

## Introduction

Indian tomato prices tripled in the month of July 2023 from around ₹30 per kg in the month of June 2023 to ₹109 per kg in the retail market by the end of July 2023. There have been news of few farmers turning millionaire in past few days in Maharashtra.

Indian tomato prices are making global headlines and are spelling trouble for millions while also bringing windfall gains for many. In the month of June 2023, inflation in **tomato** was **64.46% (month-on-month)**. The other side of the coin has been the crash in the prices of tomato in some months causing distress to farmers, even forcing some farmers to dump their tomato produce in the fields. *The question here arises that why same crop is bringing joy to many and distress to others.*

**The answer lies in the very nature of this crop-high perishability, short duration crop and inability to store the crop for long (due to high perishability), and production concentration in few states.**

Such nature renders tomato crop to higher price volatility compared to any other vegetable crop. In fact, tomato has higher inflation volatility<sup>1</sup> (43.6%) in comparison to the volatility witnessed in sub-group of vegetables (16.5%) in the CPI basket.

This necessitates the study of production, market dynamics and middlemen's margin in the price of tomato.

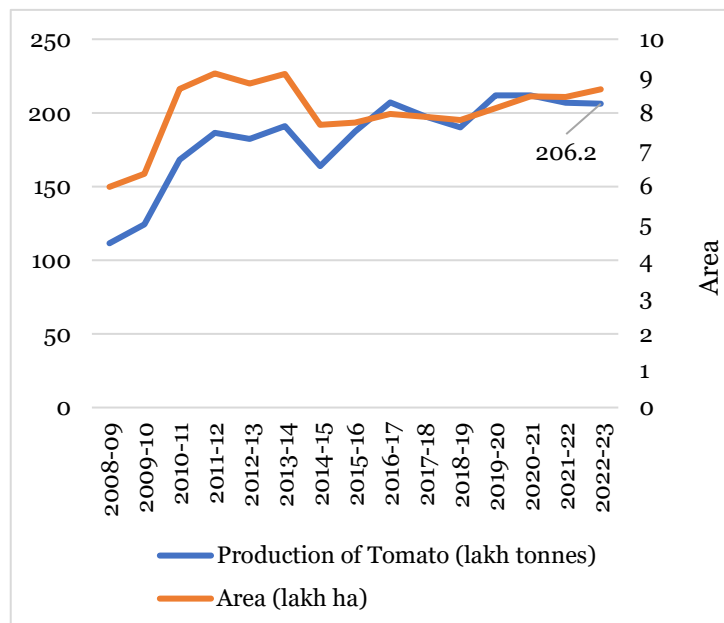
## 1. Area and Production:

The production data shows that tomato production have moderated by 0.35% from 206.9 lakh tonnes in 2021-22 to 206.2 lakh tonnes in 2022-23. It has fallen by -2.3% during 2021-22 after remaining stagnant during 2020-21 and increasing by 11.5% in the year 2019-20 (Figure 1). Production from 2008-09 to 2022-23 has increased at the Compound Annual Growth rate (CAGR) of 1.11%.

The fall in production in 2022-23 is driven by the fall in production in major states like Gujarat (-23.9%), Tamil Nadu (-26.10%) and Chhattisgarh (-19.7%). Gujarat had deficient rainfall in the previous season and Tamil Nadu and Chhattisgarh have been witnessing fall in a year followed by increase in production in next year. This speaks of a cobb-web phenomenon. Similar trends are noticeable in other

major tomato producing states like Andhra Pradesh, Bihar, and Karnataka (Table 1).

**Figure 1: Trends in area and production of tomato**



Source: Final Estimates from 2008-09 to 2021-22 and First Advance Estimates of Area and Production of Horticulture Crops, 2022-23, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India.

