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The Way Forward for Hedging Price Risk in Maize: A Price Discovery Mechanism

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Abstract

Maize is a highly versatile cereal crop that finds extensive use in feed, food, and industry. The period of the study is 1950-51 to 2021-22. The impressive growth rate of maize production, which has increased at a compounded annual growth rate of 4.3 per cent from 12 million tons (mt) in 2000-01 to 33.6 million tons in 2021-22 is a testament to its importance in the agricultural sector. Globally, 54 per cent of the maize produced is mainly used as feed, mainly for poultry and cattle, 33 per cent of the produce is used for food, seed and industrial use. Thus, it is rightfully referred to as the 'Queen of cereals'. Farmers tend to receive lower prices as they flock to the APMC mandis just after the harvest season. Maize has the highest volatility with a coefficient of variation of 43.3 per cent, compared to egg (37.1 per cent), chicken (25.3 per cent), and its competing crop, soybean (41.7 per cent). This high volatility not only affects farmers' earning but also consumers. The study firmly suggests that farmers in their significant maize-producing regions must have access to the best markets and should be able to hedge their price risks through futures markets. Out of all agricultural commodities traded at NCDEX, Maize has been the largest commodity traded since 2016. The integration of negotiable warehouse receipt systems with e-NAM can further help them overcome liquidity constraints immediately after harvest. The study strongly urges to implement reforms in the APMC markets, e-NAM, warehouse receipt system, futures markets, and contract farming laws to hedge price risk in the maize market.

Keywords: Maize, Marketing, Price risk, Reforms

JEL Classification: Q1, Q11, Q13, Q17, Q23

Introduction

Maize is one of the most important cereal crops in the world with a global production of 1096 million metric tonnes and ranks third in India after rice and wheat which contributes about nine percent of total volume of cereals produced (Rani and Singh 2018 and Bobenrieth E *et al* 2013). The acreage and productivity of maize has touched 10 lakh ha and 3.3 tons/ha in 2021-22 which is the highest than the past three years. The production has increased from 33.6 million tons in 2021-22 to 28.77 million tons in 2019-20 (GoI 2022) shows increase in its demand driven from the poultry sector for its feed requirement, as well as other factors like adoption of high-yielding seeds and acreage expansion in non-traditional states. With its varied uses and continued growth, maize presents a significant opportunity for the agricultural industry to explore and optimize its potential. The maize farmers continue to face a variety of risks which include price risk, marketing risk, climate and biological risk (Musser and Patrick 2022; Zulfiqar *et al* 2016; World Bank 2011). Due to the existence of heavy risk in maize production, it is important to know how farmers perceive these risks how they are coping with these risks. From the marketing perspective, however, the current marketing system for maize in India is highly fragmented and lacks modern and innovative practices, resulting in inefficiencies that require urgent reforms.

The traditional marketing channels for maize in India, particularly the Agricultural Produce Marketing Committee system, have some inefficiencies and weaknesses. Local aggregators generally bring the maize to APMC mandis, where commission agents-cum-wholesalers buy the produce. Traders with connections to feed manufacturers and other industrial users then purchase the commodity from the commission agents through local traders. The farmers have a limited role in the price discovery process. The market forces, such as commission agents and traders or brokers, play a significant role in determining the price of maize (CACP 2022). Due to small landholdings, mostly maize farmers cannot participate in direct marketing channels. The situation like Bihar, a major rabi-maize producing state,

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is particularly challenging since the APMC system was dismantled, resulting in a lack of trade regulations and an increase in intermediaries (GoB, 2016). Small and marginal farmers sell their produce directly to village traders, while medium and large farmers sell their produce to traders in mandis. The efficiency of marketing is inconsistent across different states when measured in terms of farmers' share in consumer rupee and spatial integration.

The alternative marketing channels like Future trading, e-NAM, e-NWR and direct marketing through FPOs are not widely used by maize farmers. Currently, most of the maize trading in major producing states through e-NAM is limited to within state trading. Bihar, where the APMC system is dismantled, and Karnataka, which has its own ReMS, are two crucial maize-producing states that are not part of e-NAM. One of the challenges farmers faces when accessing the e-NAM platform is that they must physically transport their commodity to the APMC mandi for sale. The banks have not been providing credit against e-NWRs, depriving farmers of much-needed capital. The paper suggests promoting FPOs as a means of providing small landholding maize producers with some bargaining power so that they can sell their produce directly to traders, processors, or feed millers. Most of the maize farmers are unable to engage in direct selling with national-level traders who have connections with feed makers and maize processors.

