Maize

Introduction

Maize is the third most important cereal crop in India after rice and wheat. It is grown throughout the year in India. It is predominantly a kharif crop with 85 per cent of the area under cultivation in the season. It accounts for 9 per cent of total food grain production in the country. Most of the maize in India is used in the poultry feed industry. Poultry industry is heavily dependent on maize as it forms 50-60 per cent of the input required for broiler feed and 25-35 per cent of the input required for layer feed. Maize is the preferred source of energy in feed when compared with other substitutes due to availability, higher energy and price economics. Poultry feed's share has remained around 45-50 per cent of the total demand for maize in the country over the past 4-5 years. Maize is the basic raw material required for manufacturing starch and constitutes 60-70 per cent of the total operating costs. Maize has 60-65 per cent starch content, hence cannot be easily substituted by other commodities. Amongst the top importing countries, Japan, Korea and China are both much closer to India than USA, Brazil and Argentina (top exporting countries). India could have a cost advantage due to lower shipping costs. Malaysia, Vietnam, Philippines, Indonesia are the other Asian countries which import maize and the high demand in these countries is expected to increase their maize import quantity.

Domestic Scenario

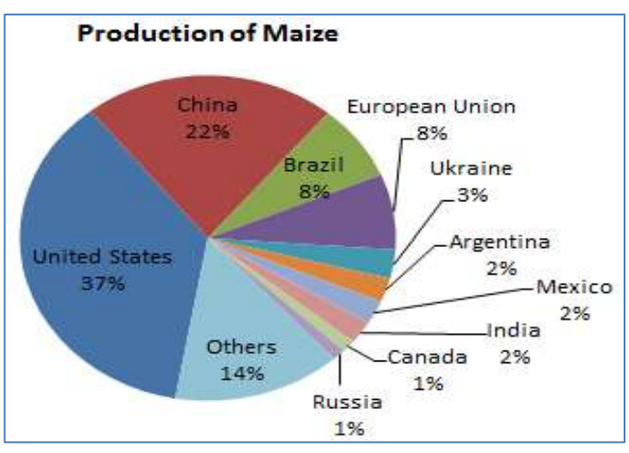
India's Maize production in 2012-13 is estimated at around 22.25 million MT, which is marginally increase from 21.75 million MT produced in 2011-12. The major maize growing states in India are Andhra Pradesh, Karnataka, Bihar, Maharashtra, Rajasthan, Madhya Pradesh, Uttar Pradesh, Tamil Nadu, Gujarat and Himachal Pradesh. Over 48.55 per cent of the total production for the country was contributed by 3 states. The top barley producing states of the country are Andhra Pradesh (21.81 per cent), Karnataka (15.61 per cent) followed by Bihar (11.12 per cent) and Maharashtra (8.19 per cent).

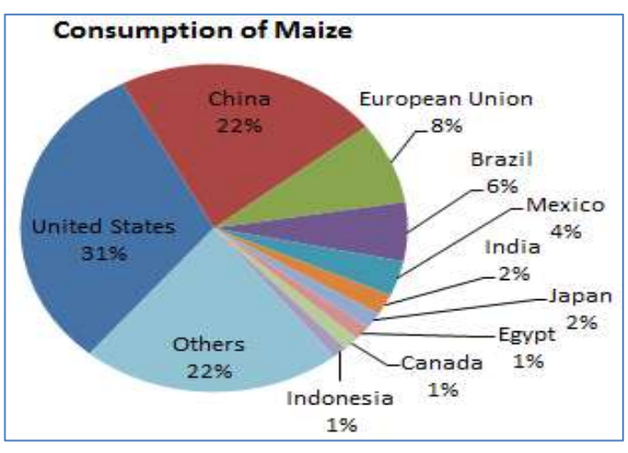
Maize Production in India **('000 MT)**

State	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Andhra Pradesh	2477	2064	3087	2462	3621	4152	2762	3956	3658	4855
Karnataka	1210	2512	2728	2719	3254	3029	3013	4444	4085	3475
Bihar	1474	1466	1361	1715	1455	1714	1479	1440	1611	2476
Maharashtra	752	753	996	1150	1790	1560	1828	2602	2433	1824
Rajasthan	2071	1263	1102	1116	1955	1828	1146	2053	1667	1755
Madhya Pradesh	1866	1253	1249	840	1133	1144	1045	1052	1287	1514
Uttar Pradesh	1319	1494	1054	1164	1209	1198	1039	1114	1308	1234
Tamil Nadu	251	295	241	759	811	1258	1144	1028	1695	946
Gujarat	832	413	560	363	583	739	533	820	786	791
Himachal Pradesh	730	736	543	695	863	677	543	671	715	657
Others	2004	1925	1788	2113	2282	2432	2187	2547	2513	2731
All India	**14984**	**14172**	**14710**	**15097**	**18955**	**19731**	**16719**	**21726**	**21759**	**22258**