**Table 1: Major tomato producing states and growth in production in past three years (%)**

State	Share in production (%) in 2022-23	Growth (YoY) (%)		
		2020-21	2021-22	2022-23 1AE
Madhya Pradesh	13.40	9.70	-8.00	0.10
Karnataka	12.60	-24.20	1.30	23.10
Andhra Pradesh	11.30	-12.80	-6.00	1.50
Gujarat	7.20	11.10	23.70	-23.90
Odisha	7.00	18.70	-20	25.20
West Bengal	6.10	1.10	-2	0.00
Maharashtra	6.00	14.40	4.50	-1.20
Tamil Nadu	5.80	-8.80	11.70	-26.10
Bihar	5.40	20.50	-13.30	11.20
Chhattisgarh	4.80	-5.00	8.20	-19.70
Others	20.4	4.88	-7.98	3.79
All-India	100	0.00	-2.30	-0.35

Source: NABARD estimate from data provided by Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India.

<sup>1</sup> Volatility has been calculated using standard deviation formula on monthly inflation data

## 2. Causes for Extreme Price Movement

### a. Tomato price shock more of a seasonal phenomenon

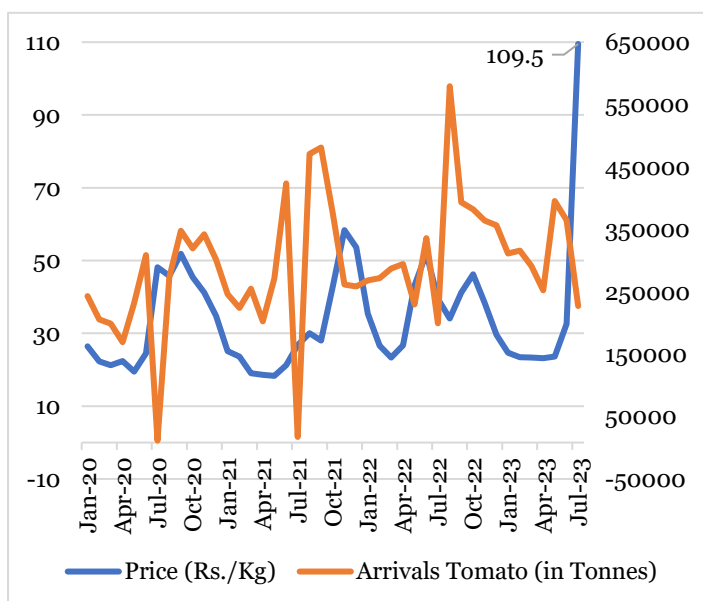
Tomato prices are the highest during the months of July to August as this is the lean production period. December to March is the period when tomato prices are trading at their lowest (Figure 2). Tomato price crashes in one season and are at its peak in next season of harvesting. This has been a regular phenomenon in India. It is a *short-term crop (2-3 months)* with transplanting taking place in different regions multiple times in a year (Table 2). Hence, we witness such episodes of price crash and peak more than once in a

**Table 2: Details of transplanting and harvesting period in each producing region**

Region	Transplanting	Harvesting Period
Southern & Western States	A-June- July	A- August - September
	B-October - November	B- December - February
	C-January- February	C-March - June
Northern & Eastern States	A- October- November	A- January - March
	B- January - February	B- March - June
Hilly States	A- May- June	A- July - September
	B-October - November	B-December - March

Source: Monthly Report Tomato (October 2018) Horticulture Statistics Division, Ministry of Agriculture & Farmers Welfare, GoI.

**Figure 2: Trends in market arrival and retail price**



Source: Agmarknet

The price line in Figure 2 is a water image of tomato arrival line with every peak accompanying a low point in

year. For example: *Tomato's inflation on m-o-m basis was negative (-24.42%) in December 2022 and subsequently stands at 64.5% in June 2023.*

Tomato crop suffers from double whammy of being a short duration crop of 2-3 months (Table 2) as well as being a perishable crop. **As this crop cannot be stored, unless in processed form, farmers have to sell off their crop immediately after the harvesting leading to glut and resultant price crash. This leads to lower transplantation in the next season resulting in price hike.**

market arrival. The figure 2 showcases same peak in prices in the month of July every year accompanied by fall in arrivals during the same month. *Such fluctuation in production within an agricultural year ensures stagnant or minimal change in production y-o-y.*