Futures market is a crucial tool for hedging against price risk. Future markets performed two main functions viz to mitigate price risk and to discover the price for commodities which are the foremost problems confronted by the farmers in India. In a bumper crop year, when farmers across the country have been battered by lower crop prices, future contracts can be used to hedge against price dips during the harvest season (Bera 2017). Thus, with the help of continuous flow of information, prices are discovered in the commodity future market. However, India's traded volume of maize (970 tons in 2019-20) is significantly lower than the volumes achieved at the two major commodity futures markets worldwide: CBOT and the Dalian Commodity Exchange. With this background, the present study was conducted to glisten the importance of price discovery mechanism with future trading and hedging price risk of maize and also to analyze the maize marketing channels which are having inefficiencies and to develop future outlook to get maize markets on track.

Data Sources and Methodology

The investigation is based on validated secondary data. To gain further insight into the marketing of maize. The study used online open sources of data from the Statistical Database of India, NCDEX, APEDA, Agmarknet, Agriculture Statistics at a Glance, Directorate of Economics and Statistics, Ministry of Agriculture and Farmer's Welfare. The study obtained suggestions and information on the marketing of maize from marketing experts through telephonic interviews. Top maize producing states of India were selected (Karnataka, Madhya Pradesh, Maharashtra, Bihar, Uttar Pradesh) on the basis of highest production. The area, production and productivity of maize were gathered from the agricultural statistics at glance from the period 1950-51 to 2021-22 for the analysis.

To measure seasonal fluctuations, the study calculated seasonal indices (SI) using the ratio to moving average approach over a twelve-month period. A correction factor was used to ensure that the sum of seasonal indices equaled 1200. The degree of intra-year/seasonal price fluctuations was estimated using the coefficient of average seasonal price variation (ASPV), the extent of intra-year price rise (IPR), and the coefficient of variation (CV). Mini tab programs and E-view software were utilized for the analytical part.

Ratio to Moving Average Method for Seasonal Index for Price and Arrivals:

$$\text{Ratio to 12-month Moving Average} = \frac{\text{Original Value}}{\text{CMA}} \times 100$$

Intra-year Price Rise (IPR):

$$IPR = \left[\frac{HSI-LSI}{LSI}\right] \times 100$$

Average Seasonal Price Variation (ASPV):

$$ASPV = \left[\frac{HSPI-LSPI}{(HSPI+LSPI)/2}\right] \times 100$$

{HSPI = Highest Seasonal Price Index and LSPI = Lowest Seasonal Price Index}

Coefficient of Variation

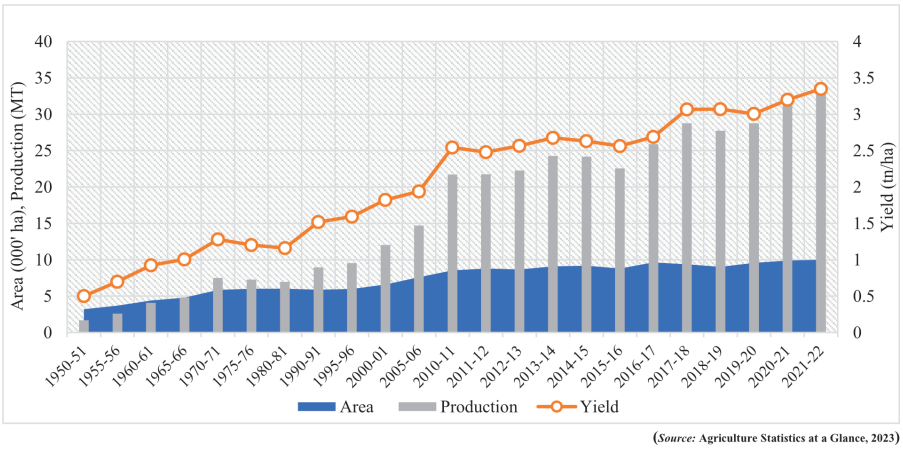
$$CV(\%) = \frac{\hat{\sigma}}{\bar{S}} \times 100$$

{$\hat{\sigma}$ =Standard deviation and $\bar{S}$ =arithmetic mean}

Results and Discussion

Area, Production and Yield of Maize in India (1950-2022)

Maize production in India has seen a significant increase over the years from 1.7 million tons during 1950-51, 12 million tons during 2000-01 to 33.6 million tons during 2021-22 (Figure 1). Moreover, the area under maize cultivation has also increased from 3.2 million ha to 9.3 million ha, and the yield has increased from 0.5 tonnes per ha to 2.8 tonnes per hectares during the period 1950-51 to 2021-22. The maize production has increase with a compound annual growth rate of 4.3 per cent due to the increase in adoption of high-yielding single cross-hybrid seeds, acreage expansion in non-traditional states, and incentives like high MSPs being the driving forces behind this growth. The rising demand for poultry and starch has further increase the demand for maize in India.