Source: Ministry of Agriculture

Overall India's maize production has increased by about 48.54 per cent over the decade (2003-13). During the above period the maximum growth in production was seen in Tamil Nadu (276.97 per cent). The other top four maize growing states with significant growth in production are Karnataka (187.21 per cent), Maharashtra (142.55 per cent) and Andhra Pradesh (96.00 per cent).





International Scenario

The global maize scenario also expected to affect the prices in a big way. To measure the exact impetus of the global factors, we can have a close watch at the global maize balance over the last 15 years. From the table we can see that the global production over the years have shown gradual improvement by about 67.24 per cent in the last 15 years. Likewise the export and consumption grew by 55.20 and 59.85 per cent respectively. The positive fact about the Maize trade is the growth in the consumption over the years and the consistent increase in the production. If this pattern of consumption (rate of growth) continues in the coming years, the prices are bound to maintain a steady uptrend as the supply is always going to lag behind the demand.

World Maize: Supply and Demand (Million MT/Ha)

Years	Area Harvested	Production	TY Exports	Domestic Consumption	Ending Stocks
2000-01	137.10	591.80	75.90	610.90	175.30
2001-02	137.30	601.80	72.70	625.60	151.50
2002-03	137.40	603.90	76.80	628.60	126.80
2003-04	141.70	627.40	79.00	649.70	104.60
2004-05	145.40	716.80	76.00	690.30	131.10
2005-06	145.40	700.70	82.50	708.30	123.50
2006-07	150.30	716.60	91.30	730.70	109.40
2007-08	160.40	795.50	98.20	775.00	129.90
2008-09	158.70	799.70	83.60	784.30	145.30
2009-10	158.50	824.90	92.70	826.10	144.20
2010-11	164.60	835.40	91.70	852.00	127.60
2011-12	172.10	888.20	103.70	883.60	132.10
2012-13	177.60	868.00	100.50	864.50	135.70
2013-14	180.60	989.60	129.70	953.10	172.10
2014-15	178.20	989.70	117.80	976.50	185.30

Source: USDA

Country wise Trends in Production, Consumption and Ending Stocks ('000 MT)