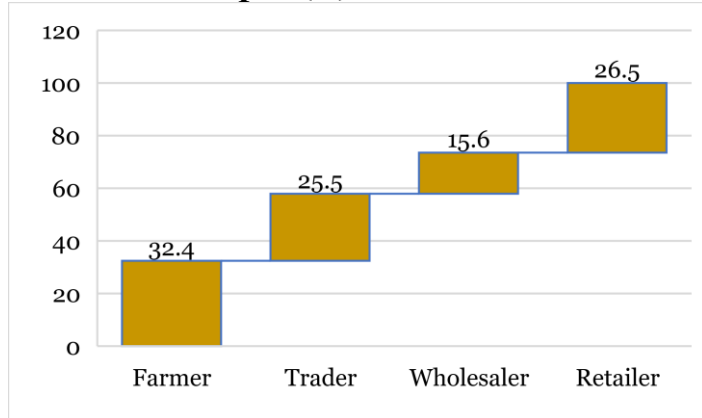
### b. Inefficient market adding to woes

An imperfect market structure and inefficient value chain for vegetables often lead to volatility in domestic prices as there is high market intermediation between the farmer and the end consumer. The costs incurred and margins earned by these intermediaries inflate the prices.

As opposed to intermediaries, farmers have rarely benefitted from increased production. This is exacerbating the price volatility in tomatoes and causing distress to consumers during high price situation.

For tomato, farmers' share in price paid by consumer is very low. As per a research study in the Azadpur Mandi of Delhi, farmers' share is as low as 32.4% in a rupee by consumers (Ashok Gulati, Kavary Ganguly and Harsh Wardhan, 2021) (Figure 3).

**Figure 3: Share of different players in Consumer's Rupee (%)**



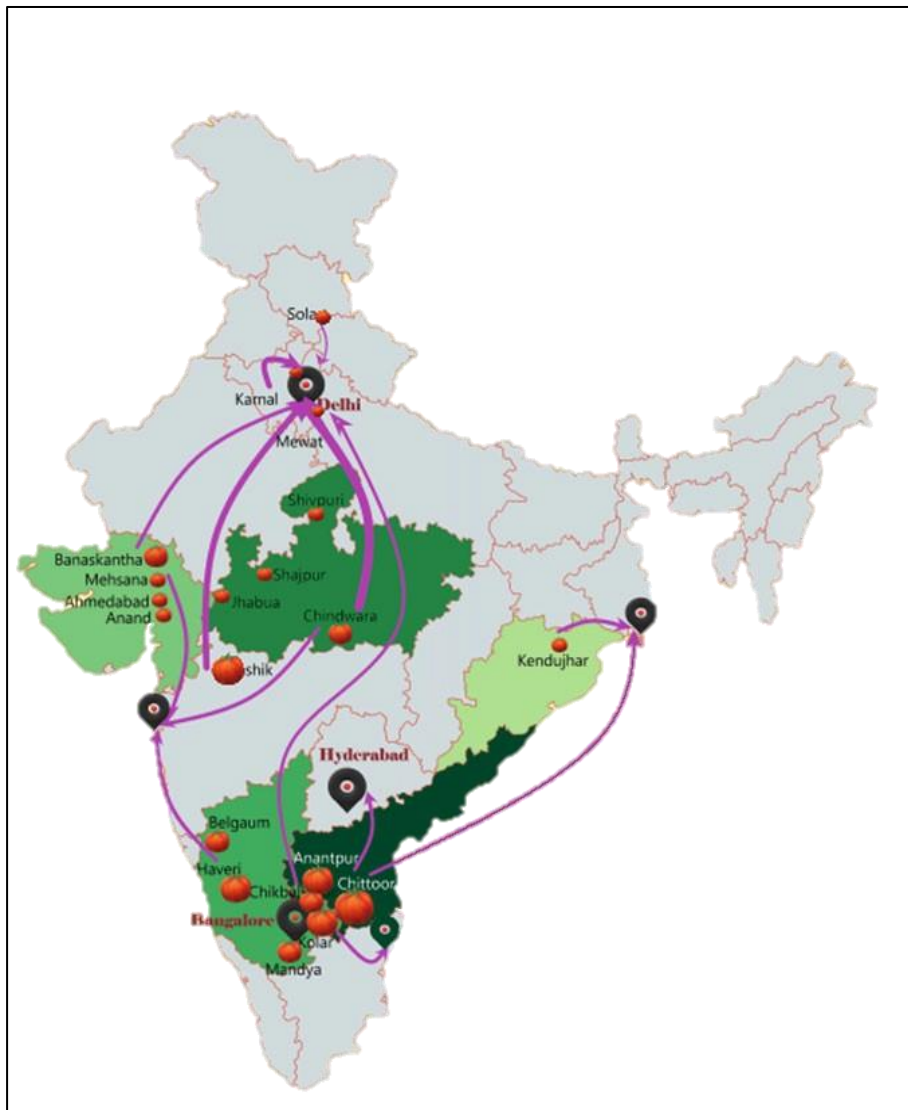
Source: Agricultural Value Chains in India, Ashok Gulati, Kavery Ganguly and Harsh Wardhan, 2021

