for the Maize over the years, the major hike was occurred in the year 2010-11 with difference from the previous year of Rs. 1970. Another significant increase appeared during the year 2018-19. Maize MSP prices increased in 2024-25 by Rs. 135 compared to the previous year.

Table 6. MSP vis-a-vis Market Prices of Maize in Andhra Pradesh during June-23 to May-24

Crop	MSP (Rs./qtl)	Major Markets	Average days and months of trading			
			Greater than MSP		Less than MSP	
			No. of Days	Month	No. of Days	Month
Maize	2090	Kurnool, Rayadurg	146	December to May	138	June to September

Source: **vyavasayamarketingshakha.ap.gov.in**

Table 6 shows the number of days when the market prices of Maize were above, equal to, or below the MSP in major markets of Andhra Pradesh during June-May, 2023-24. On average, for 146 days from December to May, Maize prices were above the MSP, while for 138 days from June to September, prices were below the MSP.

According to DGCIS, India exported 45,073 MT of Maize in March 2024, marking an 80% decrease compared to March 2023. The main destinations for export were Nepal, Bhutan, and Thailand which are the neighbouring countries. India imported 55,000 MT of Maize during March 2024, which is a 229% against 16,700 MT during April 2023 to March 2024 period. Most of the corn was imported from Ukraine.

Based on data from the Directorate of Economics and Statistics, Andhra Pradesh (DESAP), the time series analysis shows that the area for Maize cultivation is expected to increase to 139 thousand hectares during the kharif season and 203.67 thousand hectares during the rabi seasons of 2024-25. Under normal conditions, the estimated annual production is 2361.26 thousand tonnes in Andhra Pradesh.

Under these circumstances, Agricultural Market Intelligence Centre, ANGRAU expects that Maize could trade in price range of **Rs. 1970 - 2175** quintal during kharif harvesting / marketing season, 2024.

Note: The predicted / forecast values given in the report were estimated using historical data analysed by different econometric models with the assumption of prevalence of normal weather and market conditions.

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