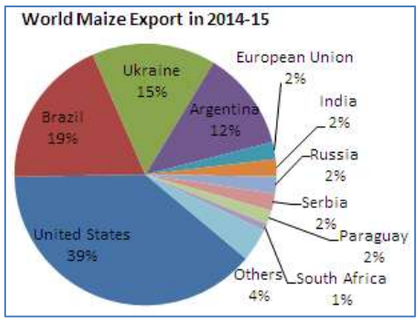
Country	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
Production										
United States	2,82,263	2,67,503	3,31,177	3,05,911	3,31,921	3,15,618	3,12,789	2,73,192	3,51,272	3,61,091
China	1,39,365	1,51,600	1,52,300	1,65,914	1,63,974	1,77,245	1,92,780	2,05,614	2,18,490	2,15,500
Brazil	41,700	51,000	58,600	51,000	56,100	57,400	73,000	81,500	80,000	75,000
European Union	63,168	55,629	49,355	64,821	59,151	58,272	68,123	58,896	64,259	74,160
Ukraine	7,167	6,426	7,421	11,447	10,486	11,919	22,838	20,922	30,900	28,450
Argentina	15,800	22,500	22,017	15,500	25,000	25,200	21,000	27,000	26,000	23,500
Mexico	19,500	22,350	23,600	24,226	20,374	21,058	18,726	21,591	22,880	23,200
India	14,710	15,100	18,960	19,730	16,720	21,730	21,760	22,260	24,260	22,500
Canada	9,332	8,990	11,649	10,643	9,796	12,043	11,359	13,060	14,194	11,500
Russia	3,060	3,510	3,798	6,682	3,963	3,075	6,962	8,213	11,635	11,500
Others	1,04,631	1,12,013	1,16,662	1,23,838	1,27,457	1,31,819	1,38,826	1,35,748	1,45,718	1,43,260
World	**7,00,696**	**7,16,621**	**7,95,539**	**7,99,712**	**8,24,942**	**8,35,379**	**8,88,163**	**8,67,996**	**9,89,608**	**9,89,661**
Consumption										
United States	2,32,015	2,30,674	2,61,632	2,58,041	2,80,987	2,84,549	2,77,914	2,62,973	2,93,045	3,02,147
China	1,37,000	1,45,000	1,50,000	1,53,000	1,65,000	1,80,000	1,88,000	2,00,000	2,12,000	2,16,000
European Union	63,800	64,300	65,900	63,600	61,300	64,900	69,500	69,600	76,500	78,500
Brazil	39,500	41,000	42,500	45,500	47,000	49,500	50,500	52,500	55,000	56,500
Mexico	27,900	30,700	32,000	32,400	30,200	29,500	29,000	27,000	31,700	33,550
India	14,200	13,900	14,200	17,000	15,100	18,100	17,200	17,500	19,600	20,000
Japan	16,700	16,500	16,600	16,700	16,300	15,700	14,900	14,500	15,100	15,400
Egypt	10,100	10,700	10,400	11,100	12,000	12,500	11,700	12,000	13,200	13,800
Canada	10,804	11,442	13,769	11,738	11,868	11,761	11,636	11,605	12,700	12,900
Indonesia	8,300	8,100	8,500	8,900	8,800	9,800	10,500	10,900	11,900	12,000
Others	1,47,231	1,54,684	1,59,144	1,64,430	1,70,490	1,76,666	1,85,752	1,90,152	2,04,134	2,11,682
World	**7,07,550**	**7,27,000**	**7,74,645**	**7,82,409**	**8,19,045**	**8,52,976**	**8,66,602**	**8,68,730**	**9,44,879**	**9,72,479**
Ending Stocks										
China	35,255	36,602	38,394	51,183	51,302	49,415	59,335	67,570	77,315	79,215
United States	49,968	33,114	41,255	42,504	43,380	28,644	25,122	20,859	31,292	45,149
Brazil	3,017	3,594	12,581	12,086	9,991	10,278	9,212	14,150	18,950	17,750
European Union	9,881	7,729	4,727	6,532	5,572	5,233	6,682	5,147	6,424	7,584
Iran	1,547	2,363	2,474	2,502	2,795	2,790	3,386	2,486	2,986	3,086
Mexico	2,707	3,084	4,131	3,559	1,389	1,112	1,316	1,061	2,694	2,744
Ukraine	1,031	1,204	825	937	672	1,121	1,051	1,191	2,237	2,337
Egypt	641	912	826	1,383	1,482	1,272	2,220	1,069	2,159	1,599
Pakistan	682	676	812	811	680	789	942	1,254	1,609	1,514
India	326	322	613	748	453	576	570	651	1,450	1,460
Others	18,443	19,773	23,278	23,060	26,464	26,379	22,293	20,224	25,021	22,839
World	**1,23,498**	**1,09,373**	**1,29,916**	**1,45,305**	**1,44,180**	**1,27,609**	**1,32,129**	**1,35,662**	**1,72,137**	**1,85,277**

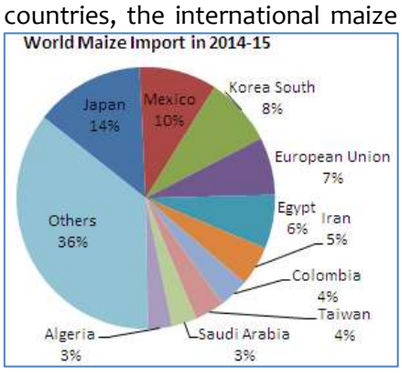
Source: Foreign Agricultural Service, Official USDA Estimates

From the above table, we can see that the global production over the years have shown gradual improvement. It showed an increase of about 41.24 per cent over the last ten years. The top maize producing countries are United States (36.49 per cent), China (21.78 per cent), Brazil (7.58 per cent), European Union (7.49 per cent), and Ukraine (2.87 per cent). During this period the maximum growth in production was seen in Ukraine (296.96 per cent). Likewise the consumption has improved by (37.44 per cent). It was seen in United States (31.07 per cent), China (22.21 per cent), European Union (8.07 per cent), Brazil (5.81 per cent) and Mexico (3.45 per cent). There has been global ending stock increased by 50.02 per cent. The maximum ending stock contribution was seen in China (42.75 per cent), United States (24.37 per cent), Brazil (9.58 per cent), European Union (4.09 per cent) and Iran (1.67 per cent).