(*Source:* Agriculture Statistics at a Glance, 2023)

Fig. 1. Area, Production and Yield of Maize, India, 2021-22

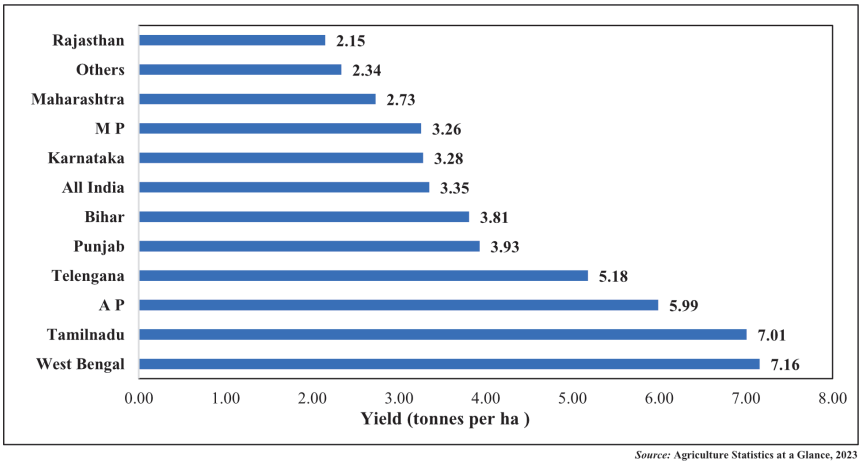
In the years 2017-18 to 2020-21, the maize production has declined from 28.8 MT in 2017-18 to 27.7 MT in 2020-21 due to the emergence of fall Armyworm (FAW), a pest that has been threatening maize production since it first appeared in Karnataka in July 2018. The fall Armyworm (FAW) is an invasive pest that has caused significant damage to maize crop. To address this issue, ICRISAT recommends effective monitoring, bio-pesticides, and Integrated Pest Management (IPM) promoted by CIMMYT, along with BT maize. (Padhee & Prasanna, 2019).

Selected States of India According to Maize Yield, 2021-22

It is interesting to note that while India's average maize productivity stands at 2.8 tonnes per ha, there is a significant variation in the yields among major maize-producing states as shown in figure 2. The yields of the two states that produce the most maize i.e., Karnataka (2.7 t/ha) and Madhya Pradesh (2.5 t/ha), were lower than the national average (2.8 t/ha). In contrast to Andhra Pradesh (6.5 t/ha) and Tamil Nadu (6t/ha) recorded the highest yield than the national average respectively. Bihar, a major producer of Rabi maize, recorded yield of 3.6 tonnes per hectares, exceeding the national average. It should be noted that despite the maize yield in Punjab being only marginally higher than the national average, the crop is gaining significance in the state. This is not solely due to its corn yield, but also because of its vegetative yield, that is used for fodder and silage directly. The availability of maize fodder in the form of silage throughout the year is a new trend in Punjab.

Utilization Pattern of Maize

Maize is indeed a versatile crop with various uses in food, feed, and energy. It is widely distributed and grown in diverse seasons and ecologies. In fact, no other cereal is used in as many ways as maize. Out of total maize produced worldwide, around 54 per cent, is used as feed, mainly for poultry and cattle. Another 33 per cent is used for food,



