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The Journey of Tomato: From Poisonous Myths to a Global Staple

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Tomatoes, now an indispensable part of diets around the world, had a rather controversial beginning. Native to South America, they were once labeled as “poisonous apples” and thought to be foul-smelling fruits when introduced to Europe and India. This misconception arose due to a chemical reaction between tomato acidity and copper cookware, which released harmful substances. Over time, as cooking practices improved—particularly in New Jersey, USA—tomatoes gained popularity and gradually spread globally. Today, tomato cultivation holds immense global importance due to its nutritional value, economic potential, and widespread culinary use. Tomatoes are grown in over 170 countries and are among the most consumed vegetables worldwide. As of 2023–24, global tomato production stood at approximately 190 million tonnes. China leads the world in tomato output with about 68 million tonnes, followed by India, the United States, Turkey, and Egypt. These top producers benefit from large-scale farming practices, mechanized harvesting, research-driven hybrid seeds, and expanding agro-industrial infrastructure. Tomatoes are cultivated both in open fields and in protected environments like greenhouses, especially in regions with climate limitations. Major tomato-exporting countries such as the Netherlands, Mexico, and Spain have developed efficient supply chains and cold storage systems that support long-distance trade. With increasing global demand for processed tomato products and fresh produce, the crop continues to play a vital role in global food security, rural employment, and international trade (Table 1).

Table: 1. Details of Tomato-producing countries

Rank	Country	Production (Million Tons)	Area under Cultivation (Thousand Hectares)	Productivity (Tons per Hectare)	Key Production Regions	Popular Varieties/Notes
I	China	68	1500	45.3	Shandong, Henan, Jiangsu	High-yield hybrids, greenhouse farming
II	India	21	500	42	Madhya Pradesh, Odisha, Karnataka, Uttar Pradesh	Disease-resistant hybrids, ‘Ark Rakshak’, ‘Ark Shreshtha’

III	United States	14	190	73.7	California, Florida	Fresh market and processing varieties
IV	Turkey	13	450	28.9	Antalya, Mersin	Mostly field-grown, traditional varieties
V	Egypt	7	220	31.8	Nile Delta	Greenhouse and open-field production

Source: FAO, MA&FW; USDA and National Agricultural Statistics from respective countries (2022–2023)

In India, tomatoes were brought by Portuguese traders in the 15th century and later cultivated more widely under British colonial rule in the 16th century. Despite their growing presence, public skepticism persisted for centuries. It wasn't until 1938 that health advocates like Dr. Tara Chitle began promoting their nutritional value—highlighting their richness in vitamin C and iron. This gradually shifted public perception, and tomatoes started gaining acceptance across Indian households.

Today, tomatoes are valued not just for their flavor but also for their health benefits. They are rich in antioxidants, support heart and brain health, regulate blood pressure, and aid digestion. Their cultivation in India has expanded rapidly, and in the year 2023–24, the country produced approximately 21.32 million tonnes—ranking second globally after China, which leads with 68 million tonnes. Tomato farming plays a crucial role in India's agricultural landscape. Farmers typically grow between 5,000 to 10,000 plants per acre, depending on factors like variety, climate, and soil conditions. Major producing states include Madhya Pradesh, Odisha, Karnataka, West Bengal, Andhra Pradesh, Gujarat, and Tamil Nadu (see Table 2). These regions benefit from favorable agro-climatic conditions, advanced irrigation systems, and access to hybrid seeds that enhance productivity.

Table: 2. State-wise Tomato details of tomato production in India (2022–2023)

S. No.	State	Production (Lakh Tons)	Area (Thousand ha)	Yield (Tons/ha)	Major Production Areas and Varieties
1.	Madhya Pradesh	32	72	4.44	Bhopal, Indore; 'Ark Rakshak', 'Ark Shreshta'
2.	Odisha	27	62	4.35	Bhubaneswar, Cuttack; Local and hybrid varieties
3.	Karnataka	24	57	4.21	Bangalore, Mysore; High-production varieties
4.	West Bengal	22	52	4.23	Kolkata, Dadar; Hybrid varieties
5.	Andhra Pradesh	20	47	4.26	Vijayawada, Amaravati; Diverse varieties
6.	Uttar Pradesh	18	44	4.09	Lucknow, Varanasi; Disease-resistant and high-yield varieties
7.	Gujarat	16	42	3.81	Ahmedabad, Surat; Disease-resistant varieties
8.	Tamil Nadu	15	40	3.75	Chennai, Madurai; Long shelf-life varieties

Source: MA&FW; IIHR, Bengaluru

Significant research efforts are being led by the Indian Institute of Horticultural Research (IIHR) in Bengaluru. The institute has developed innovative tomato varieties tailored to local challenges. One such variety is 'Arka Rakshak', a hybrid known for its resistance to common diseases like bacterial wilt, leaf curl virus, and early blight. This variety is prized for its high yield and suitability for Indian farming conditions. Another important development is 'Arka Shreshta', which is engineered for longer shelf life—making it ideal for transportation and export, and helping reduce post-harvest losses caused by inadequate cold storage and logistics infrastructure.

With global demand rising, especially for processed tomato products, India is positioning itself as a competitive player in the international market. The development of disease-resistant, high-yield, and storage-friendly varieties is key to this ambition. Furthermore, government support, modern farming techniques, and awareness among farmers are driving improvements in both production and quality. From being misunderstood as a dangerous fruit to becoming a staple in kitchens worldwide, the tomato's journey is a remarkable one. Its transformation—from a feared "poisonous apple" to a vital agricultural commodity—is a testament to human innovation, scientific research, and cultural adaptation. As India continues to invest in tomato research and infrastructure, both domestic consumption and global exports are set to grow even further in the coming years.