World Maize Trade ('000 MT)

In the international maize trade, a relatively small number of exporting countries must interact with a large number of importing countries. However, because of market segmentation, some of the larger maize importers have had major impacts on world maize prices. The top four importing nations accounts for 84.88 per cent of the total global imports of which 38.62 per cent is done only by United States. The other countries worth mentioning are Brazil (18.67 per cent), Ukraine (15.28 per cent) and Argentina (12.31 per cent). The major countries involved in the export of maize are explained by the following chart. Because of the high concentration of exports coming from only a few countries, the international maize market is vulnerable to disruptions in supply from major exporting countries, leading to higher world prices. This means that a sudden change in production trade policy in one or more of these countries could have a major impact on world market flows and prices. More maize exports from a larger number of countries will help buffer future trade against some of the causes of instability that have been described. However, world prices are likely to remain unstable, as production shocks occur or trade policies change in the major exporting countries. Climate change could also contribute to the instability in prices, depending on how it affects productivity in maize-producing countries. As per the details top five maize exporting countries contributed 45.71 per cent. The top barley producing countries are Japan (13.69 per cent), Mexico (9.69 per cent), Korea South (8.54 per cent) and European Union (7.11 per cent).





Major Importers of Maize in World **('000 MT)**

Country	2010-11	2011-12	2012-13	2013-14	2014-15
Japan	15648	14892	14412	15121	15400
Mexico	8252	11172	5676	10954	10900
Korea South	8107	7636	8174	10406	9600
European Union	7385	6113	11362	15919	8000
Egypt	5803	7154	5059	8500	7500
Iran	3500	4000	3700	5500	5500
Colombia	3511	3209	3264	4333	4200
Taiwan	4134	4341	4232	4400	4200
Saudi Arabia	1933	1816	2063	2684	3500
Algeria	2683	3203	2909	4200	3400
Others	30025	37640	37981	40906	40260
World Total	**90981**	**101176**	**98832**	**122923**	**112460**

Source: Foreign Agricultural Service, Official USDA Estimates

Major Exporters of Maize in World **('000 MT)**

TY Exports	2010-11	2011-12	2012-13	2013-14	2014-15
United States	45162	38389	18262	50707	45500
Brazil	11582	12674	26044	22041	22000
Ukraine	5008	15157	12726	20004	18000
Argentina	15198	16501	22789	12846	14500
European Union	1096	3287	2193	2401	2500
India	3376	4674	4768	3889	2500
Russia	37	2027	1917	4192	2500
Serbia	2004	2331	601	1736	2500
Paraguay	1201	2188	2858	2714	2000
South Africa	2839	1831	2398	2104	1000
Others	4206	4665	5956	7061	4815
World Total	**91709**	**103724**	**100512**	**129695**	**117815**

Source: Foreign Agricultural Service, Official USDA Estimates

Crop Calendar

In most parts of India, maize during kharif is sown with the break of monsoon, the actual dates varying from region to region. It is sown in early March in north-eastern hills, in April to early May in north-western hills, in May-June in Peninsular India, in the end of June to mid-July in the Indo-Gangetic Plains. The late sowing of maize may extend up to late August in certain irrigated tracts of Punjab. Spring maize is sown in late January to the end. Rabi maize is generally sown in Bihar, Andhra Pradesh, Tamil Nadu and Karnataka in the end of October to mid-November. Both the spring and the rabi crops are raised, more or less, under irrigation.

Crop Calendar of Maize for Major States in India **(K – Kharif R - Rabi)**

States & Season	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Andhra Pradesh (K)												
Andhra Pradesh (R)												
Karnataka (K)												
Karnataka (R)												
Bihar (K)												
Bihar (R)												
West Bengal (K)												
West Bengal (R)												
Maharashtra (K)												
Madhya Pradesh (K)												
Uttar Pradesh (K)												
Gujarat (K)												
Haryana (K)												
Himachal Pradesh (K)												
Orissa (K)												
Punjab (K)												
Rajasthan (K)												

Sowing | Harvesting

Source: Indian Council of Agricultural Research (Crop Science Division)

Different types of maize:

- **Field maize** in the U.S. is used mainly to feed livestock, but in other countries is used for human consumption as well.
- **Sweet maize**, the type most commonly eaten in the U.S., is a genetic variation that accumulates more sugar and less starch in the kernels; it is usually shorter than field maize.
- **Baby corn**, popularly used in Asian cuisine, is a variety of maize developed to produce many small ears, rather than a few larger ones. The ears are harvested very young while they are still immature, and are tender enough for the whole ear to be eaten.
- **Popcorn**, the ability of maize kernels to "pop" and expand upon heating, was also discovered by the Native Americans.