Source: Agriculture Statistics at a Glance, 2023

Fig.2. Yield pattern of selected states of Maize in India, 2021-22

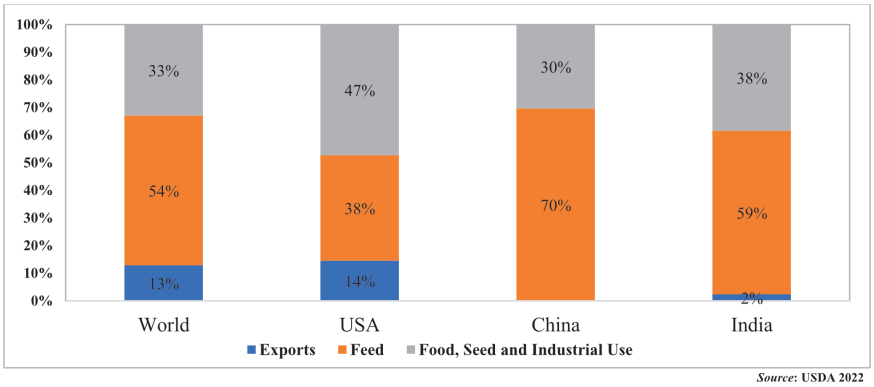


Fig. 3. Global Utilization Pattern of maize

seed, and industrial use as basic raw material for several industries, including starch, ethanol, oil, alcoholic beverages, food sweeteners, pharma and cosmetics. Around 13 per cent of maize is used for exports purposes (Obie 2017). While the aforementioned rough shares are indicative of the global average, it's important to note that the usage of maize varies greatly across different countries and regions. For instance, in African countries, maize is primarily used as a staple food, playing a crucial role in local diets. In contrast to other countries like China and India, maize is predominantly used as poultry and animal feed, making up around 70 per cent and 59 per cent of its usage respectively. In a country like USA, there has been a significant increase in corn usage for ethanol production, leading to the ongoing debate regarding the trade-offs between food and fuel production (USDA (2020). Figure 3 clearly indicates that India exports only 2 per cent of its maize produce, primarily due to its large domestic consumption. Out of the the total consumption, 38 per cent is used for food and industrial purposes, while the majority of the consumption, which constitutes around 59 per cent, is used for feed purposes.

Marketing Pattern of Maize Produce in India

The maize marketing system in India involves several stakeholders, including farmers, local aggregators, commission agents, traders, feed millers or manufacturers, and starch units or processors. The poultry industry is also a major player in maize marketing as it drives the demand for the commodity. The current marketing system is inefficient and lacks modern and innovative practices, making it difficult for farmers to get fair prices for their produce. This is because of number of intermediaries which are engaged in marketing of maize. However, it is imperative to note that the cultivation of maize is a cash crop and farmers must establish linkages with commission agents at local mandis prior to cultivation. These agents provide necessary support to farmers in purchasing quality seeds and inputs. The majority of farmers engaged in maize cultivation in India have small land holdings. Typically, intermediaries at the village or field level act as aggregators and bring the produce to the APMC or local mandis. Commission agents purchase maize based on quality, with moisture content affecting prices. Mandis lacks an open bidding system, and prices are determined by commission agents and big traders.

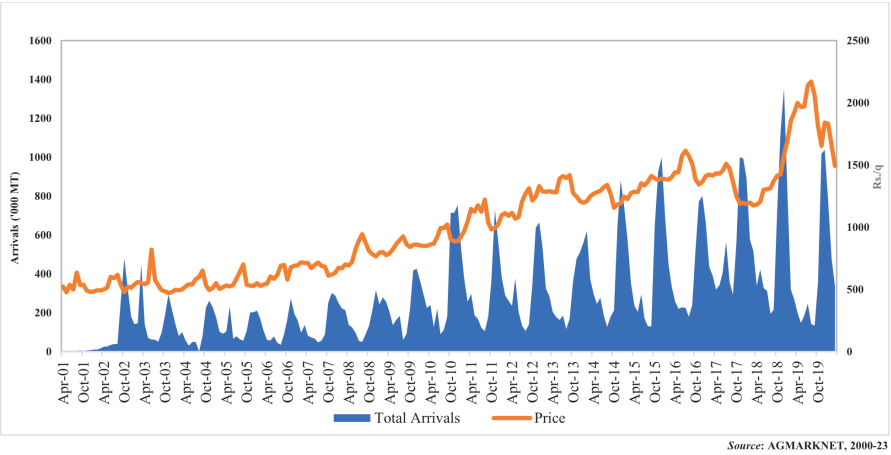


Fig. 4. Total Arrivals and Average Price of Maize through APMCs, 2021-22

Marketing Through Agricultural Produce Market Committee (APMC)

Except for Bihar, where the APMC structure has been dismantled, the sale or procurement of maize from farmers mainly takes place through APMC mandis located in key producing states. Under the National Food Security Act (NFSA, 2023), coarse cereals such as Jowar, Bajra, Maize, and Ragi, along with rice and wheat, are included. This highlights the importance of coarse cereals in ensuring food security and the need for efficient marketing channels for their procurement and distribution. The Food Corporation of India (FCI) primarily procures rice and wheat from farmers through its Minimum Support Price (MSP) operations. However, FCI has only purchased maize in Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Chhattisgarh, and Bihar during the 2013-14 season to provide MSP support to farmers. Since then, FCI has not carried out small purchase on MSP for maize farmers.