### c. Regionally Concentrated Production

For tomato, only few surplus states supply the crop to metropolitan cities (Figure 4). Regional concentration of production of tomato and consumption throughout the country leads to extreme volatility in prices. The need to transport these perishable commodities from surplus to deficient regions escalates the costs further.

For example: In Delhi's Azadpur mandi, tomatoes are supplied from different parts of the country. Major supplying states include Maharashtra, Karnataka, Himachal Pradesh, Madhya Pradesh, besides adjoining regions in Haryana, Rajasthan and Uttar Pradesh. From here on, tomatoes are supplied to different consumption centre. ***This production and consumption chain further escalates the prices.***

**Figure 4: Major production and consumption centres for tomatoes in India**



Source: Agricultural Value Chains in India, Ashok Gulati, Kavery Ganguly and Harsh Wardhan, 2021

### 3. The Current Crises

Currently, the prices of tomato in the retail market is at high of past 3 years (Figure 2). The prices have increased further in the last week of July and the first week of August 2023 (Table 3). Price on 10<sup>th</sup> August 2023 was 304% higher in the wholesale market and 284% higher in retail market in comparison to prices a year ago. The roots of the tomato crisis go back to last

year's extreme weather in states such as Maharashtra and Karnataka, followed by damage to crops this year too. Hailstorm in March, April and May 2023 destroyed large swathes of tomato crop in Maharashtra which is a major supplier during the monsoon months. Similarly rains in Karnataka in last fortnight of July 2023 has further intensified the crises. Two major reasons behind the current crises are explained below:

**Table 3: Prices of Tomato in wholesale and retail market in past few days**

Particulars	10-08-2023	09-08-2023	01-08-2023	31-07-2023	30-07-2023	10-07-2023	10-08-2022
Wholesale Price (Rs./kg)	106.91	109.18	110.7	108.5	104.0	86.31	26.4
Retail (Rs./kg)	131.69	131.69	132.57	130.2	126.18	105.42	34.24

Source: Agmarknet

#### a. Erratic Weather Conditions

Part of the crop was destroyed when an early heat wave hit large parts of India from February to March 2023. Production has also remained low in the southern parts of the country and Maharashtra, due to the extreme heat in May and then unseasonal rainfall and hailstorms in June.