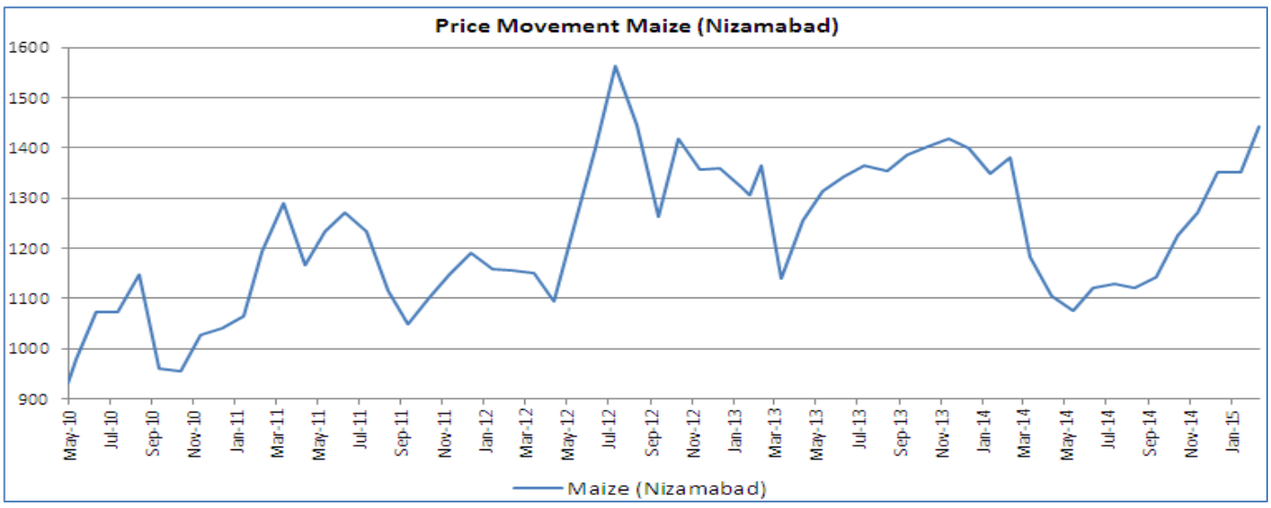
Different uses of maize:

- Maize flour, or meal, is made into a thick porridge in many cultures (polenta, Italy; angu, Brazil; mãmãligã, Romania; sadza, nshima, ugali, and mealie pap, Africa). Maize meal is also used as a replacement for wheat flour, to make cornbread and other baked products.
- Masa (maize meal treated with lime water) is the main ingredient for tortillas, atole, and many other dishes of Mexican food.
- Cornstarch is made from maize kernels, which are high in starch, and used as a thickening agent in soups.
- Maize syrup is used as a sweetener instead of sugar in thousands of products, including soda, candy, cookies and bread.
- Kitty litter made from maize is environmentally-friendly.
- Maize for cows, hogs, catfish and chickens: the largest market for maize in the U.S. is actually as food for livestock (sometimes called fodder, or silage). Cows eat field corn, not the sweet corn that people in the U.S. usually eat. Maize is also a large component of commercial chicken feed, as well as food for catfish, especially in farmed catfish.