The volume of maize procurement by FCI has been significantly smaller in comparison to the total production. This indicates the need for better support mechanisms to ensure fair prices for maize farmers. Several state governments, including Andhra Pradesh, Telangana, and Karnataka, have been conducting maize procurement operations whenever the prices in APMC mandis fell below MSP. In fact, in 2013, Andhra Pradesh, MARKFED had developed an end-to-end business model in collaboration with village self-help groups (SHGs) to procure maize for the poultry industry's use. This highlights the importance of state-level initiatives to support maize farmers and ensure fair prices for their produce (Reddy, 2013).

Figure 4 represents the total arrivals and prices of maize through APMC are reported by Agmarknet since April 2001, shows that arrivals tend to peak twice each year. The higher peak, around October-November, is for Kharif maize, while the smaller peak during April is for rabi maize. These higher peaks during harvesting months suggest that farmers tend to rush to the mandis to sell their produce just after harvest, ultimately receiving a lower price for their produce. This highlights the need for better marketing channels and price discovery mechanisms to ensure fair prices for farmers. Farmers usually do not have much say in the marketing of their produce, as they bring their maize to APMC mandis where the middlemen, known as arthiyas, buy their produce. These arhtiyas then supply the maize to local traders, who in turn sell it to feed companies or brokers across the country. The brokers play a crucial role in connecting the farmers with the poultry feed manufacturers, as poultry feed is the largest consumer of maize produced in India. As a result, the demand for poultry products determines the maize price in the mandis.

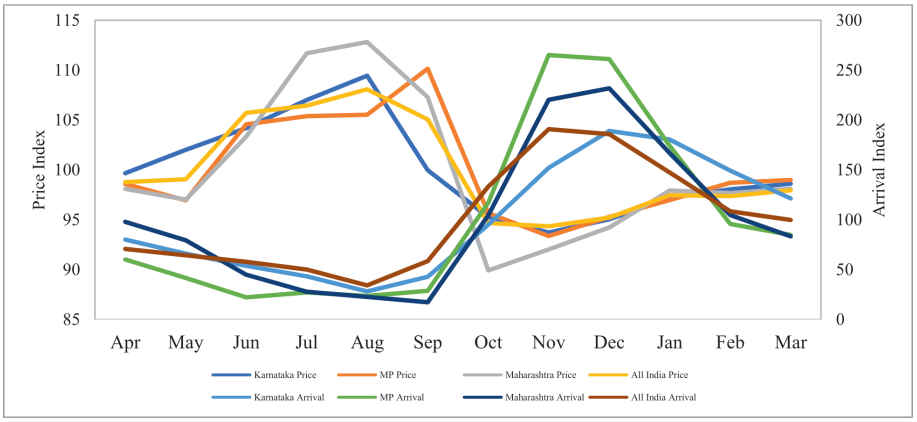
Estimating Seasonal Index of Prices and Arrivals

The seasonal index of monthly prices and arrivals for maize have been calculated using the ratio to moving average method (Fig. 5). This was done to estimate the pattern that maize prices and arrivals follow due to seasonality. The study used month-wise prices and arrivals data from April 2000 to March 2020 (20 years) and calculated the indices using 12-year moving averages. The resulting monthly seasonal index of price and arrivals have been presented in figure 6.

There is an inverse relationship between arrivals and price and arrivals do impact the prices for both commodities. The price and arrival indices form a scissor-like curve. In general, maize prices were highest during August. However, in the case of Madhya Pradesh, prices were highest during September. Interestingly, these two months also had the lowest arrivals. It is noted that after this period the Kharif maize is harvested when arrivals are at their peak and prices are at their lowest.