Overview of Tomato Cultivation in India

In India, tomato cultivation is done successfully in almost all agricultural climates. Generally, it is a crop of warm climate. It is necessary to increase the standard and produce the product. Vegetable, organic gardens rich in soil and good water treatment are suitable for tomato cultivation. For tomato cultivation, its seeds are sown and tomato is cultivated in advance and planted in the field. Regular care, biological or chemical is used to train entrepreneurs. Apart from this, dampness, weeding, supporting the approved and maintaining the balance of nutrients are helpful in improving the stems. Tomato is also important from the economic point of view as well as profitable in the food industry (Table 3).

Table: 3. Key Aspects in tomato cultivation in table format

Topic	Description
Popular Varieties	Pant T-5 (1993), Pusa Rohini (1994), Naveen (2005), Arka Abha (BWR-1) (2002), Arka Rakshak (2011), US-440 (2010), Abhinav (2016), Saksham (2018), Arka Abhed (2019), Arka Samrat (2020), Pusa Shakti (2024), Pusa Tomato Hybrid 6 (2024), Bayer Greenhouse Hybrid (2025)
Soil and Sunlight Requirements	6–8 hours of daily direct sunlight is required. Fertile loamy soil, with a soil pH ranging from 6.0 to 6.8. The field was prepared by being plowed 2–3 times before cultivation of the crop.
Bowing and Transplanting	Seeds are first sown in a nursery to prepare the seedlings, which are then transplanted into the main field after about 25–30 days. In warm regions, sowing is done during June–July or October–November, while in cooler regions, it is done from March to June. During transplanting, a spacing of 45–60 cm between plants and 75–90 cm between rows should be maintained.
Irrigation	Regular irrigation, with careful avoidance of waterlogging; drip irrigation is best method
Manure and Fertilizer Management	20–25 tons of FYM or compost/ha for mixing in soil. Balanced dose of chemical fertilizers (SHC based) —100 kg N, 60 kg P, and 60 kg of K/ha. Half of the fertilizers are applied at transplanting, and the remaining half at flowering and fruiting stages
Staking and Weeding	Give support to tall varieties by bamboo or ropes; manual weeding or mulching is done 2–3 times. Major pests—fruit borers, whiteflies, and aphids—are controlled by organic methods using neem oil or chemical pesticides.
Major Pests & Control	Common diseases—leaf curl virus, blight, and wilt; control, -use of disease-resistant varieties, applying pesticides, and avoiding water logging.
Major Diseases & Disease Control	The crop matures in 60–85 days after transplanting, with harvesting done every 5–7 days when fruits are fully ripe (red); yield varies based on field conditions and care. For higher production, greenhouse cultivation is better, Give support to tall varieties by bamboo or ropes; manual weeding or mulching is done 2–3 times.
Crop Duration, Harvesting & Yield	Major pests—fruit borers, whiteflies, and aphids—are controlled by organic methods using neem oil or chemical pesticides, Common diseases—leaf curl virus, blight, and wilt; control-use of disease-resistant varieties, applying pesticides, and avoiding water logging
Storage Temperature and Packaging & Marketing	The crop matures in 60–85 days after transplanting, with harvesting done every 5–7 days when fruits are fully ripe (red); yield varies based on field conditions and care. For higher production, greenhouse cultivation is better

Industrial and Nutritional Uses of Tomato in Food Processing

Tomatoes are extensively used in the food processing industry due to their rich flavor, color, and nutritional value. Various products are made from tomatoes, including ketchup—a popular condiment made by cooking tomatoes with sugar, vinegar, and spices; tomato sauce, which adds flavor and moisture to many dishes; tomato paste, used in soups, sauces, and ready-to-eat meals; tomato juice, a nutrient-rich beverage; and canned tomatoes, which are preserved whole or chopped for long-term storage. Additionally, tomatoes are used in pharmaceutical and cosmetic industries because of their antioxidant properties. Thus, the tomato food processing industry generates employment and strengthens the economy (Table 4).

Table: 4. Industrial and Economic Importance of Tomato-Based Products

Category	Details	Quantity/Volume annually	Approximate Market/Impact Data
Processed Tomato Products	Ketchup: Popular condiment made by cooking tomatoes with sugar, vinegar, and spices.	3-4 million tons	Global market size: \$10 billion+ (2023 est.)
	Sauce: Used to add flavor and moisture in various dishes.	5-6 million tons	Widely consumed worldwide
	Paste: Concentrated product used in soups, sauces, and ready-to-eat meals.	~20-25% of total tomato production	Major processed tomato product
	Juice: Nutrient-rich beverage consumed for health benefits.	0.5-1 million tons	Market growing at ~5-7% CAGR
Canned Tomatoes	For long shelf life whole or chopped tomatoes were preserved in cans	2-3 million tons exported annually	Important export commodity
Pharmaceutical & Cosmetic	Medicines and beauty products were prepared from tomato extracts due to its antioxidant properties	Niche market quantities	Growing demand due to health trends
Economic Impact	Food processing industry generates employment and strengthens the economy.	Employs millions worldwide	Contributes billions USD to global economy

Conclusion

Tomatoes have come a long way from being misunderstood as poisonous fruits to becoming one of the most important and widely cultivated crops in the world. Their nutritional benefits, economic value, and versatility in the food industry make them essential to global food security and rural livelihoods. Countries like China and India lead in production, supported by advanced farming techniques, hybrid varieties, and government initiatives. In India, ongoing research and improved cultivation practices continue to boost yield and quality, while the food processing industry adds significant economic value. With increasing global demand, especially for processed tomato products, tomatoes will remain a key crop for farmers, traders, and consumers alike. Continued innovation, sustainable farming, and efficient supply chains will be crucial to meeting future challenges and ensuring tomatoes remain a staple in diets worldwide.