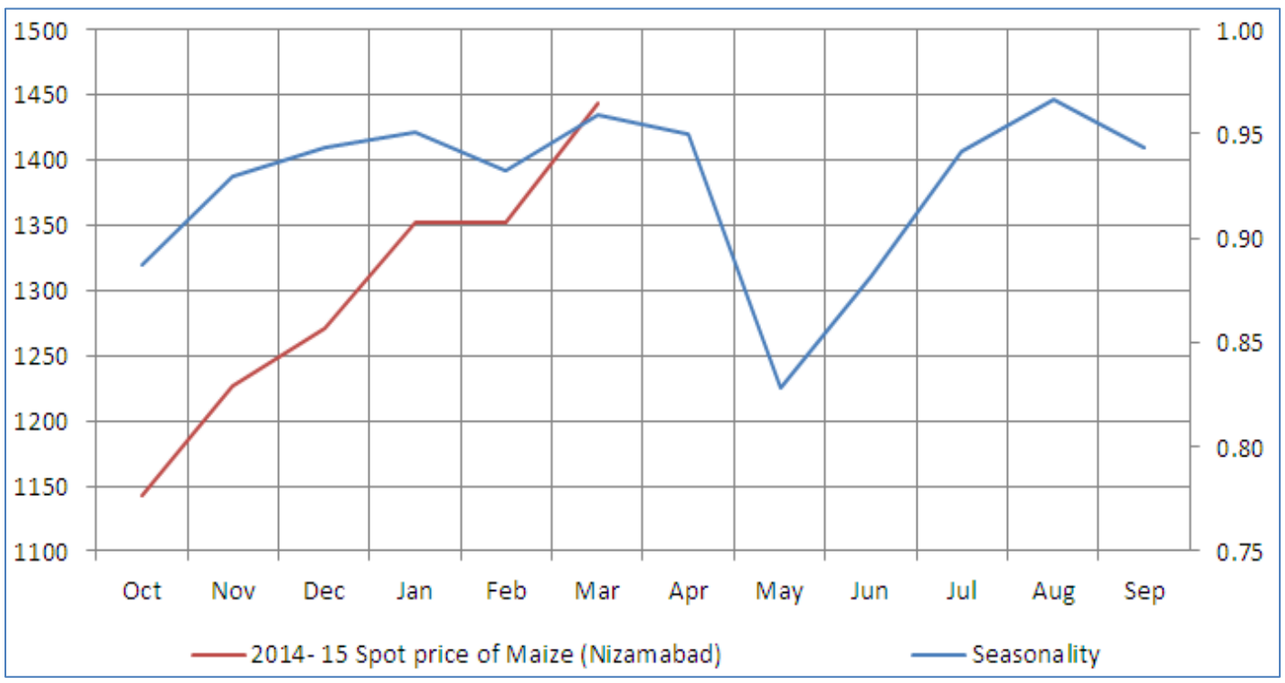
Important Factors Driving Maize Prices

- Department of Agriculture, Government of India, in 2014- 15 expected maize production is 23 million MT which is 2 per cent higher than the previous year. Karnataka is the highest producer of maize in India contributing 18.94 per cent followed by Andhra Pradesh (17.42 per cent), Maharashtra (10.65 per cent), Rajasthan (7.74 per cent), Tamil Nadu (7.27 per cent) and Bihar (7.04 per cent). As per ministry of agriculture, maize have been sown in 12.22 lakh hectares as on 2nd January, 2015 during Rabi season, lower by 0.42 lakh hectares as compared to last year.
- According to US Department of Agriculture (USDA), Indian maize output for 2014-15 is forecast at 21 million MT, down from 23 million MT last year. The third advanced estimates of India Agriculture Ministry have put maize output for 2013-14 at 24.19 million MT.
- In India, the kharif output this year to be lower by 10-15 per cent on lower acreage. Delayed and deficit monsoon has hit the kharif acreage and the maize was planted in 57.85 lakhs ha approximately, some 17 lakh ha lower than last year.
- Global maize output is now expected to decline by 2 per cent year-on-year in the forthcoming crop year to 950.5mt, with the projection for total grain production revised down by 14 million MT from the IGC's March report to 1.935 billion MT.
- United States Department of Agriculture (USDA) predicted that global maize production for 2014-15 will be 979.1, million MT which is 1.25 per cent higher than previous year's production and also global stocks in 2013-14 is estimated to be 7.69 per cent higher than 2012-13.
- Geo-political tensions arising out of problems Ukraine is facing after a political upheaval are seen fuelling demand for Indian maize (corn). With exports picking up in recent weeks after a rather muted start to shipments in the current marketing year starting September, demand prospects look good.
- Ukraine, the world's third-largest maize grower, planted 4.6 million ha of maize in 2014 and harvested 27.0 million MT, according to an estimate by the USDA. Ukraine's sown maize area could fall by up to 7 per cent this crop year due to higher planting costs and a jump in prices of foreign seeds, analysts at UkrAgroConsult said in a recent report.
- Mexico will produce about 24 million MT of maize in the current 2014-2015 season, up about 6 per cent compared to the previous harvest, according to the agriculture ministry. As per USDA, private exporters reported sales of 157,500 MT of U.S. maize to Mexico for delivery in the 2014-15 marketing year, which started on Sept. 1. USDA increased its maize ending stock forecast for Mexico by 0.049 million MT.
- China's maize imports fell 11 per cent in January from the year ago month, but shipments from Ukraine soared as suppliers there stepped up loadings to honour contracts signed last year.
- As Ukraine's position of maize exporter has strengthened over the last year, the Black Sea country continues to set its eyes on boosting trade with China and loosening its EU ties.
- A mixture of extremely wet conditions in 2014 and a projected dry outlook for southwestern Manitoba is leading one maize-expert to predict less maize acres in 2015.
- Argentina will produce 22.5 million MT of commercial-use maize in the 2014-15 crop cycle, the Buenos Aires Grains Exchange forecast. USDA decreased its production forecast for Argentina by 1 million MT to 22 million MT from the previous month estimates for 2014-15. Also, decreased its export forecast by 0.5 million MT to 12 million MT for 2014-15.
- The higher global carryover which results, also weighs on the 2014-15 balance sheet. Lower US production was partially offset by lower projected animal feed demand and an increase to EU production. It is expected a second straight record crop of maize that will boost domestic stockpiles already at a four-year high. Output in the U.S.A will jump 2.8 per cent to 14.314 billion bushels, the most ever. Improved output in the U.S will help boost global inventories by 8 per cent next year to 182.65 million MT, the highest in 15 years.