Seasonal Variation of Price Index for Maize

The seasonal variations in the price index for maize were estimated using three measures of variation, namely Intra-year Price Rise (IPR), Average Seasonal Price Variation



Source: Calculation using data from Agmarknet

Fig. 5. Seasonal Index of Maize Prices and Arrivals, 2021-22

Table 1. Variations in Seasonal Price Index for Maize

States	Variation in Seasonal Price Index (%)		
	Intra-year Price Rise (IPR)	Average Seasonal Price Variation (ASPV)	Coefficient of Variation (CV)
Andhra Pradesh	24.4	27.8	8.8
Karnataka	15.5	16.8	4.9
Madhya Pradesh	16.5	18.0	5.2
Maharashtra	22.6	25.5	7.3
Tamil Nadu	17.7	19.4	4.8
Telangana	15.0	16.2	3.8
All India	13.6	14.6	4.9

(ASPV), and Coefficient of Variation (CV). The results have been presented in table 1, which highlights that Andhra Pradesh (24.4%) had the highest IPR, followed by Maharashtra (22.6%) and Tamil Nadu (17.7%) which is above the national average (13.6%). Similar results were found for ASPV for all the selected states for maize.

The coefficient of variation in the seasonal price index for maize clearly demonstrates the significant impact of arrivals on market prices and the consequent price variation. The study unambiguously found that Andhra Pradesh (8.8%) had the highest coefficient of variation followed by Maharashtra (7.3%) and Madhya Pradesh (5.2%) while Telangana (3.8%) had the lowest followed by Tamil Nadu (4.8%). This unequivocally underscores the urgent need for farmers to align their supply with market requirements during high seasonal price indexes. Furthermore, there is an imperative need for farmers, feed manufacturers, and starch industry to hedge maize to mitigate this price risk. This can be accomplished by actively participating in the futures market and leveraging electronic warehouse receipt systems to avoid selling during peak arrival periods.

Analysis of Price Risk of Maize and Other Commodities

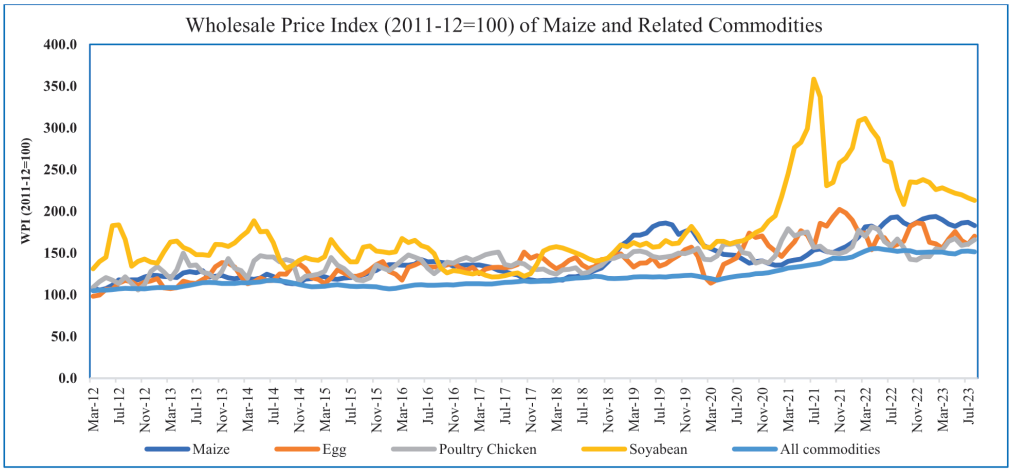
The seasonal nature of maize production makes maize prices highly volatile. This volatility can be attributed to various factors such as changes in production levels due to pest attacks, planting decisions by farmers based on previous profitability, government policies, changing demand patterns of poultry products, starch industries, trade policies, and international prices of maize. The wholesale price index of maize reveals that maize prices follow a similar pattern as poultry chicken and egg prices, as shown in Figure 6. Among all the plotted commodities, maize has the highest volatility with a coefficient of variation of 43.3 per cent, compared to egg (37.1 per cent), chicken (25.3 per cent), and its competing crop, Soybean (41.7 per cent). This high volatility not only affects farmers' earnings but also large consumers of maize such as the poultry, starch, and food industries. Therefore, producing or consuming maize comes with a price risk that requires hedging to contain the risk. This is why maize is among the popular commodities where futures trading is done worldwide, including India.

Poultry industry influenced the price of maize at great extent. The poultry industry in India generally operates on a credit range of 7-15 days. Hatcheries typically place their orders with feed makers about two weeks in advance. These feed makers, in turn, source maize and other ingredients through brokers based on the projected demand from the poultry industry. Brokers, through their network, source maize from multiple locations based on the cost quoted by local traders or arhtiyas, depending on their personal

Estimating Farmer's Share in Consumer Rupee

The wholesale prices from Agmarknet and retail prices from the Directorate of Economics and Statistics (DES), Ministry of Agriculture and Farmer's Welfare were used to estimate farmer's share in the consumer rupee. The wholesale price released by DES was used since data from Agmarknet was not available for a state like Bihar. The largest mandis wholesale prices were considered, while the largest consuming centers, the retail prices were taken from major maize-producing states. These prices are weighted averages based on seasonal production shares for the peak harvesting months.