The unseasonal rain in May 2023 in major tomato producing states resulted in diminished tomato yields and damaged the crop in these areas. For instance, as per the data released by Ministry of Earth Sciences, rainfall for the month of May 2023 in the Eastern and Western Madhya Pradesh regions was in excess by 377% and 386% respectively, from the normal rainfall for the month. Saurashtra & Kutch, Gujarat Region, Rayalaseema, Coastal Andhra Pradesh & Yanam, South Interior Karnataka, and North Interior Karnataka also experienced precipitation that was significantly higher than average, at 764%, 233%, 68%, 63%, 36% and 18%, respectively from the normal for the month.

*Heavy rains in Karnataka's main growing hubs have damaged 70% of the crop that was sown in June and would be ready in August.*

#### b. Viruses hit Tomato Crop

In 2022, abrupt rainfall followed by extreme heat led to an explosion in the number of plant viruses transmitted by aphids that feed on tomato plants, especially in both Maharashtra and Karnataka states. For example, farmers in Maharashtra have said that attacks by the cucumber mosaic virus have impacted

their tomato crop, while growers in Karnataka and other South Indian states have attributed crop losses to the tomato mosaic virus. Tomato growers have reported a rise in these two viruses' invasion over the past three years, which has resulted in partial to complete crop losses. The local Agricultural Produce Market Committee (APMC) that received nearly 1.99 lakh tonnes of tomatoes in July last year for the period (01/07/2022 to 13/07/2022) has got just 0.95 lakh tonnes now for the same period this year.

### 4. Key to the solution

The lower the number of intermediaries in the value chain, less could be the mark-up which would help bring down the final price, thereby having a favourable impact on food inflation. Measures to strengthen the value chain are enlisted below:

- Private companies have done well in introducing different varieties of hybrid and disease-resistant seeds. However, in the absence of a strong intellectual property rights (IPR) regime, private companies find no incentive to further invest in seed research as copying of genetic material of seed developed after years of research by a company is very common in India. Hence, there is need to strengthen the IPR regime for tomato seeds.
- Indian tomato yields are very low as compared to yields in European countries. There is a need for large scale adoption of polyhouses to enhance the yield of Indian tomatoes. This will help create a continuous cycle of tomato crop, and also help protect crop from pest attacks. As polyhouse



construction is capital intensive, government can subsidise such investments for individual large and medium farmers, or small and marginal farmers through FPOs, who are willing to adopt this technology.

- iii. Tomato exports from India are very limited, despite India being the second- largest producer in the world. A high degree of pesticide residue in the vegetables makes it non-exportable in the world market and the exports remain limited to our neighbouring countries. Precision farming that allows farmers to improve their farming practices and harvest safe and quality produce, need to be encouraged and incentivized.
- iv. FPOs can be encouraged to set up small-scale processing plants to produce tomato pulp and puree to supply to large-scale ketchup manufacturing plants. This will ensure surplus production is sold by farmers at remunerative prices and they benefit from direct marketing opportunities.
- v. The monopoly of APMC can be tackled by allowing private mandis on PPP basis or by developing other marketing channels. This will give farmers a wider choice to sell their produce at remunerative prices as well as render APMC markets to become more competitive and improve their infrastructure and services.
- vi. Aggregation facilities for tomatoes should be done at farm-level itself with assaying, sorting and grading based on size, colour and texture and packaging with tinker proof bar codes for easy traceability.

### 5. Future Outlook

New crop arrivals are expected from Nashik district, Narayangaon and the Aurangabad belt in Maharashtra in August (Ministry of Consumer Affairs, Food & Public Distribution). However, with heavy rains lashing the other tomato growing states, farmers are expected to begin the sowing when the rains slow down. Thus, transplantation may happen in early August in most areas and harvesting will take at least 60 days from transplantation.

Therefore, *the prices are not expected to stabilise before the end of August and early September.*

### References:

Ashok Gulati, Kavary Ganguly, Harsh Wardhan (2021). Agricultural Value Chains in India: Ensuring Competitiveness, Inclusiveness, Sustainability, Scalability, and Improved Finance. Springer

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E-mail Id: [dear@nabard.org](mailto:dear@nabard.org)

Website: [www.nabard.org](http://www.nabard.org)