Price Trend Analysis



Indian Maize prices remained in general uptrend amid the increasing government support in the form of MSP. Sharp gains in wheat prices during year 2006 that has shifted feed demand along with higher global prices that has allowed exports kept the Indian maize prices on uptrend with prices reaching the high of INR 1550 per quintal during the July 2012. Also continued rise in MSP has helped in arresting any fall in prices. Nevertheless, a steep correction in prices was seen since Nov'10 with the sharp fall in global maize prices that has dampened export demand, and significant growth in domestic production, amid higher acreage paving way for increased domestic supplies. Prices have reached a low of INR 980 per quintal by Nov 2010. The higher MSP at INR 1310 per quintal has arrested any significant fall in prices and another uptrend in prices has started thereafter, with significant improvement in production during the year 2013-14 amid good monsoon rains, Indian share in global trade is likely to improve. Also, the expected drops in wheat and rice production for the year 2014-15 is likely to provided lateral support to the maize prices and keep it on the higher side.



Looking at the seasonal trends, it can be observed that Indian Maize prices tend to remain strong during the months of March-April as the demand from Poultry feed manufacturers remains strong after the onset of monsoon weather bringing down temperature. This trend can be observed despite the increase in acreage of the crop in Kharif season. Nevertheless, prices tend to fall, rather sharply from month of October as the Kharif harvest pressure looms. During the year 2014-15, it appears that Indian maize prices have followed the seasonal trend throughout the entire season, though the degree of upsurge in the May-June period is likely to be steep. The expected disruptions in the monsoon rains towards the start of the season in 2014-15 would be main reason for the sharp upsurge.

Technical Recommendation

Explanation:

Marginal divergence is seen in the (Moving Average Convergence - Divergence) MACD curves for the duration of 7 days and 21 days. The lower 7 day moving average is intersecting the 21 days moving average from the lower side and is approaching the mean level, which is denoting that the weakness of price movement is likely to continue. The Parabolic SAR refers to a price and time based trading system. SAR stands for "stop and reverse." SAR trails price as the trend extends over time. In the case of maize, the SAR is pointing to the lower side for the last 12 weeks indicating the underlying weakness in the prices.

Technical Recommendation:

The market is expected to find very strong support at the levels of 1100 on the downside and has good potential of rising to 1420 and 1680 on the higher side, though the initial momentum is range bound. Thus, as per my analysis of wheat fundamentals, the prices would experience bullishness after breaching the 1280 mark on the up side.

Price Expectation

Commodity	Units	Current Market (26.03.2015)	Minimum Support Price (MSP)	Market View	Technical Projections		
					Resistance	T1	T2
Wheat	Rs. / Qtl	1171	1310	↑	1580	1780	1850