Table 2 in the study provides an estimation of the share of wholesale price in the producing markets to retail price in the consumption center for the top five maize-producing states for the year 2022-23 are presented in Table 2. The study found that the lowest share was observed for Karnataka (52.19%), followed by Maharashtra (54.95%). Medium shares were recorded for Madhya Pradesh (79.27%) and Telangana (87.86%). The highest share was observed for Bihar (87.96%). The majority of small and marginal farmers sell their produce to village traders without going to mandis, and the price they receive may be significantly lower than the price paid by wholesalers.



Source: OEA (Office of the Economic Adviser), Ministry of Commerce and Industry, Government of India, 2022

Fig.6. Wholesale Price Index of Maize and Related Commodities, 2012-23

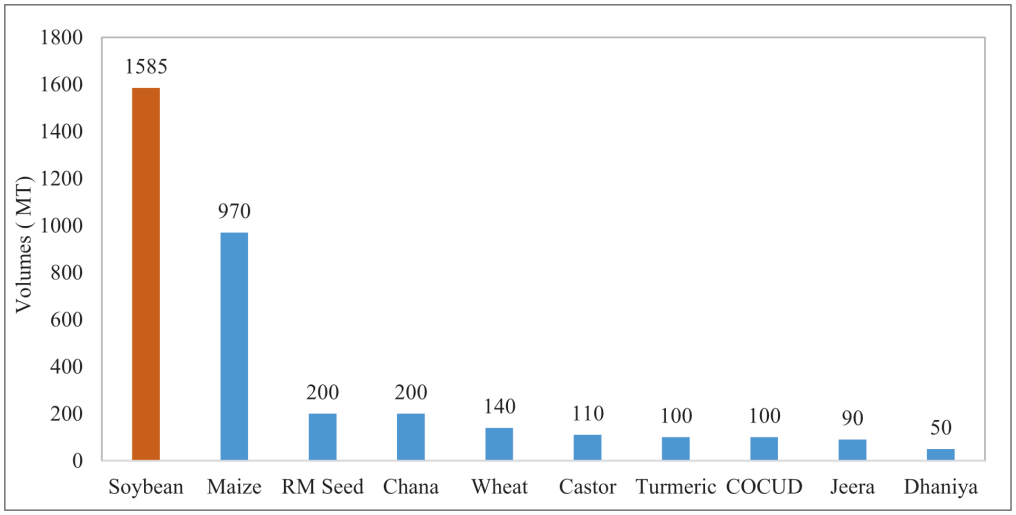
How to Hedge Price Risk and Fix Market Inefficiencies

The maize future marketing is a best alternative to the traditional marketing system (APMC). The introduction of the commodity derivatives market, including maize, by the Government of India in 2003 has made maize an important commodity in derivatives exchanges (NCDEX, 2023). Maize offers several advantages over other agricultural commodities in the derivatives market, such as less government control and regulation, longer shelf life, ease of standardization and gradation, and high demand in the non-food sector. Despite these advantages, the volume of futures trade in maize on platforms like NCDEX has not picked up pace due to the mandatory advance payment for the commodity. According to maize brokers, the poultry industry is not cash rich and hence depends on supplies in credit. Currently, the National Commodity & Derivatives Exchange Limited (NCDEX) and Multi Commodity Exchange (MCX) are the major exchanges in India that offer futures contracts on feed or industrial-grade maize on their platform. The delivery centres for NCDEX Maize contracts are Nizamabad, Andhra Pradesh (for kharif maize) and Gulab Bagh, Bihar (for rabi maize) which spread

Table 2. Price Spread of maize, 2022-23

States	Price	Producing Market/ Consuming Centre	2018-19	2019-20	2020-21	2021-22	2022-23
Karnataka	Wholesale	Davangere	1381	1971	1554	2050	2057
	Retail Price	Bangalore	2786	2964	3222	3425	3941
	Wholesale price as a share of retail price (%)		49.57	66.50	48.23	59.85	52.19
Madhya Pradesh	Wholesale	Chhindwara	1336	1662	1415	1661	2114
	Retail Price	Bhopal	2125	2225	2117	2075	2667
	Wholesale price as a share of retail price (%)		62.87	74.70	66.84	80.05	79.27
Maharashtra	Wholesale	Nashik	1427	1753	1441	1642	2070
	Retail Price	Mumbai	3700	3300	3133	3617	3767
	Wholesale price as a share of retail price (%)		38.57	53.12	45.99	45.40	54.95
Bihar	Wholesale	Muzaffarpur	1438	1782	1592	2080	2345
	Retail Price	Patna	2000	2325	2128	2150	2666
	Wholesale price as a share of retail price (%)		71.90	76.65	74.81	96.74	87.96
Telangana	Wholesale	Nizamabad	1444	1933	1540	1554	1852
	Retail Price	Hyderabad	2363	2935	2448	2033	2108
	Wholesale price as a share of retail price (%)		61.11	65.86	62.91	76.44	87.86

Source: Authors' calculation using data from Agmarknet and DES (2022-23)



Source: National Commodities and Derivatives Exchange (NCDEX)

Fig.7. Commodities traded at NCDEX during 2021-22

in an area of 68 acres (Kumar, 2020). Maize has been the largest commodity traded at NCDEX since April 2016, followed by soybean, out of all agricultural commodities traded at the exchange (figure 7).

During 2019-20, soybean was the most traded commodity at NCDEX, with 1585 MT of soybean traded out of a total of 3545 MT of commodities traded at the exchange during the year, followed by maize at 970 mt. To ensure that farmers are provided with remunerative prices, NCDEX launched the Gulab Bagh maize contract in 2013. Marketing of the commodity remained a challenge in Bihar, which produces rabi (winter) maize, as most of the consumption or processing areas were far away from the state, and small farmers could not be aggregators of the maize before bringing the produce to the mandi. In January 2020, NCDEX announced that the maize future contract during the months April-September period would be based on ex-warehouse Gulab Bagh, and the contract during October-March would be based on ex-warehouse Nizamabad, exclusive of GST. In Bihar, farmers have formed self-help groups or FPOs for marketing their maize produce due to the absence of marketing infrastructure. Over the past four years, NCDEX has partnered with Jeevika and Techno Serve to raise awareness regarding maize futures as an alternative channel for marketing. This has helped small farmers to hedge maize prices and mitigate price risk. Farmers are trained on quality assessment, grading, sorting of maize, and informed about prevailing and expected prices. Most of the trade in maize is carried out through local traders and arhtiyas in APMC, with farmers opting to sell their produce to them as they provide cash. Futures trade in maize is yet to expand, and farmers do not participate due to their lack of financial bandwidth. Traders with financial backing participate in futures trade.

Conclusion and Policy Implications

The findings of the study concluded that the area, production and productivity of maize has increased tremendously over the years 1950-51 to 2021-22 due the increase in adoption of high yielding single cross hybrid seeds and an incentive like high MSP's being the driving forces behind the growth. Karnataka and Madhya Pradesh recorded lower yield whereas Andhra Pradesh and Tamil Nadu recorded higher yield than national average. Punjab being only marginally higher than the national average in maize yields due its gaining popularity in fodder and silage directly. It should also be noted that 13 per cent of the maize production is being exported worldwide whereas; India exports only two per cent of the maize produce. The seasonal variation index also showed that Andhra Pradesh had highest IPR followed by Madhya Pradesh and Tamil Nadu. Maize has the highest volatility with a coefficient of variation of 43.3 per cent, compared to egg (37.1 per cent), chicken (25.3 per cent), and its competing crop, Soybean (41.7 per cent). This high volatility not only affects farmers' earnings but also large consumers of maize such as the poultry, starch, and food industries. The price spread of maize i.e., wholesale and retail prices were considered to see the marketing channel of maize and found that the lowest share was observed for Karnataka (52.19%), followed by Maharashtra (54.95%). Medium shares were recorded for Madhya Pradesh (79.27%) and Telangana (87.86%). The highest share was observed for Bihar (87.96%). The study recommended an efficient marketing system for maize by revamping the APMC system through the adoption of the model APMC Act, 2017, ensuring FPOs' participation in marketing and contract farming. The e-NAM and ReMS platforms should be integrated seamlessly to enable farmers

to benefit from the price discovery mechanism. More APMCs across key producing states should join the e-NAM platform for better price realization. The integration process of e-NWR and e-NAM must be expedited across states, and the model Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017, may be adopted by key producing states, allowing FPOs to bypass the APMC structure.

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